EFFECTS OF *LANTANA CAMARA* LEAF EXTRACT ON THE MORTALITY OF *MUSCA DOMESTICA* LARVAE .

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ABSTRACT

The common problem faced by society is the breeding of *Musca domestica* or housefly, especially in garbage bins containing rotting food. This situation most likely leads to health problems such as food poisoning, cholera and dysentery as the houseflies can transmit these diseases by acting as carriers of pathogens. Killing the houseflies at larval stage is the most effective way to prevent the problems from spreading. Extracts from certain plant parts were found to have larvicidal properties. It is also a pollution-free and environmentally safe method. On this basis, we aimed to investigate whether *Lantanacamara* leaf extract is applicable to the housefly larvae in a similar manner. *Lantana camara* is an evergreen shrub with characteristic odour which is found growing widely all over Malaysia. Methanol extract of*Lantana camara* leaves was tested using direct contact method on the housefly larvae to determine the mortality rate of the larvae. Our study showed that *Lantana camara* extract of concentration 0.04 g/ml exerted the highest larvicidal activity towards the housefly larvae. The outcome of this investigation indicates that the beneficial effect of the plant towards the control of housefly borne diseases can be utilised if studied in further detail to create a healthy environment for society.

KEYWORDS: *Lantana camara*; housefly; methanol extract; mortality; larva

INTRODUCTION

Lantana Camara is an evergreen shrub which is found growing widely all over Malaysia. It can be used to kill housefly larvae and its usage has not been commercialized yet in Malaysia. Development of insect resistance to synthetic pesticide, high operational cost and environmental pollution have created the need for developing alternative approaches to control vector-borne diseases. We believe that such an alternative is the use of the *Lantana Camara*plant. *Lantana Camara* is a hardy, evergreen shrubwith characteristic odour which can grow up to 3m in height. Next, *Musca domestica* is also known as housefly. *Musca domestica* constitutes a major health problem as vectors of serious conditions like food poisoning, cholera, dysentery and many more. It is a common species found on poultry farms,ranches, horse stables, garbage bins and it is actually a species that lives in dirty and smelly habitatssuch as smelly drains and even on rotten food. The objective of our project is to kill the *Musca domestica* housefly and the most effective way to kill the housefly is at the larval stage. Thus, this research is to investigate the effect of *Lantana camara* leaf extract on mortality rate of housefly larvae.

LITERATURE REVIEW

The housefly, *Musca domestica*, is one of the most common insects associated with human settlements (Kumar, Mishra, Malik, & Satya 2011) . Houseflies are considered vectors of pathogens and hence categorized as pests. Housefly management relies heavily on sanitation, screening measures and pesticide application (Kumar et al. 2011). Thus, many insecticides such as organochlorides and organophosphates, and more recently, pyrethroids and spinosad have been used for housefly control. However, houseflies can develop resistance to these pesticides (Scott, Alefantis, Kaufman, & Rutz 2000). As such, an alternative source for the synthetic pesticides is the application of easily degradable plant compounds which is considered to be one of the safest methods to control insect pests and vectors (Remia & Logaswamy 2010). In the case of mosquito control, synthetic pesticides have been extensively used for mosquito control by either killing, preventing adult mosquitoes to bite human beings or by killing mosquito larvae at breeding sites of the vector (Joseph, Ndoils, Malima, & Nkuniya 2004). A point to be highlighted here is that synthetic pesticides have been used to kill mosquito larvae. Similarly, the present study aims to kill *Musca domestica* or housefly larvae at larval stage by using a leaf extract instead of pesticides. While most previous studies have focused on topical application or fumigation targeted towards the killing of adult houseflies (Pavela 2008). This study gives weight to killing houseflies at an earlier stage to prevent the emergence of adult houseflies by using an eco-friendly, cheap and pollution free method.

Extracts from leaves and flowers of plants and oils were found to have housefly larvicidal properties (Abdel-Hady, Abdei-Halim & Al-Ghadban 2005). The larvicidal properties of *Lantana camara* have been investigated in a number of studies (Kumar & Maneemegalai 2008; Abdel-Hady, Abdei-Halim & Al-Ghadban 2005; Remia & Logaswamy 2010). Kumar et al. (2008) found that the methanol extract of *Lantana camara* leaves showed maximum mortality towards *Aedes aegypyti* and *Culex quinquefasciatus* mosquito larvae. Remia &Logaswamy (2010) also reported a similar observation when *Aedes aegypti* larvae were in contact with methanol extract of *Lantana camara* leaves. Another study by Abdel-Hady et al. (2005) revealed that oils of leaves and flowers of *Lantana camara* showed larvicidal potency on larvae of *Musca domestica*. Other studies have also proven that the method of using essential oils from certain plants exerted larvicidal activity on the housefly. In relation to this, larvicidal activity of essential oils from *Mentha piperita* and *Eucalyptus globulus* was reported by Kumar et al. (2008) But the use of essential oils in housefly control has its shortcomings as it cannot be applied at field level because such applications would be impractical and very costly (Kumar, Mishra, Malik & Satya 2011). Apart from the potential of essential oils, even leaf extracts of the *Lantana camara* possess larvicidal activity (Chavan & Nikam 1982). The present study was carried out to study the effects of the *Lantana camara* leaf extract on the mortality of housefly larvae which may be beneficial in the control of houseflies.

METHODOLOGY

Collection of plants and preservation of methanol extract of leaves

The leaves of *Lantana camara* were collected locally in Universiti Kebangsaan Malaysia and they were shade dried atroom temperature, powdered with the help of a mechanical device and sieved obtain the different sizes of fine leaf powder. Dried powder of 101.7 g was extracted in 1526 ml of methanol solvent for 24 hours, and filtered. After extraction the extract was evaporated to dryness using rotary vacuum evaporator. The extract was dissolved in distilled water, before being filtered to obtain 331 ml filtrate, and diluted to obtain different concentrations which are 0.021, 0.018, 0.015 and 0.012 g/ml.

Collection and storage of experimental animals

The larvae of *Musca domestica*were collected from Ecovet Consultancy which is a lab owned by Universiti Kebangsaan Malaysia for the breeding of*Musca domestica* larvae, otherwise known as housefly larvae. Among the larvae, the larvae aged 4 and 7 days were taken to observe the difference in the mortality rate. The larvae with the age of 4 days are considered as young larvae, while the larvae with the age of 7 days are considered as old larvae, as it would turn into pupae the next day. The larvae were fed protein and glucose, and were kept in a container with holes to make sure that the larvae get the appropriate amount of oxygen. On the 7^{th} day, the larvae did not need food because they are preparing for the next stage.

Bioassay experiment

Different concentrations of extract were prepared using distilled water. Therefore, 0.021, 0.018, 0.015 and 0.012 g/ml of extract were obtained. Using the direct contact method, the larvae were tested with the extract. In each concentration, 15 *Musca domestica* larvae were introduced to the extract. Distilled water with the same volume was used to test the larvae by acting as a control. Distilled water was used because larvae can live in water for a very long time. The larvae were half immersed in the extract to make sure that they got enough oxygen and to prevent them from drowning. After 6 hours of immersion along in room temperature, all the larvae were removed. The number of dead larvae was counted to calculate the mortality percentage.

	Distilled water	**0.021 g/ml**	**0.018 g/ml**	**0.015 g/ml**	**0.012 g/ml**
4^{th} day	0	87	80	67	60
7^{th} day	13	87	73	60	47

Figure 1 The mortality percentage of the housefly larvae

RESULTS AND DISCUSSION

The results obtained from the experiment are as in the table. In distilled water, the larvae with the age of 4 days were alive while 13% of the older larvae died. In the concentration of 0.021 g/ml, the same percentages of mortality for both of the age were obtained. In 0.018, 0.015 and 0.012 g/ml of Lantana *camara*leaf extract, the younger larvae (aged 4 days) showedhigher mortality percentage compared to the larvae with the age of 7 days. Based on the results obtained, the extract shows larvicidal activitytowards *Musca domestica* larvae. More larvae died in the extract compared to the larvae in the distilled water. In distilled water, the older larvae have lower durability compared to the larvae with the age of 4 days. This may be caused by the nature and characteristics of larvae of the 7^{th} day which were becoming more similar with the housefly, which cannot live in water. 0.021 g/ml was the highest concentration tested. Both ages of the larvae gave the same percentage of mortality, and that may due to the high concentration of the leaf extract itself. Therefore, it is concluded that the higher the concentration, the higher the mortality percentage that is showed by the larvae and it is applicable for both ages of the larvae. In lower concentrations, which are 0.018, 0.015 and 0.012 g/ml, the results showed that the leaf extract is more effective towards younger larvae (with age of 4 days) compared to the older one. This also concludes that the leaf extract is effective in the early stage of the larvae, which is better in order to prevent the breeding of housefly. Since the larvicidal effect of the *Lantana camara* (leaf extract) has been observed and confirmed, further study will be very crucial and useful in this field and very helpful to create a better and healthier environment for society.

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NORMAL COMMUNICATION BEHAVIOUR OF HOSPITALITERMES HOSPITALIS SP. TERMITERANDOM IN TRANSMIT INFORMATION BETWEEN INDIVIDUAL

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ABSTRACT

Hospitalitermes hospitalis sp. is a foraging termite. Communication among individuals of this termite is very important because their communication shows teamwork. The purpose of this study was to determine their behaviour during transmission of information by observing their behaviour. Sampling of this species was made at UniversitiKebangsaan Malaysia Fern Garden. Setting of their experimental arena was made according to their environment to enable them to survive for a long period. Quantitative methodology was applied by recording their behaviour from the first to next individual along the tunnel to the food place. Quantitative data was then used based on video playback and data was recorded in two terms: 'in the tunnel' and 'in the nest place'. All data obtained was calculated into average of each term that was to be observed. Results indicated that, average distance, time taken, frequency and speed are; 1.76 mm ± 0.7951, 1.8 s ± 0.9319, 0.75 Hz ± 0.7354 and 1.13 mm/s ± 0.7316 respectively. This showed that this species transmitted information in a very short distance and period. This species communicate and transmit information more frequently as the period became shorter. Hence, their behaviour showed that they communicate in a row, known as 'teamwork communication' to transmit information among them in faster speed, short period and distance.

KEYWORDS: speed; time taken; distance; transmit information; communication behaviour; first individual

INTRODUCTION

Hospitalitermes hospitalis is free-ranging termites (Toe 1992) which forage in single line. The ability of this species is to forage in open surrounding in 28 ^{o}C and humid (Beakers 1977). If the precaution step is taken to maintain their colony in the arena, they are still active in doing activities and survive for a few weeks. Generally, it divides into three castes; soldiers, works and reproductive. Workers gather food and feed the other members (*Trophallaxis*) of colony while soldiers defend the colony from attack mostly by ants. Jones& Ghathore-Hardy (1995), stated lichens is the main diet. For the smaller workers gnaw the micro-epiphytes from tree trunk and pass food to the larger workers who move among them collecting food in their mandibles. They normally move in two-way traffics, and workers returning back to the nest with balls of food. They communicate with 'teamwork' to transfer some information whether for finding food, reproductive and so on. This is the main reason that period and distance taken for transmitting is very short. It looks like congested traffic which proves that their distance among individuals is very short.

Generally, frequency is 1 / time which shows the frequency of communication in a period. From this, this species communicates more frequently when less time is taken to transmit any information. Next, we talk about speed. Overall, speed is equal to distance divide time to get its speed. Termites communicate in very fast speed among individuals due to their behaviour.

Soldier of termites (Stuart, 1960) normally vibrate by their head compared to worker which shows that soldier gives more instruction to its workers. *Hospitalitermes medioflavus* (Tho 1992) has very similar foraging behaviour to *H. hospitalis*.

Yes, they communicate by vibrating their head using alarm at their head or antena. Head-tapping of termites is an incidental phenomenon (Goetsch 1953). This research is significant because it investigates normal communication, an important method of communication,as compared to communication by vibration.

Hence, this research will elaborate more on their behaviour during normal communication with other individuals based on the result and flow of graph. Furthermore, the aim of this research is to make sure communication behaviour of termites in terms of distance and time taken to transmit information among individuals can be determined.

LITERATURE REVIEW

Based on Beaker's research, 'communication of termite of bio field', termite normally can survive for at least 27 $^{\circ}$C and 80 % humidity (Beaker 1977). Based on A.M Stuart's research, 'Communication of alarm in the termite', he stated that normally termites have their head-tapping movement, which vibrates to show they communicate between individuals (Stuart 1960). He did more on soldiers, one component of termites' organisation which vibrates more than workers.

Rossi postulates that the slight jittering of *Reticular liter mesluci fugus* at irregular intervals, its '*futteralarm*' is a low intensity alarm which increases in rhythm. Goetsch (1953) and Grabensberger (1933), on the other hand, suggest that in alarm, at least, contact is the means of communication. Goetsch considers that the sound made by head-tapping in termites is a rest phenomenon and has no part in communication. This already shows most scientists made their research in communication alarm by vibration, bio field and so on. Although they did not focus on the time taken and distance of communication but this research focuses on their communication in a very short period and distance.

METHODOLOGY

Sampling & Setting Arena of Termite.

Random *Hospitalitermes hospitalis* species was taken as the sample for observation using a round container, at Fern Forest, Universiti Kebangsaan Malaysia. *Hospitalitermes hospitalis* sample was

collected from one tree. Furthermore, their nest, soil (their environment) and few leaves (their food which contain lichen) were taken and put into a round container.

The survival of this species was tested for one week. The container was put in the cupboard because termitesrequirea dark environment which has more humidity. Some of G Beakers theory were adapted in the methodology in mantaining colony. Every 4 times per day, a lot of wet tissues were prepared to maintain their humidity and their container waswiped because they breathe and produce sweat. At the same time, knife blazer was used to cut the center of a closed container of radius 4 cm and two small layer of net was put to let them breathe better to show that termites need air to continue their life process. Another sample of the same species was takenfrom the same tree as a second sampling process. They were maintained by placing them around the wet tissues with larger container.

Finally, a model of their natural habitat was built before another sample was taken and directly observed after being placed in the new place for 24 hours. One container was used for their place and one more container was for their food and a lot of leaves were placed in the container. Acircle of big radius was punched on one side of each container and connected with a tunnel made from transparent plastic cover so their behaviour could be observed.

Then, another sample was taken from the same treefor observation. The new observation from trial and errorfor successful colony maintainence was used throughout the research. The termites were then put under the fan (knob no 4). The condition was maintained using the same method as the first and second sampling. Termites were left for 24 hours to adapt in the new environment.

Video Recording

A video was recorded using Olympus Lens digital camera, 12 Megapixels, red in colour. The recording began from the first group of termites in the nest and continued as the termites moved through the tunnel. The camera was focused along their way by zooming 2x towards the tunnel. Termites from the first group met with other termites and communicate, met again with the next individuals and their communication behaviour along the way in the tunnel was recorded. This investigation required a lot of focus to get better result.

Until the end of the tunnel, the digital camera was focused to food place where first individual reached and transmitted information and communicated with other individuals in the nest place. The recording continued untilfirst individuals came back to the tunnel and their same behaviour was recorded. This methodology continued whenfirst individuals reach the nest place and each time they met in nest place and communicate. Then, second individuals which received information from first individuals moved to the tunnel. This methodology was continued again until 30 minutes later and one full recording was played back.

Video Playback&Recorded Distance Communication Data

The video recording was played back using 'Pot Player' software by slowing the video speed to 0.9 x. The playback started from the first individual movement towards the tunnel and the distance between head of termites was measured using a long ruler (0.1 cm). When first individuals of termites met with another individual of termites and communication happen, video was paused and measuring was conducted from the head of one first individual to the head of another individual of termite that they met. The distance obtained between individuals was recorded in the observation table 2, second column in (cm) unit on a draft paper.

This methodology was continuously applied until they reached the food place. When the individual came back to the tunnel, the distance was measured from the end of one first individual to another individual termite that was met until they reached the nest place. The distance obtained between individuals was recorded in the observation table 2, second column. At the nest place, communication distance between the end of first individuals and the end of other individuals in the nest place was measured each time they met and started to communicate and recorded in observation table 1, second column. The overall distance was averaged and recorded in third column. This methodology was continuously applied when second individuals which received information from first individuals moved into the tunnel and finally ended with information received by individuals within 30 minutes (end of the video).

Video Playback & Data Recorded for Time Communication

The video was played back again using the 'Pot Player' video software. During playback of the video, the time taken forthe first individual inside the tunnel to meet and communicate with other individual termites was recorded using a stopwatch.

This procedure continued as mentioned earlier when first individual met with other individual termites until they reached the food place. Once the first individual entered back inside the tunnel, the same procedure was continued using stopwatch to record the time for communication with other individual termites. Their behaviour during communication time was recorded in observation table 2, third column while the minute they communicated was recordedin the first column of the same table. Once they started to enter the nest place, the stopwatch was stopped and the time taken to transmit information from first individual to the next individual termites until they entered the tunnel and came back to the nest place was recorded in observation table 3, first and second column.

This continued when they entered the nest place. Every time first individual met with another individual termite, a stopwatch was started to record the time they communicate. Once they finished, the stopwatch was stopped and the time taken was recorded in draft paper. After second individual received the information, thesecond stopwatch was stopped. The time taken for the first individual to transmit information to second individual until second individual entered the tunnel was recorded in observation table 1, fourth column. While the time taken every time first individual met and communicated with other individual in nest place was recorded in observation table 1, fifth column. Then, all the time taken was

averagedfor the first individual to meet with other individuals in the nest place to get overall average for the time taken by first individual to transmit information to the second individual until the second individual entered tunnel. All time taken in this methodology was recorded in terms of second (s).

This methodology was continuously apply for the second individual until the video finished. The method to calculate the overall average was the same. The entire methodology was repeated to obtain accurate result.

DATA ANALYSIS

For observation table 1

The length of a termite body was measured using a long ruler. The actual length of the termite body was 4 mm. When the length of termite body was measured using the video playback, the termite body was 15 mm. The scale of the actual termite body length to the video length is 1 mm : 3.75 mm. This scale was used to calculate the actual communication between termites based on the distance obtained from the video.

Then, the time taken to transmit information and average overall distance in each minute in the nest place was recorded in actual data. For frequency and speed, the formula mentioned was used. All average of communication distance, time taken, frequency and speed was averaged to obtain standard mean for termites communication. Standard error was calculated using formula of standard deviation.

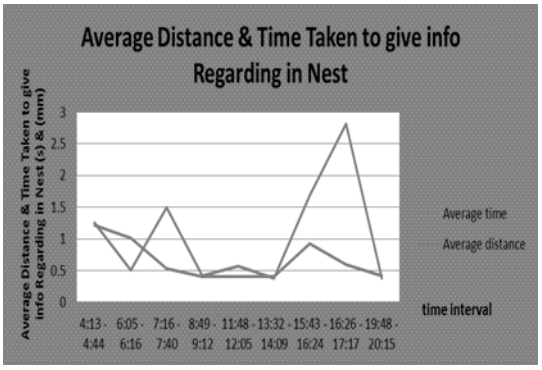
For observation table 2

All data for this observation transferred to 'Microsoft Excel' sheet for every minute when they began to communicate was recorded in actual data. Then, the time taken to transmit information and average overall communication time in each minute in the tunnel was recorded in actual data. For frequency, this formula was used, 1/T (T – time taken) and their frequency for each minute took was recorded. While for speed, this formula was used: distance/time taken and their speed was averaged for each minute took in (mm/s). All average of communication distance, time taken, frequency and speed was averaged to obtain standard mean for termites communication. Standard error was calculated using formula of standard deviation.

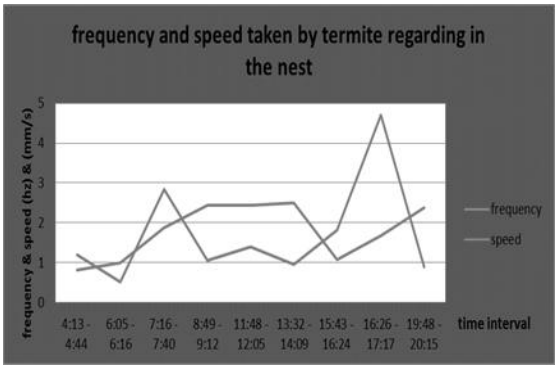
For observation table 3

After every minute was recorded in the first column and time taken (in seconds) was recorded in the second column, all the minutes that were taken based on observation table 2 for distance, time taken, frequency and speed was averaged and recorded in each minutes in observation table 3. Standard error was also calculated using formula of standard deviation.

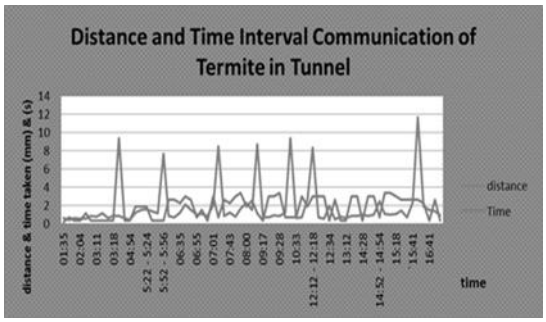
RESULT



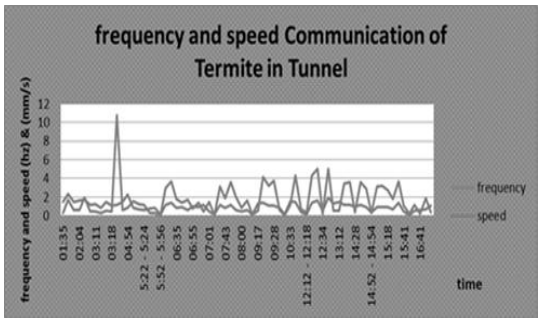
Graph 1



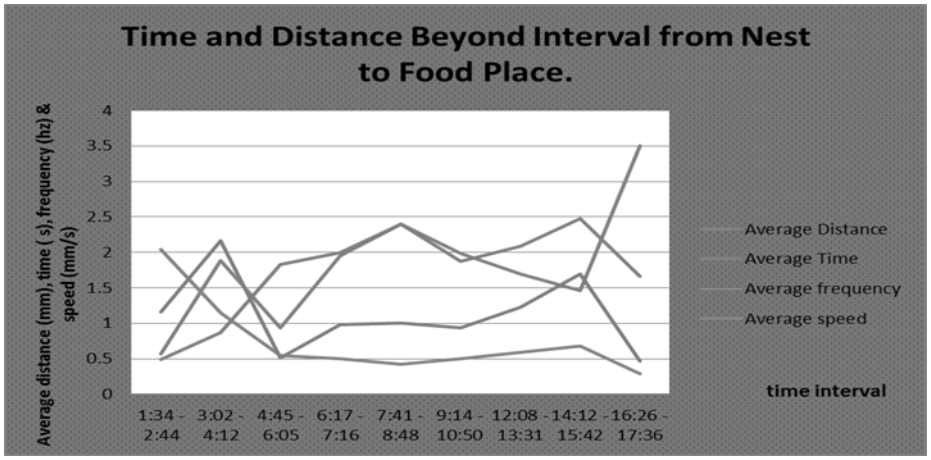
Graph 2



Graph 3



Graph 4



Graph 5

OBSERVATION

Table 1 Distance and Time Interval of Communication Behaviour for Termite in the Nest

Time Interval	Time Taken to give info Regarding in Nest (s)	Average info Regarding in Nest (s)	Distance to give info Communication in Nest (mm)	frequency (hz)	Average distance on nest(mm)	speed (m/s)
4:13 - 4:44 (37 s)	0.93	1.22	0.75	0.82	1.25	0.0012
	1.74		1.5			
	0.99		1.5			
6:05 - 6:16 (11 s)	0.87	1.01	0.75	0.99	0.5	0.0005
	0.8		0.38			
	1.37		0.38			
7:16 - 7:40 (24 s)	0.5	0.53	1.5	1.87	1.5	0.00283
	0.52		0.38			
	0.54		0.38			
	0.54		0.3			
	0.44		2.63			
	0.84		2.63			
	0.31		2.63			
8:49 -9:12 (23 s)	0.53	0.41	0.38	2.44	0.42	0.00105
	0.36		0.75			
	0.57		0.75			
	0.28		0.38			
	0.43		0.38			
	0.53		0.38			
	0.58		0.38			
	0.19		0.38			
	0.26		0.38			
11:48 - 12:05 (17 s)	0.32	0.41	0.75	2.44	0.57	0.0014
	0.5		0.38			
13:32 - 14:09 (33 s)	0.36	0.4	0.75	2.5	0.38	0.00095
	0.28		0.75			
	0.26		0.38			
	0.71		0.38			
15:43 - 16:24 (41 s)	0.51	0.93	3	1.08	1.69	0.00182
	1.26		1.5			
	0.92		3			
	0.63		1.5			
	0.46		0.38			
	0.53		0.75			
	2.23		0.68			
16:26 - 17:17 (41 s)	0.69	0.6	3	1.67	2.82	0.0047
	0.52		2.63			
19:48 - 20:15 (27 s)	0.56	0.42	0.38	2.38	0.38	0.0009
	0.28		0.38			
		SD 0.312188	SD	0.689409973	SD 0.837571	SD 0.001308435
		SE 0.5587	SE	0.8303	SE 0.9152	SE 0.0361

Table 2 Communication in the tunnel

Time Interval	Distance Communication (mm)	Time to Communicate (s)	frequency (hz)	speed (mm/s)
01:35	0.19	0.67	1.5	0.28
01:39	0.75	0.43	2.33	1.74
01:58	0.38	0.68	1.47	0.59
02:04	0.38	0.6	1.67	0.63
02:21	1.13	0.58	1.72	1.95
03:10	0.38	0.85	1.18	0.45
03:11	0.38	0.79	1.27	0.48
03:12	0.38	1.14	0.87	0.33
03:17	0.38	0.67	1.5	0.57
03:18	0.38	0.89	1.12	0.43
4:04 - 4:06	9.38	0.87	1.15	10.78
04:51	0.38	0.66	1.51	0.58
04:54	0.38	0.44	2.28	0.86
05:20	1.88	1.22	0.82	1.54
05:21	1.88	1.5	0.67	1.25
5:22 - 5:24	1.88	1.58	0.63	1.19
5:40 -5:42	0.38	1.35	0.74	0.28
05:44	0.38	1.2	0.83	0.31
5:52 - 5:56	0.38	7.64	0.13	0.05
06:20	2.63	0.88	1.14	2.99
06:21	2.63	0.71	1.41	3.7
06:35	2.25	1.23	0.81	1.82
06:37	3	2.12	0.89	1.42
06:38	2.63	1.54	0.65	1.71
06:55	0.75	1.02	0.98	0.74
06:58	1.5	1.1	0.91	1.36
07:00	0.38	0.84	1.19	0.45
07:01	3	2.04	0.49	1.47
7:12 - 7:16	0.75	8.49	0.12	0.09
07:44	2.63	0.84	1.19	3.13
07:43	2.25	1.22	0.82	1.84
07:47	3	0.83	1.2	3.61
07:57	3.38	1.67	0.6	2.02
08:00	1.88	2.31	0.43	0.81
08:11	2.55	1.55	0.65	1.65
8:27 - 8:31	1.13	8.68	0.12	0.13
09:17	0.38	0.74	1.35	0.51
09:20	3	0.72	1.39	4.17
09:25	3	0.94	1.06	3.19
09:28	3.38	0.89	1.12	3.8
10:03	0.75	1.21	0.83	0.62
10:06 - 10:14	0.75	9.35	0.11	0.09
10:33	0.75	0.65	1.54	1.15
10:34	3	0.69	1.45	4.35
10:42 - 10:44	1.88	2.68	0.37	0.7
12:12 - 12:18	3	8.37	0.12	0.36
12:22	3	0.7	1.43	4.29
12:28	3	0.6	1.67	5
12:34	0.38	1.98	0.51	0.19
13:00	2.63	0.52	1.92	5.06
13:04	0.38	0.77	1.3	0.5
13:12	0.38	0.68	1.47	0.56
13:13	3	0.88	1.14	3.41
13:14	3	0.84	1.19	3.57
14:28	0.38	1.01	0.99	0.38
14:29	3	0.84	1.19	3.57
14:35	3	1.04	0.96	2.88
14:52 - 14:54	0.75	2.5	0.4	0.3
15:04	3.38	1.07	0.93	3.16
15:12	3.38	1.05	0.95	3.22
15:18	3	1.1	0.9	2.73
15:27	2.63	1.48	0.68	1.78
15:32	2.63	0.72	1.39	3.65
`15:41	2.63	2.37	0.42	1.11
16:26 - 16:31	2.63	11.7	0.09	0.22
16:36	2.25	1.91	0.52	1.18
16:41	0.38	1.55	0.65	0.25
16:56	2.63	1.4	0.71	1.88
17:17	0.38	0.94	1.06	0.4
	Average	1.84 mm	Average	1.81 s
	SD	1.35647	SD	2.336009
	SE	1.213	SE	1.5284

Table 3 Communication Overall Time and Distance beyond Interval from Nest to Food Place.

Time Interval to Transmit from Nest to Food Place and Back Again	Time Needed to Transmit Info (s)	Average Distance in a Tunnel (mm)	Average Time Taken in a Tunnel (s)	Average frequency (f - hz)	Average speed(mm/s)
1:34 - 2:44	70	0.57	0.49	2.04	1.16
3:02 - 4:12	70	1.88	0.87	1.15	2.16
4:45 - 6:05	80	0.94	1.83	0.55	0.51
6:17 - 7:16	59	1.95	2	0.5	0.98
7:41 - 8:48	67	2.4	2.4	0.42	1
9:14 - 10:50	96	1.87	1.99	0.5	0.94
12:08 - 13:31	13	2.09	1.7	0.59	1.23
14:12 - 15:42	90	2.48	1.46	0.68	1.7
16:26 - 17:36	70	1.66	3.5	0.29	0.47
Average	68.3	Average 1.76	Average 1.8	Average 0.75	Average 1.13
SD	23.79601	SD 0.632258	SD 0.868434	SD 0.540833	SD 0.535275
SE	4.8781	SE 0.7951	SE 0.9319	SE 0.7354	SE 0.7316

DISCUSSION

As their journey method was mentioned that used on methodology, we divided into three terms for elaboration on their normal communication:

For this communication, the number of termites communicating was not constant. It was random because based on the observation; one termite communicating can transfer information to certain individuals (group) of other termites. Some of them communicate by vibration (head tapping).

During minute 8:49 – 9:12, the fifth individual that reached back to nest place transferred information or communicate with other individual. But, much normal communication happened during this minute (refer to graph & table 1) which resulted in many measurements and timing calculation. This caused more frequent communication which produced continuously increasing frequency of communication (graph 2).

'3 first individual termites met a single termite one by one. They met in the original nest (main nest place)'. This note based on table 1 showed more communication happened in this minute. For their timing, distance and so on that was recorded in each minute was not discuss because overall, their communication value was not constant. Thus, the speed that they took to finish their communication until the last, sixth individual entered the tunnel was the highest among all minutes during the 30 minutes recorded. As shown in graph 2, their point on the graph was the peak before their frequency and communication speed decreased.

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From minute of 4:13 – 4:44 until 7:16 – 7:40, their communication slowly increased and caused higher frequency and the speed also increased. During 11:48 – 12:05, their communication frequency was still maintained and a few times they communicate although it took much time to transmit information until the last, seventh individual entered back into the tunnel. Due to this scenario, graph for speed slowly

decreased. ‘They’ refer to the number of individuals that entered back into the nest place to transmit information.

During 15:43 – 16:24, they communicate more times but their frequency decreased (refer to graph 2) as their distance and time taken was high and sometimes low compared to the other minutes. Until 20:15, both graphs slowly decreased as timing and distance was long speed increased.

Overall, majority minutes were one individual termite communicating with a few other termites and one other individual. For distance (refer graph 3), its graph showed their distance to transmit information had many peaks which was considered and increase and sudden decreased as shown in minute of 3:18, 5:52 – 5:56, 7:01, 8:00, 9:28, 12:12 – 12:18 and 15:41.

The most active communication was during minute 12:28 which took 3 mm of its distance while it only took a time of 0.6 s (refer to table 2). They communicate more frequently and at higher speed although their distance and time taken were slowed. After all of their communication was averaged, they took 1.84 mm for distance, 1.81 s for time taken, 0.1 HZ for frequency and also 1.76 mm/s for speed. This showed overall their communication was very fast. Although some of the time intervals were recorded from minute to minute, but the way they took to transmit information and their distance was summarized in frequency and speed.

Overall, after every time interval was averaged to obtain the average in table 3, it was observed that the most shortest distance, shortest time taken, highest frequency and highest speed is during time interval 1:34 – 2:44. Based on table 2, it relates because although their communication is not more or less but all of their distance and time taken was the shortest.

The longer their time needed to transmit information among individual, the longer the distance, time taken, low frequency and speed for communication. More frequent communication was not the main factor for short period, distance, high speed or high frequency average overall. Hence, four aspects were already discussed (period, distance, speed and frequency) in table 2 and table 1 which were the main factor to this observation.

Finally, based on graph 5, it was observed that their average distance actually increased, where shown during the final time interval, their communication was less active. As already discussed, their communication was not constant, where sometimes their distance to communicate was long but time taken was short. But, their frequency and speed at the final time interval in the graph showed decreased as the distance between individuals was very long.

The final average for distance, time taken, frequency and speed that was obtained was 1.76 mm, 1.8 s, 0.75 HZ and 1.13 mm/s respectively. Final average result was a real standard for communication of *Hospitalitermes hospitalis* sp. The shorter distance and time taken, the higher frequency and speed taken to transmit information among individuals.

CONCLUSION

As observed, *Hospitalitermes hospitalis* sp is a foraging termite, causing their communication to be short, more frequent and of high speed. The main factor to determine how fast they communicate in normal terms is they communicate (Jones& Ghathore-Hardy 1995), in a single line and through teamwork. These also apply to other termites and ants that also communicate in the same manner, but their characteristics determine the different type of insect.

The final result of the average values obtained based on table 3 showed their communication is very fast and short. This also is a standard for their normal communication. If the result is stated in terms of A.M Stuart's observation on vibration communication, the data and value prove their normal communication is very short and fast. In relation to vibration communication, it concluded that termites communicate using alarms at their headthrough head-tapping. This is the main factor that effects their normal communication causing themto communicate very fast and short.

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COLONY FORMATION UNIT LEVEL OF FIVE PLACES IN PERMATApintar^{TM}NATIONAL GIFTED CENTRE

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ABSTRACT

Colony Formation Unit Level is an indicator to measure the amount of microbes that present in environment. The purpose of this study is to compare the amount of microbes present in five different places. The number of microbes in a place can tell us how clean the place is compared to others. We have distributed questionnaires to see the perspectiveof students in PERMATApintar^{TM} Gifted Centre about the cleanliness of a few places in the school. From the questionnaires, we have decided to take samples from dustbin lid, toilet bowl, hostel water, air conditioner and library door handle. We started our experiment by using cotton balls to swab samples and culture them overnight. Next, we did the serial dilution for each sample and poured 0.1ml into petri dishes containing LB Agar and incubated them for a day. Finally, we counted the colony formation unit (CFU) level per ml and compared it with CFUs level of other samples. The findings showed thathostel water has the highest CFU per ml followed by toilet bowl. Sample from air conditioner had the least CFU level per ml. Therefore, we deduced that what students think as dirty is not really dirty and what they think as clean is not really clean. Thus, this finding would able to create the students' awareness about their perspective on cleanliness in places surrounding them.

KEYWORDS: colony formation unit (CFU) level; serial dilution; incubate; culture; perspective

INTRODUCTION

Microbes exist everywhere even in our body. Although we cannot see them with naked eyes, they exist everywhere, even in the air we breathe. Microbes are single-cell organisms so tiny that millions can fit into the eye of a needle. Microbes include bacteria, fungi, protozoa and many more. In our research, we selected five places in PERMATApintar Complex to collect our samples from; dustbin lid, toilet bowl, water pipe, air conditioner and library door handle. We might think that the hostel water is clean based on its colour, smell and so on. But how true is that? The colony-forming unit (CFU) can be used as a parameter to know how clean a place is compared to another. CFU is normally used to estimate the number of viable cells from samples collected from a place. We also did some further exploration to investigate the resistance of the bacteria to three types of antibiotic which are ampicillin, gentamycin and tetracycline. From our results, we can know which sample has the highest CFU and how effective antibiotics are in inhibiting the growth of bacteria.

LITERATURE REVIEW

Bacteria are a large domain of prokaryotic microorganisms. They have a wide range of shapes. They reproduce through binary fission and grow in colonies. Most organisms on average have greater transfer efficiencies under high relative humidity than under low relative humidity (Gerrardo U. Lopez, 2013).Colony Formation Unit (CFU) is commonly used to estimate the viable bacterial or fungal numbers. The appearance of a visible colony requires significant growth of the initial cells plated - at the time of counting the colonies it is not possible to determine if the colony arises from one cell or 1,000 cells. Therefore, the results are given as CFU/mL (colony-forming units per millilitre) for liquids and CFU/g (colony-forming units per gram) for solids to reflect this uncertainty (rather than cells/mL or cells/g). The sample is diluted 10 times and each is plated for each dilution. Then, the CFU is obtained and deduced mathematically to get the average bacteria/mL (Breed, Robert S.; Dotterrer, W. D., May 1916).

Antibiotics are also known as antibacterial. An antibiotic is an agent which inhibits bacterial growth or kills bacteria. Scientists have spent the last few decades investigating when, how and why bacteria take up DNA from other resistant bacteria, and eventually become resistant to antibiotics themselves (Nordqvist, Joseph, 2013). According to an article on *www.medicalnewstoday.com*, antibiotics are also used to treat infections caused by bacteria. It is the antibiotic itself that causes the resistance by subjecting the bacterium to stress; this stress induces the uptake of genetic material which may bring about antibiotic resistance. In other situations (without stress), no bacterium would have taken up that DNA, and consequently would not have had the chance to become resistant. Antibiotics can be categorized into two; bactericidal and bacteriostatic. A bactericidal antibiotic kills the bacteria. Penicillin is a bactericidal. A bactericidal usually either interferes with the formation of the bacterium's cell wall or its cell contents while, a bacteriostatic stops bacterium from multiplying.

Table 1 The zones of clearing for various antibiotics.

Antibiotic (and disc identifier)	Disk potency	Inhibition zone diameter to nearest mm		
		Resistant	Intermediate	Susceptible
Ampicillin (AM10) Gram-negative rods and enterococci	10 µg	11	12-13	14
Ampicillin (AM10) Staphylococci and highly penicillin-sensitive organisms	10 µg	20	21-28	29
Bacitracin (B)	10 units	8 or less	9 to 12	13 or more
Chloramphenicol (C)	30 µg	12 or less	13 to 17	18 or more
Ciprofloxacin (CIP)	5 µg	15 or less	16 to 20	21 or more
Colistin (CL)	10 µg	8 or less	09 to 10	11 or more
Doxycycline (D)	30 µg	12	13-15	16
Erythromycin (E)	15 µg	13 or less	14 to 17	18 or more
Gentimycin (G)	10 µg	12	13-14	18
Kanamycin (K30)	30 µg	13	14-17	18
Methicillin (ME5)	5 µg	9	10-13	14

Nalidixic Acid (NA)	30 µg	13 or less	14 to 18	19 or more
Oxacillin	1 µg	17	18-24	25
Penicillin G (P)	10 units			
Staphylococci		28 or less	-	29 or more
most others		11 or less	12 to 21	22 or more
Polymyxin B (PB)	300 units	8 or less	9 to 11	12 or more
Streptomycin (S)	10 µg	11 or less	12 to 14	15 or more
Sulfadiazine (SD) *	300 µg	12 or less	13 to 16	17 or more
Sulfaoxizole (G300)	300 µg	12 or less	13-16	17 or more
Sulfisoxazole (G25) *	25 µg	12 or less	13 to 16	17 or more
Tetracycline (TE)	30 µg	14 or less	15 to 18	19 or more

METHODOLOGY

List of apparatus and materials:

LB broth, LB agar, distilled water, antibiotics (ampicillin, tetracycline, and gentamycin), pipette and tips, 50 mL falcon tubes, 15mL falcon tubes, forceps, petri dish, parafilm, paper disc, shaker, hockey stick, 70 % ethanol and Bunsen burner.

Collecting samples and growing bacteria

The samples are collected at five different places around PERMATApintar™ National Gifted Centre using sterile forceps and cotton balls and was put into different 50 mL falcon tube labelled; A (dustbin lid), B (toilet bowl), C (hostel water), D (air conditioner) and E (library door handle).The falcon tubes containing the cotton balls was filled with LB broth and was let to culture in the incubator for 24 hours after being mixed thoroughly by the shaker. Then, Ten 15mL falcon tubes were prepared for each place and 4.5 mL of LB broth were pipetted into each falcon tube. The tubes were labelled with the letter indicating the places and the value of dilutions. Example, A 10^{-1}, A10^{-2}, A 10^{-3}, A10^{-4}, A 10^{-5}, A 10^{-6}, A 10^{-7}, A 10^{-8}, A 10^{-9} and A 10^{-10}. The serial dilutions were done by pipetting 0.5 mL of the original falcon tube into falcon tube A 10^{-1} and the bacterial suspension was mixed thoroughly. Then, the tip of the pipette was changed and 0.5 mL were withdrew from the diluted bacterial suspension from the first falcon tube and pipetted into the next falcon tube, A 10^{-2}. This fashion was repeated until the serial dilutions reach falcon tube A 10^{-10}.The petri dish was labelled as the same with the falcon tube. All the petri dish was filled half full with LB agar and was left aside to solidify it. After that, 0.1 mL of the diluted suspension was pipetted into the petri dish according to the label on the petri dish and the falcon tube.A hockey stick was used to spread the diluted bacteria suspension evenly over the surface of the plate. Dip the hockey stick into the alcohol solution and flame the stick until the alcohol has burned off. The plates were allowed to dry.All the plates were taped using parafilm and were incubated, upside down, at 37 $^{\circ}$C for 24 hours. This experiment was repeated for samples from B, C, D and E.The number of colony forming units was counted. Then, the data collected was tabulated.The average bacteria per mL were counted and were tabulated into the tab.

Testing the susceptibility of bacteria towards the antibiotics

Petri dish filled half full with LB agar was prepared for sample A, B, C, D and E.The petri dishes were labeled according to the samples and were divided into three sections. Then, 0.5 mL of the original solution containing the samples was pipetted onto the petri dish.The hockey stick was used to spread the bacteria solution evenly over the surface of the plate [Dip the hockey stick into the alcohol solution and flame the stick until the alcohol has burned off].The petri dishes were left aside to dry for 15 minutes.The paper disc containing three different types of antibiotic such as ampicillin, tetracycline and gentamycin were put on each section on each petri dish. One paper disc with no antibiotic was put in the middle of each petri dish to act as a control.The petri dish was allowed to dry.All the plates were taped using parafilm and were incubated, upside down, at 37^{o}C for 48 hours.The plates were observed.The inhibition zone present around the paper disc containing the antibiotics was measured.The data was tabulated.

RESULTS

The CFUs reading for the sample

The average CFUs readings for the each sample are shown in the Table 1 below. As observed in the above Tables, analysis of the average reading over the five samples showed that reading for the sample C (Hostel Water) was significantly higher than the other samples .The sample B taken from the Toilet Bowl came in as second most dirty sample while sample A (Dustbin Lid) was ranked as third after the both samples. This is followed by the sample E (Library Door Handle) and lastly sample D (Air Cond) as the cleanest one when compared with the other 4 samples.

Table 2 Average CFU reading for the five samples

Samples	Final bacteria/ml	Avg#
A (Dustbin Lid)	2.07 X 10^^{09}	
B (Toilet Bowl)	2.64 X 10^^{10}	
C (Hostel Water)	7.62 X 10^^{10}	
D (Air Cond)	1.36 X 10^^{07}	
E (Library Door Handle)	4.10 X 10^^{08}	

The antibiotic susceptibility

Table 2 shows the susceptibility of the bacteria towards certain antibiotics tested which are measured by measuring the diameter of the zone of inhibition. The table below tells us that the microorganisms or specifically the bacteria that grows on those 4 samples which are Sample A, B, D and E are more susceptible to antibiotic “Gentamycin”. Except for the sample C, the findings shows that the microorganism are more susceptible to the antibiotic “Tetracycline” than the antibiotic “Gentamycin”. The antibiotic “Ampicillin” seems like have no any resistance towards the microorganism that grows on the petri dish as almost all the sample except sample D recorded the reading “80”.

Table 3 The susceptibility of bacteria towards the antibiotics

Samples	Antibiotics Length (mm)		
	Ampicillin	Gentamycin	Tetracycline
A (Dustbin Lid)	0	217	275
B (Toilet Bowl)	0	170	95
C (Hostel Water)	0	133	185
D (Air Conditioner)	80	130	105
E (Library Door Handle)	0	180	105
CONTROL	0	0	0

DISCUSSION

The CFUs reading for the sample

Although the recent survey done shows that toilet bowl cuts the hostel water based on people votes as the dirtiest place, however analysis on the data available tells us that the hostel water beats the toilet bowl as the most dirty place. The sample C (Hostel water) recorded the highest reading of average CFUs among all samples. This might due to the water tank that has not been cleaned since the past three years as many bacteria such as E. coli and ferum bacteria might inhabit the water tank and thus pollutes the water. Although the water has been treated and chlorinated before being supplied to the consumers, this doesn't ensure that the water is safe to use directly as it passes though long pipelines system before ending up in the dirty water tank that might be home for thousands of microorganism.

The sample B (Toilet bowl) and the sample A (Dustbin lid) came in as the second and third most dirtiest place respectively although people thinking that they are the most dirtiest place among all the five samples. This might due to the regular cleaning of the toilet bowl and dustbin as this will get rid and at the same time kill off most of the microorganisms that live on it. While that, the studied identified sample D (Air conditioner) and sample E (Library door handle) as the least contaminated or as the cleanest samples. This is because both samples recorded the least reading of average CFUs when compared with the other samples. One of the factor that ranked them as most clean sample is due to the absence of moisture in those places. This is because lack of moisture and over exposure to light especially at the library door handle make condition unsuitable for the microorganism to live and multiply rapidly.

The antibiotic susceptibility

The microorganisms are not susceptible to antibiotic "ampicillin" because maybe the microorganism have developed a special characteristic to resist the threat while the other are very susceptible to antibiotic "Gentamycin" and " Tetracycline" because due to its high dose perhaps .

CONCLUSION

It was alarming to discover that the number of microbes present in hostel water is the highest. We haveanalysed the data that we obtained by comparing the CFU level between five different places that are hostel water, dustbin lid, air-conditioner, library door handle and toilet bowl. We finally managed to change the majority of students' perspective about the cleanliness in our targeted places. This clearly shows that most people think that the toilet bowl as the dirtiest among all five places, but at the end what they think was eventually proved wrong. Other than that, we also put three specific antibiotics in each place to see whether the microbes resistance to it or not. Based on the results obtained, we can say that Gentamycin is an effective antibiotic in inhibiting the growth of bacteria at our targeted place. In a nutshell, we must always be concerned about our cleanliness and must not simply make assumption about the cleanliness of a place.

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A STUDY ON THE AWARENESS OF DESTRUCTION ON THE CORAL REEFS

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ABSTRACT

Coral reef destruction is one of the most serious issues that are happening nowadays. However, the awareness of people regarding this issue is critical. The main objective of this study is to use the method of approaching and gathering information on the awareness of people about coral destruction. Thus, we went to the hypothesized area and handed out questionnaires to collect the data. Next, we collected three samples of seawater at different sites to determine the pH value, Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD). We also interviewed the locals and tourists to obtain more data. Based on the findings, it can be concluded that the boys were 14% more aware about coral reefs destruction compared to the girls. Between the elderly and teenagers, the adults' response proved that most of them knew about corals' damage. Furthermore, from this research, we know that Malaysians are still unaware about the corals' destruction compared to the tourists. Most of them didn't even realize that their daily routine had ruined the coral reefs. In a conclusion, the awareness about the destruction of coral reefs are still at a pitiful stage and needs serious attention to prevent corals from facing extinction.

KEYWORDS: destruction; awareness; corals

INTRODUCTION

Coral reef is basically the largest ecosystem of the ocean. It is also considered as the rainforest of the ocean. Corals are made up of polyps, which secrete calcium carbonate that acts as their exoskeletons. There are some biotic and abiotic factors that trigger coral bleaching to occur. They create the most diverse and productive ecosystems in the sea providing fisheries, sand supply, shore protection, tourism, and biodiversity services which are of the greatest economic importance to over 100 countries. There are vast numbers of marine animals that live among the coral reefs. These make them the most diverse marine ecosystem, but the majority of the species are still unknown to science.

Some corals have short life spans and die when they reach a certain size or age. Some corals can live up to thousands of years. However, most modern coral reefs are about 6,000 to 8,000 years old, when the sea level stabilized near its current level. They disintegrate within days with the tissues rotting away quickly or eaten by bacteria. The limestone skeleton takes much longer to vanish due to limestone boring organisms (algae, fungi, bacteria, sponges, worms and clams). There are also corals that are being

destroyed for many reasons, such as old age, extreme environmental temperatures, salinities, light, sediments, pollutants and algae overgrowth.

Coral destruction is considered a serious issue nowadays. One of the destruction that needs to be given full attention is coral bleaching. Coral bleaching is actually the stress response when the climate of the sea changes. Several potential stressors, e.g. salinity, light, temperature, sedimentation, aerial exposure, xenobiotics and epizootics, have been implicated convincingly in causing coral bleaching in particular instances (Brown and Howard 1985; Glynn 1990; Williams and Bunkley-Williams 1990). Despite the various factors that cause coral bleaching to occur, pollution is the main factor among all of them. These harmful substances and changes cause the loss of algal pigmentation. This loss will eventually bleach the coral reefs and decolorize them until they appear to become white. This process is very complicated.

Other than that, corals are being destroyed by human activities. Blast fishing is practiced along nearly the entire coast of Sabah using improvised explosives made of fertilizer and fuse-caps inserted into beer bottles. It this common due to expanding human populations and the use of unsustainable fishery practices such as cyanide fishing and blast fishing. This has caused the destruction of vast tracts of coral reefs, accounting for the loss of more than 80 % of original coral cover in many areas (The Status of Coral Reefs in Eastern Malaysia, Nicolas Pilcher and Annadel Cabanban 2000). Overfishing and fish blasting were main threats of coral reefs damage in Sabah (Coral Reefs Study and Threats in Malaysia: A Mini Review, Sarva Mangala Praveena, Siti Shapor Siraj and Ahmad Zaharin Aris, 7th January 2012).

The aim of this study is to increase the awareness of people towards coral destruction by using some methods. On the same situation, this research is conducted to find out the main factor of the destructions of coral reefs in an island in Malaysia which is Mantanani Island located at Malaysia's Borneo, Sabah.

LITERATURE REVIEW

Over 3000 marine species lives in our reefs. And from this breeding ground comes more than half our total seafood supply. Medicine for the treatment of cancer and heart disease has already been discovered in bioactive compounds produced in coral reefs. Corals are also used as substitutes for the human bone in orthopedic surgery. However, coral destruction is considered a serious issue nowadays. One of the destruction that needs to be given full attention is coral bleaching. Coral reef bleaching, the whitening of diverse invertebrate taxa, result from the loss of symbiotic zooxanthellae and/or a reduction in photosynthetic pigment concentrations in zooxanthellae residing within the gastrodermal tissues of host animals. (Glynn PW (1990) Coral mortality and disturbances to coral reefs in the tropical eastern Pacific. In: Glynn PW (ed) Global ecological consequences of the 198~83 E1 Nifio-Southern Oscillation. Elsevier, Amsterdam, pp 55-126)

Coral bleaching is actually the stress response when the climate of the sea changes. Several potential stressors, e.g. salinity, light, temperature, sedimentation, aerial exposure, xenobiotics and epizootics, have been implicated convincingly in causing coral bleaching in particular instances (Brown and Howard 1985; Glynn 1990; Williams and Bunkley-Williams 1990). Despite the various factors that

cause coral bleaching to occur, pollution is the main factor among all of them. These harmful substances and changes cause the loss of algal pigmentation. This loss will eventually bleach the coral reefs and decolorize them until they appear to become white. This process is very complicated. Damage due to divers seems to be the main cause of coral mortality at the heavily used reefs in Peninsular Malaysia. (Community Structures of Coral Reefs around Peninsula Malaysia, Kee Alfian and Tatsuki Toda, 19th September 2006.) However, it is not only diving activities that cause the coral destruction, but also the increase in pollution from waste such as garbage or untreated sewage, which is correlated with the increase of tourist activities, and should be considered to contribute to the restriction of reef growth and eventual coral death (Pullen and Hurst,1993; Lim, 1997).

Other than that, corals are being destroyed by human activities. Blast fishing is practiced along nearly the entire coast of Sabah using improvised explosives made of fertilizer and fuse-caps inserted into beer bottles. Common due to expanding human populations and the use of unsustainable fishery practices such as cyanide fishing and blast fishing. This has caused the destruction of vast tracts of coral reefs, accounting for the loss of more than 80 % of original coral cover in many areas (The Status of Coral Reefs in Eastern Malaysia, Nicolas Pilcher and Annadel Cabanban 2000). Overfishing and fish blasting were main threats of coral reefs damage in Sabah (Coral Reefs Study and Threats in Malaysia: A Mini Review, Sarva Mangala Praveena, Siti Shapor Siraj and Ahmad Zaharin Aris, 7th January 2012).

METHODOLOGY

In order to complete the research on the Awareness of Coral Destruction among Malaysians, we have chosen a few methodologies to be applied. They are:

1) Visiting the affected places

Some of the islands in Malaysia are recently being reported to experience the coral bleaching problems. One of them is Pulau Mantanani, which attracts a lot of foreign visitors throughout the year. As a result of the coral destruction, this island has lost its beauty and also attraction. Therefore, by visiting Pulau Mantanani, we can detect the rate of coral bleaching and how serious it has become. Further knowledge about the occurrence of coral bleaching can also be discussed as well.

2) Line Transect Method

Line transects sampling (Buckland et al. 2001) is one of the most widely used techniques for estimating the size of wildlife populations. Increasingly, wildlife managers wish to extract more than just an abundance estimate from their sightings surveys. They frequently need to relate animal density to spatial variables reflecting topography, habitat, and other factors that affect the animals' environment. The line transect used was a 50 meters path along the beach. By using tin weight hanged using fishing line then submerged into the water and the substrate laid below the tin was recorded. (Sharon L. Hedley is Research Fellow, Research Unit for Wildlife Population Assessment, University of St.Andrews, The Observatory, Buchanan Gardens, St. Andrews KY16 9LZ, Scotland).

3) Interviewing the public

We will visit public places such as malls, schools and places that are near to the researched area. Questions about the coral reefs and their current issues will be asked and their opinions taken into account. Their answers would determine their awareness of coral destruction in their areas.

4) Handing out research questionnaires to people

Apart from interviewing Malaysian citizens, we will also be handing out research questionnaires to them for statistic measure. Percentage and pie charts of their responses will be recorded and constructed as results.

5) Biological Oxygen Demand (BOD) and Chemical Oxygen Demand as the Parameters

Biochemical oxygen demand is the rate of oxygen consumption in the water by aerobic microorganisms for the oxidation of organic matter to form stable non-organic. The presence of organic material, bacteria population will also increase due to increased food resources and reduce dissolved oxygen in the water by bacteria.

1. The initial DO is measured first in field sampling using an YSI dissolved oxygen meter.
2. Water sample was placed into a dark-colored BOD bottle so the sun cannot penetrate his will accelerate the process of aerobic decomposition and cause inaccurate readings.
3. BOD bottles containing water samples included in the box of ice for the purpose of transportation and temporary storage of water samples. 4. Bottles to be filled with water sample opening / closing cover her in the river to avoid the entry of air from the outside.
5. In the laboratory, the water samples incubated in incubator for 5 days at a temperature of 20C.
6. After water samples taken out from incubator, its dissolved oxygen content measured again as DO end.
7. BOD mg / L = initial DO - DO end.

Chemical Oxygen Demand (COD)

Chemical oxygen demand is the amount of oxygen required for the oxidation of organic materials and inorganic materials in the water. It is also a method to identify or trace quantities of oxygen required by an oxidizing agent into carbon dioxide, water and ammonia.

1. Water samples for COD filled into 500ml Scott bottles.
2. Boxes filled with ice were provided for water samples to be included in it then.
3. Bottle mouth is directed against the tide of the river so that whatever is on the surface of the river will enter the bottle.
4. The cap tightly closed to avoid the combination and water samples preserved with H_2SO_4 to pH <2.
5. In the laboratory, the bottles containing the water sample COD put in cold storage (cool room) for temporary storage.
6. Reactor digestion method used to measure the COD HASH meters DR200.

7. COD meter preheated up to 150C temperature. 8. 2ml of reagent vials for COD is then added into the water sample.
9. Vial cap tightly closed vials and rinsed off with deionized water and dried.
10. Vial reversed several times to slow down and put in a COD reactor for 2 hours.
11. Vials are then will be left to cool at room temperature and then the analysis is done using DR2800 spectrophotometer.
12. The final step, the preparation of the blank solution 2ml deionized water is used as the standard blank.

RESULTS AND DISCUSSION

Method 1: Reef Check

The reef check method is conducted at three different places with the same depth. The samples are named by Mantanani A, Mantanani B and Mantanani C. There are several substrates that are predicted to be present in all sites. They are hard coral (HC), soft coral (SC), recently killed coral (RKC), nutrient indicator algae (NIA), sponge (SP), rock (RC), rubble (RB), sand (SD), silt or clay (SI) and other substrate (OT). The results are shown below in the bar charts form.

a) Mantanani A

As observed in the bar chart below, the site Mantanani A has no soft or hard coral living in it. The substrates that are present in Mantanani A are rock, rubble and sand. Based on the analysis, you can see that there is an abundant percentage of sand, which is 25 %. Next, the rubble shows the second highest percentage of coverage of substrate in Mantanani A site with only 5% less than the sand. Last but not least, the rock covers only 5% of the site.

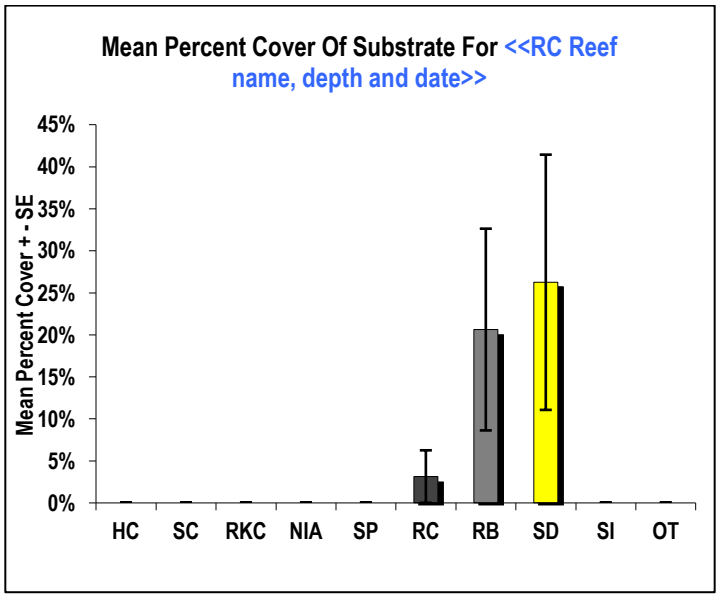

Figure 1 Coverage of substrate at site *Mantanani A*

b) Mantanani B

At Mantanani B site, again, it can be observed that only rock, rubble and sand are present. There are no sign of any living, healthy corals, only the dead one or also known as the rubble. However, at Mantanani B site, it shows a more devastating result. This is because the percentage of rubble's coverage is higher when compared to the percentage of coverage for the sand. The rubble's percentage of coverage exceeds 10% than the sand, which only covers for 20% of the site. The percentage of the rock coverage at site Mantanani B is still the lowest, which is only about 2%.

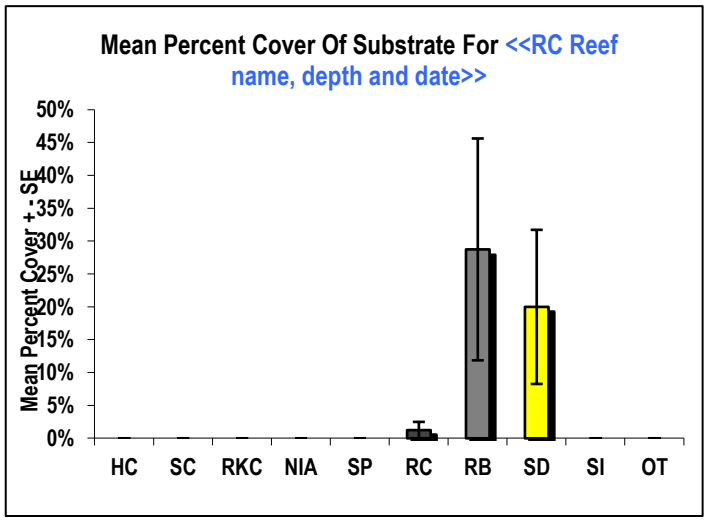

Figure 2 Coverage of substrate at site Mantanani B

c) Mantanani C

As observed below, at Mantanani C site, it has a really positive result. There is no present of dead corals or rubble, which is a good thing. The percentage for the sand coverage also is at the average amount which is 25%. The present of soft corals is almost 25%, which is quite high. This shows that the coral reefs at site Mantanani C could still be conserved and preserved. However, there is still lack of hard coral (HC), which are predicted that the hard coral may be facing extinctions.

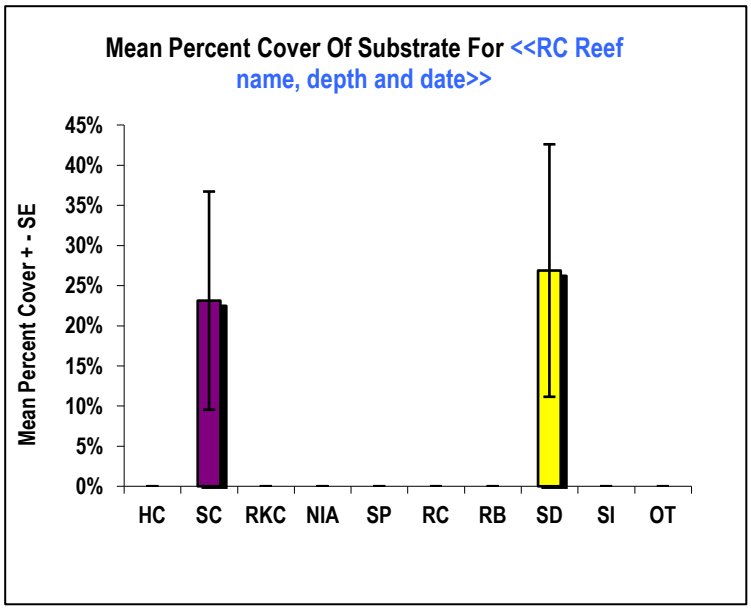

Figure 3 Coverage of substrate at site Mantanani C

Method 2: Analyzing and classifying the questionnaires

a) Education Level Of Responder

As shown below, in figure 4, it can be concluded that the university students have more understanding about coral destruction compared to the high school students (sekolah menengah) and the primary school *(sekolah rendah)* students. It shows that, the university students are clueless compared to the high school students about the destruction of coral reefs although they received higher education.

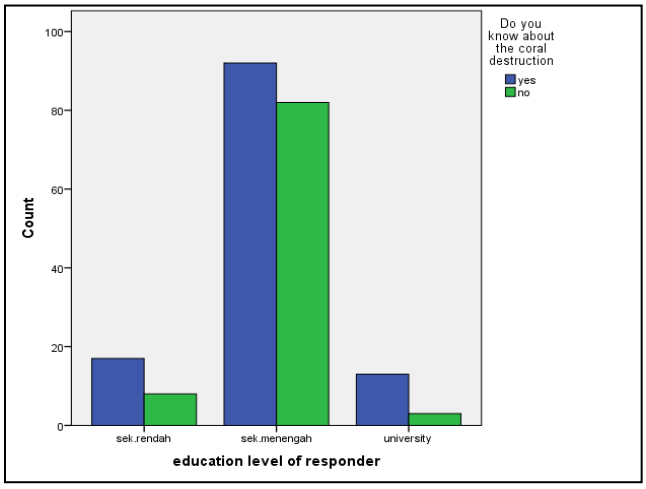

Figure 4 The understanding of correspondence according to education level

b) Occupation of the correspondence

Based on the bar graph below, it can be seen that the critical fields have a deeper understanding of the coral destruction. By calculating the percentage of respondents who agreed, we can create the percentage of the knowledge of the respondent. The percentages are as follows; Students (55%), teachers (60%), critical fields (83%) and others (75%)

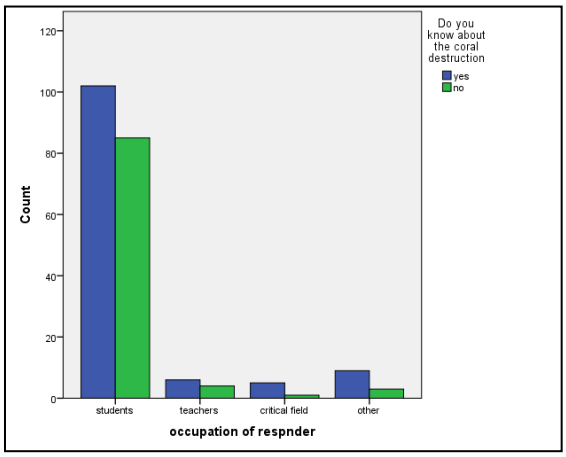

Figure 5 The understanding of correspondence according to type of occupation

c) Gender of the correspondence

Based on the bar graph below, there is a clear significance in the difference of the respondents who answered yes and the respondents who said no. From here, we can see that the male has a wider understanding about coral destruction than the female. Almost 64% of the male knows about the bleaching of corals, where else, only 48% of female had confidence in their knowledge of coral destruction.

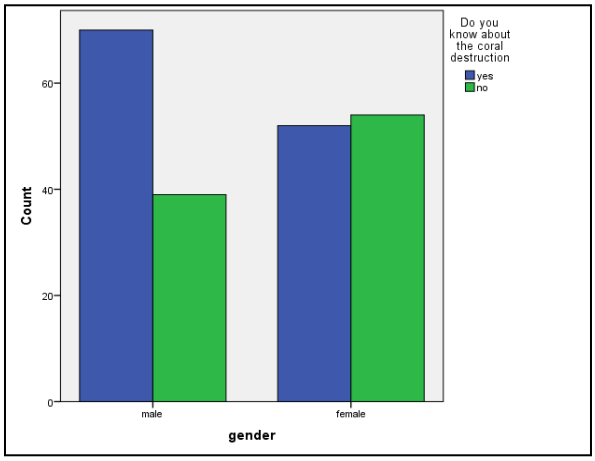

Figure 6 The understanding of correspondence according to gender

CONCLUSION

Based on our reef check results, it can be seen that Mantanani A site has no live corals at all. The site is completely covered only with sand (30%), rubbles (25%) and rock (5%). At Mantanani B site, the result stays the same. There is no sign of living, beautiful corals, just dead and dull rubbles. However, at Mantanani C site, there are soft corals and sand. This shows that coral in Pulau Mantanani could still be conserved. As the results obtained from the questionnaire, it can be concluded that the university students, the critical field workers and also the males have the most understanding about coral destruction compared to others in their respective groups. As a conclusion, the awareness of the public towards coral destruction is at a serious stage.

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THE STUDY OF SOLAR FLARE PATTERNS AND EFFECTS OF SOLAR FLARES

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ABSTRACT

In the vast and harsh solar system, the solar flare is a phenomenon which occurs on the surface of suns and stars at different times. The solar flares are scientifically called Coronal Mass Ejection (CME). CME are released with high velocity containing many harmful substances such as x-rays, ultraviolet-rays and high energy particles. So, what are the effects of solar flares towards earth and is it true that 2013 is the start of the maximum solar activity cycle? From our research we aim to learn the effects of CME's towards the Earth and to develop a prevention plan to reduce the negative effects. By using the SuperSID project to collect data regarding solar flares. From the data collected, we classified and tabulated different classes of solar flares accordingly by month. By using simple mathematics the frequency of certain classes of solar flares can be calculated. General effects were observed from data when compared to each date. Abstractly, with the help of our mentor a prevention plan was made. Moreover, different classes of solar flares affects differently on our beloved and a clear truth of the maximum solar activity can be seen in 2013. Other than that, what we have found is radio blackouts occur globally due to certain classes of solar flares. Finally, solar flares can be observed in patterns according to its classes.

KEYWORDS: solar flares; Coronal Mass Ejection; prediction; prevention; solar flare classes; solar maximum

INTRODUCTION

Solar flares are one of the hazardous weather events in space which are known as space weather. Space weather damage satellites and space/ground-based technology systems and may even threaten astronauts and adversely affect human health or life on Earth (Lu 2011). Solar flares are generated near sun-spots and are characterized by the emission of radiation in all electromagnetic ranges especially in the ultraviolet (EUV) and X-ray bands and by the ejection of charged particles (Garcia-Rigo et al. 2007). Hence, solar flares can be detected by measuring the X-ray and EUV with satellite facilities such as GOES and SOHO.

Because the far UV and soft and hard X-ray solar flare radiation is absorbed by the ionosphere, the ionized gas density increases (ionospheric solar flare effect) and a sudden enhancement of geomagnetic field near Earth surface (geomagnetic solar flare effect) is produced (van Zele and Meza 2011). However, geomagnetic solar flare effect is a poor detector of solar flares. Sudden Ionospheric Disturbance (SID)

allows detection of solar flares through the studies of the ionosphere (Liu et al. 2011). These studies include the observation of Sudden Increase of Total Electron Content (SITEC) using Very High Frequency (VHF) signals, Incoherent Scatter (IS) and Global Positioning System (GPS). The limitation of methods based on analyzing VHF signals from geostationary satellites is their small and ever increasing number and the non-uniform distribution in longitude whereas the practical implementation of the IS method requires very sophisticated, expensive equipment and inadequate time resolution (Afraimovich et al. 2001).

According to Indira Devi et al. (2008), very Low Frequency (VLF) radio waves in the frequency range 3 kHz to 30 kHz have long been in use for long-distance communication and navigation. VLF radio waves propagate in the earth-ionosphere waveguide. X-ray and EUV causes the ionosphere to become suddenly more ionized and thus affects VLF signal propagation. Ionosphere disturbance can be studied by observing the changes in phase and amplitude of VLF signals from remote VLF transmitters (Kumar et al. 2006). The SID-VLF receivers monitor the effects of solar flares on the ionosphere by observing the strength of the VLF signal received. The American Association of Variable Star Observers (AAVSO) uses SID-VLF receivers in the SID program. However, the complicated building, testing and tuning process makes it difficult to be used (Scherrer et al. 2008).

SuperSID Space Weather Monitor was developed by Stanford University Solar Center to detect SID. SuperSID, a lower-cost, more powerful upgraded instrument being distributed through the International Space Weather Initiative (ISWI). SuperSID is sensitive and able to produce research-class data and allows data comparison and sharing through the database and Internet (Scherrer et al. 2010).

METHODOLOGY

In this study, a loop antenna was built to receive VLF signals. A loop antenna is an antenna consisting of a frame which holds up big loops of wire. A loop antenna is an LC (inductor capacitor) circuit which resonates at some frequency. An inductor concentrates and stores magnetic energy, while a capacitor concentrates charge and thereby stores electric energy. The inductance is formed by the wire loop whereas the capacitance is formed by the wiring metal surface, running parallel along the loop. Wire resistance is small and increases as the length of wire increases. As the electromagnetic field from a VLF station passes by the loop, a very small (~0.1 mili-volts) electrical current is induced in the wire. Loop antenna transforms electromagnetic waves energy into electrical energy. The loop antenna is sensitive to magnetic wave fields only because, according to Faraday's law of induction, the electromotive force induced in a loop is proportional to the rate of change of magnetic flux through the loop,

$$e(t) = -\frac{d\varphi(t)}{dt}$$

Where $e(t) =$ electromotive force induced, and $\varphi(t) =$ magnetic flux through the loop. The equation is accepted for electrically short antenna wire that has a total length of less than 0.15 λ, which is the wavelength.

The performance of loop antenna is influenced by the size of the loop antenna and the number of loops of wire. The sensitivity of the loop antenna increases with the area of the loop antenna. In order to use a small loop antenna, more number of loops of wire is needed. Wire with the diameter of 18 to 24 AWG can be looped on a PVC or non-metal frame. In order to obtain a strong output at certain frequencies, a suitable capacitor can be placed at the end of the loops to obtain the output value of the resonance. However, in this study, the capacitor is not used so that the whole VLF signals spectrum can be received and amplified by the preamplifier SuperSID.

In this study, a 1m² loop antenna which consists of 23 loops with a diameter of 26 AWG wire was constructed to receive VLF signals. This type of loop antenna constructed is called electrically short antenna. For the material of the frame of the loop antenna, PVC was chosen because it is

i. Readily available and low-cost
ii. Easily constructed due to its easiness to be cut
iii. Lightweight and portable
iv. Strong and symmetrical with appropriate design

The output of the loop antenna was connected to the preamplifier SuperSID using coaxial cable. The loop antenna built is illustrated in Figure 1.

Figure 1 Loop antenna built

The block diagram of the receiver station is shown in Figure 2.

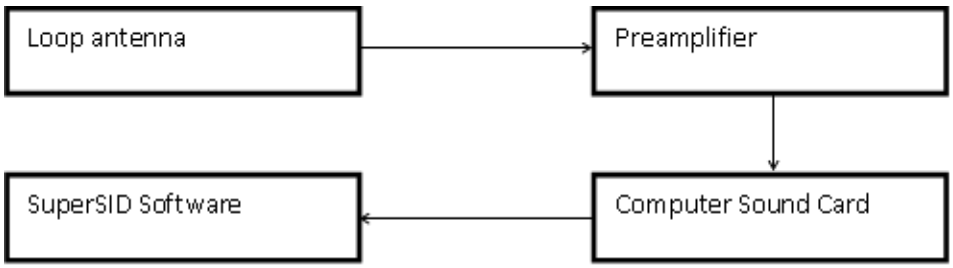


Figure 2 Block diagram of the receiver station

The receiver station was placed in the seminar room at Pusat PERMATApintar Negara, UKM. This location was chosen because it is free from electrical interference as it is far from electricity generators, large electrical appliances, microwave and other source of interference. The installation of receiver station is illustrated in Figure 3.

Figure 3 The installation of receiver station.

The receiver station collected data for about 8 months (18 January 2012 - 18 September 2012, 25 January 2013 – 20 July 2013).

The VLF signals that are reflected from the ionosphere were received by the loop antenna. The output voltage induced in the loop antenna has very small amplitude and was then amplified by the preamplifier SuperSID to be collected by the computer sound card. Computer sound card converts the analog signal to a digital signal. The output signal from the preamplifier is sampled by the Realtek High Definition Audio Soundcard at a frequency of 96 kHz. SuperSID is able to detect the signal with a maximum frequency of 48 kHz which is equal to half of the sampling frequency,

$$f_{MAX} = \frac{f_S}{2} = \frac{96}{2} = 48\ kHz$$

Where f_{MAX} is the maximum frequency and f_s is the sampling frequency.

SuperSID software observed the strength of the VLF signals received every 5 seconds, processed data and stored data in Excel format.

SuperSID software was installed in the computer after the hardware installation was complete. The software was configured by inserting specific information related to the receiver station so that the process of collecting data can be carried out effectively.

When the supersid.exe applications is running, the spectrum of signal can be seen. Transmitter stations that are going to be observed were determined according to the signal strength from the transmitter stations which appear as peak high above the noise level consistently. The frequency of the transmitter stations can be configured in the software so that the data is collected, processed and stored.

A stable peak at frequency 19.758 kHz appeared in the spectrum obtained. By referring to the list of VLF transmitter stations, the station is configured to monitor the VLF signals from NWC transmitter station (19.8 kHz) which located at North West Cape, Australia with the latitude of 21.8˚S and the longitude of 114.2 ˚E.

The data files collected were plotted using supersid_plot.exe software. Data was validated by observing the obvious pattern of the sun rising and setting. The slope decreased dramatically at sunrise and increased dramatically at sunset. The time of sunrise and sunset obtained in the data were compared with the local sunrise and sunset time which can be obtained from http://www.timeanddate.com.

Analysis of data according to UTC time was carried out by plotting the data using supersid_plot.exe software because it facilitates data comparisons.

SID effects were observed as a sudden change in the signal strength received by the SuperSID receiver during day time. When solar flares occur, the signal strength will increase swiftly and decrease slowly. However, the solar flares incident can show up as a decrease, rather than increase, in signal strength. This is due to destructive interference of the VLF waves between receiver station and the transmitter (Scherrer et al. 2010). Next, the occurrence of solar flare was identified.

The solar flare incident obtained from the data was compared with the data collected by the GOES satellite. According to the NOAA / SWPC website, GOES satellite observed X-ray flux strength in the 1 to 8 Angstrom (0.1 – 0.8 nm) and 0.5 to 4 Angstrom (0.05 – 0.4 nm) every 5 seconds and plot the data in real time. These graphs can be obtained from the website SWPC. However, for the detection of solar flares, only data observed by GOES 15 satellite in the flux strength of 0.1 – 0.8 nm should be investigated.

In this study, data collected by SuperSID was compared with XRA type of incident information which was measured in the flux strength of 1 to 8 Angstrom from the GOES database. These informations include the begin time, max time, end time, solar flares class and source of solar flares.

The source of solar flares was detected based on the list of active regions derived from GOES data. The active regions can be identified by referring to the SOHO images obtained from http://soho.nascom.nasa.gov.

Data comparison with other receiver stations was conducted to determine the reliability of SuperSID in tracking solar flares in Malaysia. Three receiver stations from United States continent which observed SuperSID data with sunrise and sunset pattern were chosen for comparison. These receiver stations were located at high latitudes and have different time zones with UKM.

These receiver stations include AlbertaU in Canada, PGNC and RHT in United States. They received signals from NAA and NPM VLF transmitters which located in Cutler and Hawaii respectively. The data from these receiver stations was obtained from the Stanford SID database.

The comparison of data was carried out by plotting the collected data at these receiver stations in UTC time by using supersid_plot.exe software. Signal strength changes over time were compared with the data collected from the receiver station at UKM.

RESULTS AND DISCUSSION

The spectrum obtained by is shown in Figure 4. According to the figure shown, it is found that SuperSID is able to detect stable peak high above the noise floor at a frequency of 19.758 kHz. The signal received was emitted by NWC transmitter from North West Cape, Australia at a frequency of 19.8 kHz. Hence, the VLF signal from NWC was detected by the SuperSID.

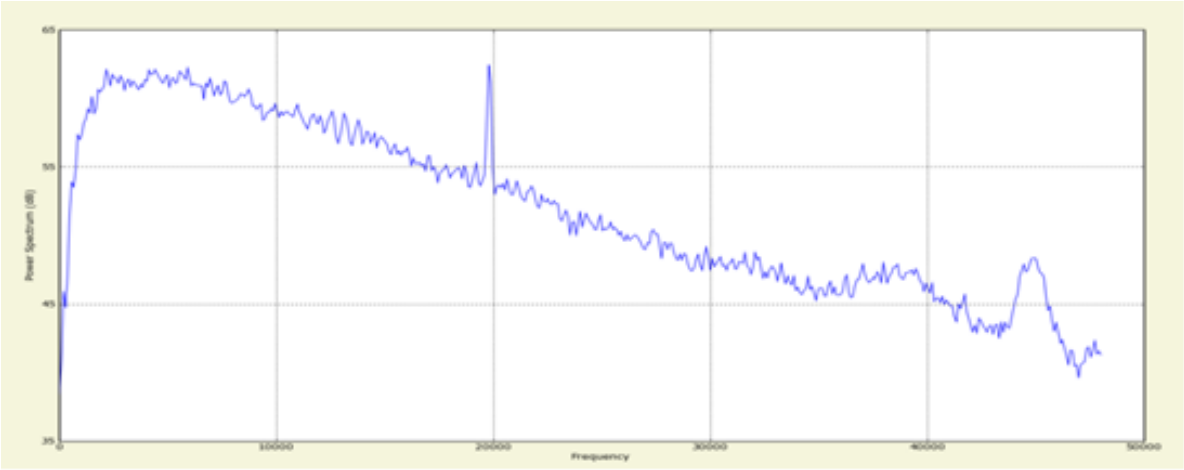


Figure 4 SuperSID spectrum obtained.

The distance of great circle between NWC (21.8 ˚S, 114.2 ˚E) and UKM (3.13 ˚N, 101.7 ˚E) is around 3089. Since single-hop VLF radio wave reflection via D-layer does not reach beyond 2000 km, an earth-ionosphere waveguide mode of propagation is assumed, following Lynn (2010).

Sunrise and sunset patterns are observed from the data daily. On 30th June 2012, sunset pattern can be observed as a minimum-shaped in the graph with the minimum point SS1 at 10.58 am in UTC time which is 6.58 pm in local time. The signal minimum is produced by modal interference generated at the sunrise and sunset height discontinuities in reflection height as they move along the path (More et al. 2010). After sunset, the VLF signals are reflected from the F2 layer. The strength of the received VLF signal varies randomly because the F2 layer is unstable at night. The local sunset time obtained from the website www.timeanddate.com is 7.26 pm on 30th June 2012. These times validate the sunset pattern observed by SuperSID receiver. As the sunrise terminator moves westward over the propagation path, the first signal minimum (SR1) is observed at the receiver at 9.06 pm (30th June 2012) in UTC time which is 5.06 am (1st July 2012) in local time with a subsequent signal minimum (SR2) at 9.46 pm in UTC time which is 5.46 am in local time. Following the completion of sunrise over the whole path, an increase in signal strength occurs as a temporary C layer develops when sunlight releases electrons from negative

ions built up during the night (More et al. 2010). The temporary C layer appears at the altitude of about 63 km when the sun is going to rise or set (Rasmussen et al. 1980). The changes in slope at the point SR3 at 10.46 pm in UTC time which is 6.46 am in local time shows D layer begins to build and C layer begins to fade off. During this time, VLF signals start to lose energy when going through D layer and are reflected by E layer. The local sunrise time obtained from the website www.timeanddate.com is 7.08 am. Thus, the sunrise pattern observed by SuperSID is also validated.

The data obtained are plotted using supersid_plot.exe to detect SID effects and solar flares. These effects are only obvious during daytime and can be seen as a sudden increase in signal strength and followed by a slow decrease in signal strength. This is due to the increase of ionization rate in the D layer of the ionosphere during solar flares. The VLF signals which propagate from remote transmitters do not experience loss of energy to penetrate the D layer and they are reflected from the D layer (Khanal 2004). Thus, the VLF signals strength received increase rapidly. Based on the Figure 5, a solar flare is detected at 5.35 am on 29th July 2012 in UTC time which is 1.35 pm on 29th July 2012 in local time.

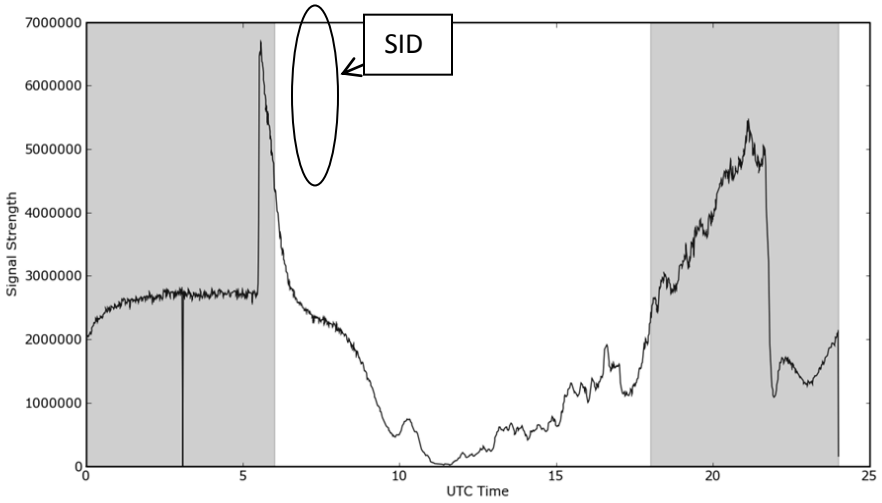
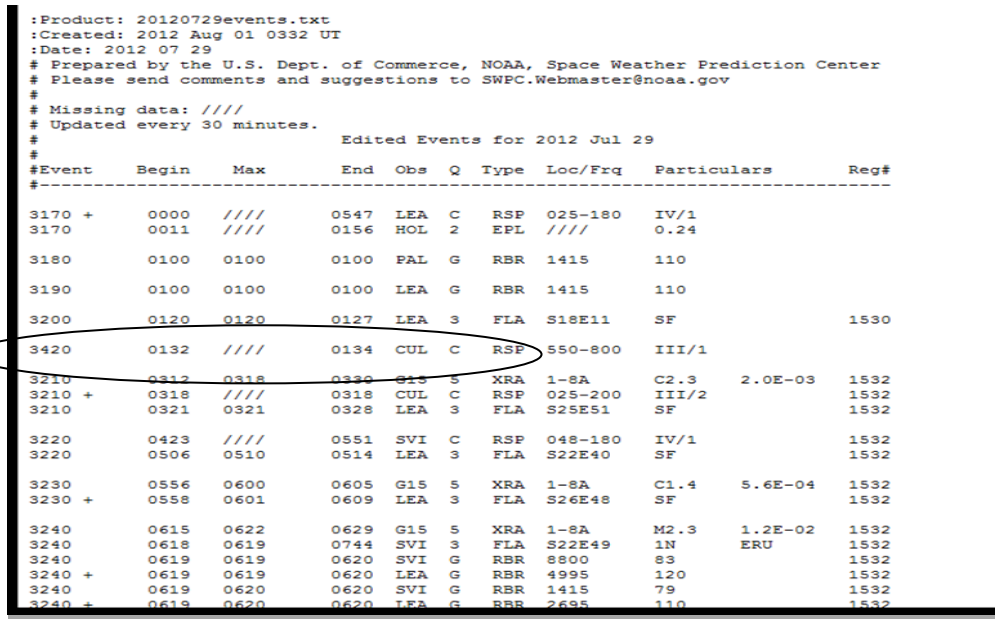


Figure 5 VLF signal strength received from NWC transmitter on 29th July 2012 based on UTC time.

Solar flares incident can be detected from GOES data and plot the X-ray flux. It was found that the solar flares detected by SuperSID are in M and C class. According to Scherrer et al. (2010), SuperSID is not sensitive enough to detect B class solar flares. C class solar flares which have large magnitude can be detected by SuperSID. M and X class solar flares are significant to be observed by SuperSID.

Some data collected lead GOES data by the range from 1 to 26 minutes whereas some delay compared to GOES data by the range from 2 to 28 minutes. Begin, max and end time of solar flares can be obtained from the GOES data. For example, Figure 6 shows begin, max and end time of a C1.4 class solar flare which occurred on 29th July 2012 based on GOES data. SuperSID data collected was ahead the time of GOES data by 26 minutes, 24 minutes and 12 minutes respectively.



```
:Product: 20120729events.txt
:Created: 2012 Aug 01 0332 UT
:Date: 2012 07 29
# Prepared by the U.S. Dept. of Commerce, NOAA, Space Weather Prediction Center
# Please send comments and suggestions to SWPC.Webmaster@noaa.gov
#
# Missing data: ////
# Updated every 30 minutes.
#                          Edited Events for 2012 Jul 29
#
#Event    Begin    Max       End  Obs  Q  Type  Loc/Frq   Particulars        Reg#
#-------------------------------------------------------------------------------

3170 +     0000   ////      0547  LEA  C   RSP  025-180   IV/1
3170       0011   ////      0156  HOL  2   EPL  ////      0.24

3180       0100   0100      0100  PAL  G   RBR  1415      110

3190       0100   0100      0100  LEA  G   RBR  1415      110

3200       0120   0120      0127  LEA  3   FLA  S18E11    SF                 1530

3420       0132   ////      0134  CUL  C   RSP  550-800   III/1

3210       0312   0318      0330  G15  5   XRA  1-8A      C2.3    2.0E-03    1532
3210 +     0318   ////      0318  CUL  C   RSP  025-200   III/2              1532
3210       0321   0321      0328  LEA  3   FLA  S25E51    SF                 1532

3220       0423   ////      0551  SVI  C   RSP  048-180   IV/1               1532
3220       0506   0510      0514  LEA  3   FLA  S22E40    SF                 1532

3230       0556   0600      0605  G15  5   XRA  1-8A      C1.4    5.6E-04    1532
3230 +     0558   0601      0609  LEA  3   FLA  S26E48    SF                 1532

3240       0615   0622      0629  G15  5   XRA  1-8A      M2.3    1.2E-02    1532
3240       0618   0619      0744  SVI  3   FLA  S22E49    1N      ERU        1532
3240       0619   0619      0620  SVI  G   RBR  8800      83                 1532
3240 +     0619   0619      0620  LEA  G   RBR  4995      120                1532
3240       0619   0620      0620  SVI  G   RBR  1415      79                 1532
3240 +     0619   0620      0620  LEA  G   RBR  2695      110                1532
```

Figure 6 GOES data on 29th July 2012

The difference is due to the less accurate computer clock of the receiver station because inconsistent connection with the Worldwide time network. SuperSID records data using the computer clock timestamp. SuperSID should be able to detect the SID effects at about the same time with GOES data or with a slight delay. Solar flares observed by GOES are more accurate due to the measurements of X-ray flux with sophisticated equipment. Besides, the end time is identified from the SuperSID data by observing the time the signal strength drops back to the normal level. The end time identified is slower because the effects on ionosphere last for a while even though the solar flare has ended. However, the SID pattern observed is acceptable within a reasonable range of time. Hence, 104 C and M class solar flares were detected by SuperSID during the observation period. There are 22 M class solar flares detected, which consist of M1.0, M1.3, M1.8, M2.3 and M1.6.

GOES data also provides information about the registered number of the active regions of the sun, which are the sources of solar flares. For example, based on Figure 6, the source of C1.4 class solar flare occurred on 29th July 2012 is given by Reg#, that is 1532. The source of this solar flare is identified by observing the image of sunspots derived from SOHO website which is illustrated in Figure 7.

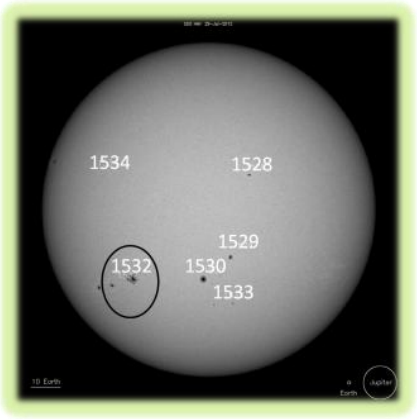


Figure 7 Images of sunspots (Source: SOHO website)

The location of the three receiver stations used for data comparison purposes with local data and the location of transmitter stations is shown in Figure 8. It was found that the signal strength observed by PGNC and RHT station is higher than AlbertaU and UKM station. This is due to the different conditions of ionosphere in different areas. However, the VLF signal received by UKM receiver station is also able to detect solar flares that occurred on 29th July 2012. This shows that Super SID is effective and reliable in tracking solar flares at the equatorial region and other regions of the world.

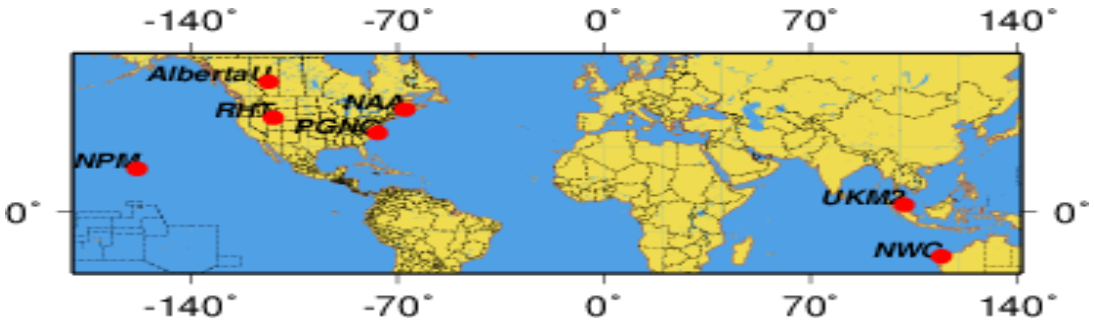


Figure 8 Location of receiver stations and transmitter stations.
(Source: Woods Hole Science Centre Map Generator 2012)

Besides that, we have proved that different classes of solar flares acts independently on our Earth for example the X-class solar flares which has caused a devastating effect in Quebec, Canada in 1989. It caused the transformers to blow up and caused the loss of electricity in that city. We also found that the Aurora in both poles are directly caused solar flares. Magnetic waves from flares interfere with the Earth magnetic field which cause protons and electrons to react with gasses that are present in our atmosphere. Reaction with oxygen will cause the formation of green light arrays; where else with nitrogen the lightshow of red light.

The year 2013 has also shown that it is the epoch of the current 11 year solar cycle. Solar activities during this year show very high compared to other years in the current solar cycle. But, it is one of the

lowest solar maximum among all solar maximum which have been recorded. This might be because of a state which the sun will hibernate is close which is still a hypothetical stage. Theoretically we have created a machine which can reproduce the aurora at the right conditions. This would allow people who have not seen it be possible to see it and enjoy it one day.

CONCLUSION

The objectives of this research were achieved. Typical diurnal variation of VLF signal strength received by UKM receiver station is clearly shown throughout the period of this research. This validates that UKM receiver station is able to receive remote VLF signals. Data comparisons between local data and global data determine the reliability of SuperSID in Malaysia and equatorial region. SID effects are observed as the transient change of signal strength during daytime. These SID effects show that the ionosphere is disturbed when solar flares occur. Solar flares incidents are determined based on the SID effects and data comparisons with GOES data. Large scale solar flares incidents as high as M2.3 class and high magnitude C class solar flares incidents were successfully observed by the receiver station. The sources of the solar flares were also identified according to SOHO images. Further research can be done by developing software and analyzing data.

As a conclusion, solar flares is a topic in Astrophysics that has to be studied deeper as there is much more to be found besides than the interference that it has cause and how to prevent solar flares negative effects. We also know that many of the weird phenomena that happen on our Earth is also caused by solar flares.

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SEPTIC ARTHRITIS IN ADULTS AND CHILDREN

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ABSTRACT

Septic arthritis is the purulent invasion of a joint by an infectious agent which produces arthritis- usually occurs among adults and children. This research was conducted to study the pattern of the disease in Malaysia, .and to give awareness to the community. Data for this study, comprising data from 2002 until 2012 were collected from UKM Medical Centre (UKMMC). Data were analysed by grouping them into specific aspects. A comparison between the previous data with the newest cases was also carried out and distributed brochure to the community. The findings show that uneven number of cases occurred throughout the period of 11 years. But roughly, this infection mostly occurred during the year of 2012, where the cases of infection increased about 31% from the previous year. Furthermore, the findings also indicate that males have a higher chance of being infected compared to female, and in terms of ethnic group distribution, Septic arthritis seem to affect more Malays than Chinese and Indian

KEYWORDS: Septic arthritis; Malay; Chinese; Indian; infection; osteomyelitis

INTRODUCTION

Bone infection, also called osteomyelitis, is an infection of the bone. Osteomyelitis occurs in both children and adults, and can affect any bone in the body. If untreated, it can cause permanent bone deformity. Children usually have an acute form of the disease, while adults are more likely to have chronic osteomyelitis. Treatment for both forms of osteomyelitis includes high doses of antibiotics to rid the body of bacteria. Additional treatment such as draining an open wound or abscess, or surgery to remove infected or dead bone tissue, may be necessary for some people.

The bacteria or other microorganisms that cause osteomyelitis can enter the bone through an injury, or can be carried through the bloodstream to the bones from another infection in the body. Although bones are usually well-protected against infection, they can become infected in several ways. Bacteria can enter the bone through an open fracture, penetration by a sharp, contaminated object (such as a nail that pierces through a shoe), orthopedic surgery, or a human bite. The findings of this research will help to reduce the cases of septic arthritis due to bacterial infection.

AIM /OBJECTIVES

Aim: To reach deeper understanding on septic arthritis caused by microbial or viral infection, the pattern of its occurrence and its distribution in Malaysia.

Objectives:

1. To study the pattern of the infection of septic arthritis that occurred inMalaysia
2. To find outquantitatively the number of cases thathave happened inMalaysia
3. To predict the possibility of the infection to occur in present
4. To raise awareness to all people regarding the infection of the disease

Hypothesis:

The pattern of the bone infection cases among adult and children around Malaysia is changing from time to time.

METHODOLOGY.

For the purpose of this study, the necessary data on septic arthritis infections were collected from the Universiti Kebangsaan Malaysia Medical Centre (UKMMC), one of the four university hospitals in Malaysia. It is located in Bandar TunRazak, Kuala Lumpur and is administered by UniversitiKebangsaan Malaysia.

The data of the older records from the Medical Information Department were also collected. Medical records of all patients, adults and children with a diagnosis of septic arthritis at UKMMC from 2002 to 2012 were reviewed. The ICD diagnosis, specimen, organisms, age and gender were analyzed by using computer system.

A comparison was made. The graph of the number cases of septic arthritis by year was plotted. Graph for other finding such as specimen, ICD diagnosis was also plotted.

Distributing brochure

To give awareness to the community, the brochure about septic arthritis was distributed. The brochure is distributed to the Permatapintar's students and instructors.

Firstly, all the data were separated according to the ages; without taking any consideration on the physical appearance of the patients. For this study, the patients were only considered adults and children; so a scale was set to differentiate both of these groups. The ages scale for the study is as follow:

Table 1 The ages scale for the study conducted

GROUP	AGES
Adults	18 above
Children	18 below

So, based on the data collected throughout the period of 11 years, the number of septic arthritis cases that occurred around Malaysia mostly occurred in the adults compared to the children. The findings indicate 73% of number of cases involved adults and another 27% involved children.

RESULT

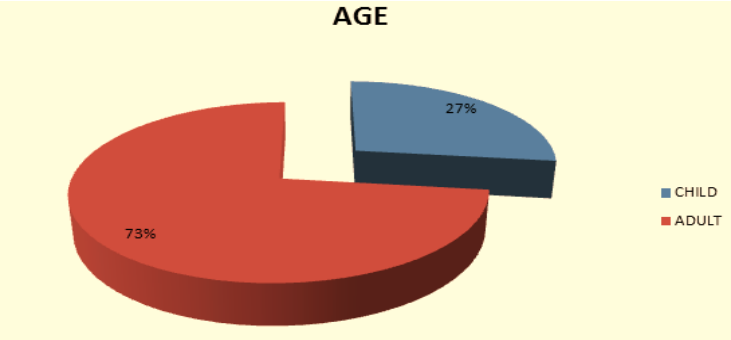

Figure 1 Breakdown of the number of cases according to category of patience

Next, the data classification was also made according to the gender to determine either the disease is more likely to affect the male or female. As is widely known, Septic Arthritis is sometimes dependent on the factor of the chromosomal behavior; whether it is because the X gene or not. So, to know the septic arthritis disease deeply, a graph regarding the gender is plotted.

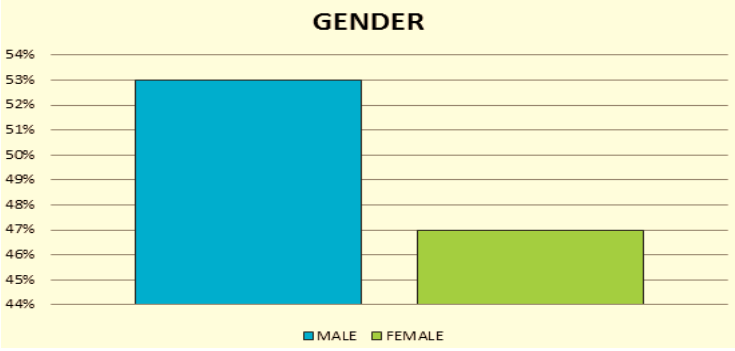

Figure 2 The gender of the patients involved in the septic arthritis cases

Thirdly, the septic arthritis cases are classified according to its ICD Diagnosis. This diagnosis actually helps to determine the type of organisms causing the disease. The microorganisms involved are mainly bacteria and from the data obtained, the type and number of bacteria that affect the patients also

increased every year. Long ago, only Pyogenic Arthritis NOS was responsible for the disease but nowadays, the types of microorganisms involved are as follow: Pyogenic Arthritis NOS, Streptococcus Arthritis, Staphylococcus Arthritis, Enterobactersp, Group B streptococcus, Methicillin Resistant Stap, Staphylococcus Aureus, Staphylococcus Coagulase Negative and Streptococcus Pneumoniae.. (however, for this study, we only got patients who were being infected by three bacteria, Pyogenic Arthritis NOS, Streptococcus Arthritis and Staphylococcus Arthritis).

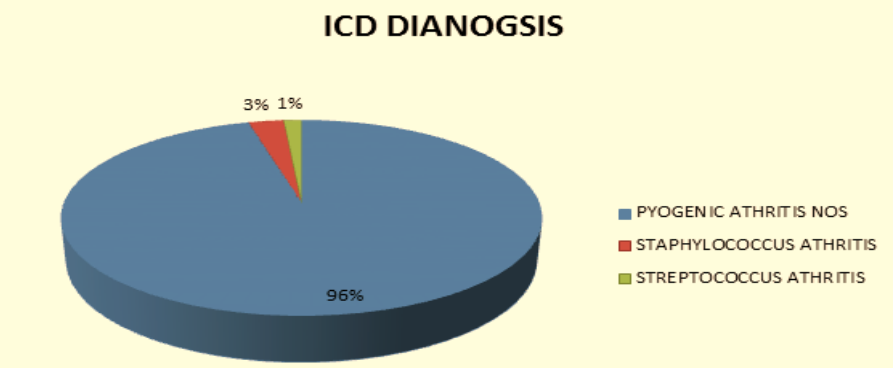

Figure 3 The ICD Diagnosis of the patients who were diagnosed to have the septic arthritis

Besides, the patients werealso separated according to the races. As the cases for the research wereonly in the area of Malaysia, the data obtained in UKM Medical Centre only involved the Malay, Chinese and Indian people. Based on the data, the number of cases of septic arthritis usually occurred in Malay people, followed by Chinese and then Indian people. The results are as follow:

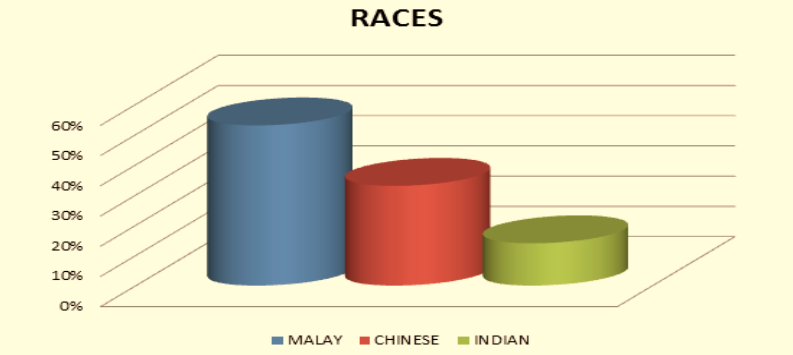

Figure 4Breakdown of races of the patients involved in the septic arthritic cases

Finally, the data is classified according to the specimen received by the medical laboratory in UKM Medical Centre. All of these specimens are obtained from the different parts the patients' body. For this study, there are 3 types of specimens involved, namely blood, pus and fluid. There are also patients who werenoted with N/A for this specimen column, which indicatedthat the specimen was not available. The breakdown of the specimen is shown in Figure5.

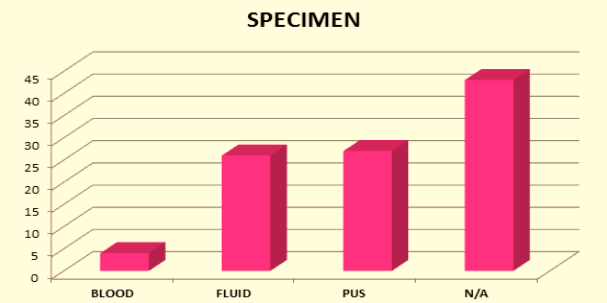

Figure 5 Breakdown of the specimen of the patients involved in the septic arthritis cases

DISCUSSION

Based on the findings of our research about Septic Arthritis among children and adults,it can be concluded that the pattern of infection of the disease is not fixed; it is either increasing or decreasing every year. Roughly, even if the result obtained varied, we could still determine that the pattern of infection was increasing. Prior to this , the only organisms involved in spreading this disease was only Pyogenic Arthritis. However, results of recent studies suggest Staphylococcus Arthritis and Streptococcus Arthritis are also responsible for the same medical condition. As such more research needs to be carried out to determinehow these microorganisms can cause Septic Arthritis.

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FEAR OF MEDICAL PROCEDURES IN CHILDREN FROM 4 TO 6 YEARS OLD

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ABSTRACT

Fear of medical procedures in children is becoming a problem nowadays as it either can disturb the process of completing the procedures or disrupt any diagnosis made by the medical officer. This study focused on 4 to 6 years old pre-schoolers in Tunas Permata as how the social, emotional and cognitive potential are developed are vital in this range of age. The aim of this study is to identify the cause of children's fear of medical procedures from the perspectives of the children themselves and also their parents. Another aim was to find out suitable actions to be taken during the medical procedures to help the children reduce, or overcome their fear. Both qualitative and quantitative methods were applied in this study. 36 of 4 to 6 years old students of Tunas Permata were interviewed and at the same time, questionnaires were distributed to the preschoolers' parents. Interviews data showed that most of the children interviewed were scared of going through medical procedures without the presence of their parents. They were afraid of being alone with the medical officer attending them. The conclusion was that, parents should be alongside with their children or make their presences felt by the children, so the children's fear of medical procedures are over came to minimize any disruption or mistakes.

KEYWORDS: Fear; medical procedures; Tunas Permata; children

INTRODUCTION

Underestimated by most adults, pre-school aged children are often considered as unreliable informants in researches. Most data of child-related researches were obtained from parents and medical officers. However, a good way to understand them is to ask the children themselves. Children in their pre-school ages are able to express themselves well enough to answer the questions and discuss them even though, they sometimes unable to produce vocabulary that clearly expresses emotion concepts described by adults.

To hold a child in a hospital, knowing the cause of fear and how to cope with it is good. It helps everyone that are involved in medical procedures; the child, parents and medical officers. Children who coped with their fears show faster recovery and have lesser emotional problems, such as separation anxiety and sleep disturbance (Justus 2006). Therefore, less medication and sedation are needed to minimize the pain thus reducing the medical fees. Also, medical errors can be prevented. The process of completing the procedures also can be done more quickly, smoothly with fewer medical personnel

involved, easing both parents and child. A child-friendly environment of medical centres made to help the children reduce or overcome their fear will influence their behaviour positively towards the medical procedures.

Fear is defined as an unpleasant and distressing emotion or anxiety caused by the belief something or someone is dangerous, likely dangerous or any imaginary scary subjects, whether the cause is real or imagined. Most childhood fears are normal and temporary. These kinds of fear eventually disappear as the children grow up. The fear of going to the doctor, undergoing medical procedures at medical centres is one of the top 10 fears of childhood besides public speaking, animals, monsters and ghosts, death, being alone in the dark, war, personal danger, loss of parent and divorce (Dale 2012). However, phobias, defined as extreme or irrational fears of aversion to something (Bourne 2011), are not included as they require more professional helps and psychotherapies.

Medical procedure is defined as an activity directed at or performed on an individual with the object of improving health, treating disease or injury, or making a diagnosis. International Dictionary of Medicine and Biology, 1986, pg 2297). Generally, medical procedures include any medical test in any medical centres supervised by medical officers.

This subject is important as pre-school-aged children are vulnerable to the effects of fear even after the medical procedures ended. These posttraumatic responses may negatively affect children's health and increase the risk of health during the next stages of growth. Also, the children's cognitive, physical, emotional and social development may be delayed (Aley 2002). It is also important to prevent any medical errors whether or not it is evident or harmful to the patient. This includes inaccurate or incomplete diagnosis or treatment and the starting over of the medical procedure.

By identifying the cause of fear, coping strategies and actions can be taken to help the children. Coping is defined as constantly changing cognitive and behavioural efforts to manage specific demands (Lazarus & Folkman 1984). The strategies and actions refer to efforts, behavioural and psychological to tolerate or minimize the fear in children. In this study, coping strategies and actions are defined as the effort of children, parents and also medical personnel at psychological and behavioural to minimize or overcome children's fear of medical procedures.

LITERATURE REVIEW

The developmental changes in this stage are more subtle but are considered just as important. According to Kirby Deater-Deckard (2004), psychology professor at Virginia Polytechnic Institute and State University, children are becoming more comfortable expressing themselves with words at pre-school-age. During these years, preschoolers also gain more self-control. They begin to rely less on other people and more on themselves. They develop the skills to calm themselves when they get excited, frightened or upset, and they are becoming more attentive and less emotionally reactive. They are also learning to build their self-confidence.

Pre-school-aged children express a wide range of emotions and are able to use appropriate labels such as mad, sad and happy to differentiate their feelings. Their feelings are specific to the situations they are in and can change rapidly. As they grow up, the regulation over their emotions increases and they acquire new cognitive skills. For emotional development, it is largely on the surface. The children's emotions are very connected to the event and feelings that are occurring at the moment. However, these developments are greatly influenced by culture, disabilities, adults' behaviour, child-parents relationship and the opportunities the children have to interact with society. In the age range of 4 to 6 years old, children have difficulty separating feelings from actions. They simply express their feelings through actions.

Table 1 Identifying fears and anxieties also start early from the age of three.

Fear/Anxiety	Explanation.
General anxiety	Recognized as the same anxiety of uncontrolled worry that occurs in adults. Children with general anxieties often feel self-conscious, self-doubting and concerned about meeting other people.
Social anxiety	Children with this disorder are painfully shy and fear exposure to unfamiliar environments. This results to clinging to parents and feeling afraid to talk to other children and adults.
Separation anxiety	Fear of being away from home or one's parents. It may develop spontaneously or under stress. This happens because in the absence of their parents, children tend to be worried about their parents' conditions.
Simple phobias	Fear of certain specific objects or situations is very common in children as they grow up. These fears come and go rapidly, as their minds and emotions become more mature. Some common objects include blood, doctor, death and animals.

Source: Children's fears and anxieties, Harvard Mental Health Letter, 21(6) 2004

Classical conditioning causes fear to arise. An object, person or situation can scare the children by association with something that is inherently frightening. Some fears and anxieties have genetic and environmental factors. Fears and anxieties in humans are associated with irregularities in the activity of neurotransmitters dopamine and serotonin, and with high levels of hormone that triggers stress response.

In most cases of fears and anxieties in children, cognitive behavioural therapy is the best treatment (Harvard Mental Health Letter 2004) Usually, child is placed near the feared object or put in the unfavourable situation, with rewards for success in facing fears. This method shows the best result when done in group as children with fears obtain the opportunities to boost their self-confidence and social skills. Therapies with the aid of toys, drawings and puppets may help children recognize and express their fears. Parents, families and guardians can help in many ways by facilitating cognitive behavioural therapies or becoming the model to the children.

Most studies reported that children were most afraid of the unfamiliar environment, separation from parents, poor child-staff relationship and the pain they are experiencing (Marja Salmela 2010). Children with severe diseases who need to go more complicated and long medical procedures may have the fear of difficult symptoms that limit their actions, activities and their daily life as a normal child. Data

from parents showed that, the children's fears and anxieties were caused by being held still, pain, injections and blood samplings and the nursing procedures.

Typical causes of fears of medical procedures in children are separation from parents, unfamiliar surroundings, cut, injection and suturing, taking medicines, poor child-staff relations and interactions, unfamiliarity with the procedures (Flinkman and Salantera 2004 & Wennstrom 2008)

Past research has shown that four to six years old children express their fears clearly with their emotional and physical expressions. The change in both expressions may be a bit subtle or weak, but the change may also be big and aggressive. Also, the expression of fears may be before the medical procedures take place, such as when the child is being informed about the medical procedures or visit to the medical centres, during the medical procedures, where the child see what kind of treatments are given to them or after the medical procedures such as sulking, loss of appetite or bedwetting.

Typical expression of fears are general anxiety, cry, clinging to parents, emotional outbursts, escape attempt, change in facial expressions, behaviour and verbal expressions, and fall silent (Wennstrom & Bergh 2008).

In conjunction to that, parents and medical officers stated that children use their cognitive and emotion oriented coping strategies to handle their fears. Cognitive oriented actions and strategies are more likely exposing the children to the cause of fears and assuring them that particular cause does not pose any threat to the children. Emotion-oriented strategies involve efforts to regulate the emotional consequences of stressful or potentially stressful events (Lazarus & Folkman 1984) such as the presence of supportive family members or guardians throughout the medical officers.

Cognitive-oriented and emotion-oriented coping actions and strategies are distraction presence of family members or guardian, child-friendly environment, music and art therapy, play doctor, presents and toys (Caprilli 2007; Foley 2000; Gagnon J, 2004; Zelikovsky 2000).

AIM

Opinion from both children and parents were recorded and analysed in this study about children's fear of medical procedures. Parents were also asked about their opinions on the coping strategies to minimize the fear. The purpose of this study was to identify the cause of 4-6 year-old children's fear of medical procedures from the children's and their parents' perspective, and identify suitable actions or strategies to be taken to help them reduce or overcome the fear.

Research Objectives:

1. To explore the cause of fear of medical procedures among 4-6 years old childrens from childrens and parent perspectives.

2. To identify the coping strategies that can be taken to minimize the fear of medical procedures among 4 to 6 years old children?

Research Questions:

1. What causes the fear of medical procedures among 4 to 6 years old children from the child and their parents' perspective?

2. What kind of coping strategies can be taken to minimize the fear of medical procedures among 4 to 6 years old children?

METHODS

Both qualitative and quantitative methods were used. In qualitative method, 4 to 6 years old students of Tunas Permata, Universiti Kebangsaan Malaysia were interviewed. In quantitative method, questionnaires were distributed to the parents of Tunas Permata student. A purposive sampling method was used.

Qualitative Approach

The data were collected by interviewing 4-6 years old children who are students of Tunas Permata, Universtiti Kebangsaan Malaysia. 36 children were interviewed with the aim to find out the cause of fear of medical procedures in them. The respondent, who were chosen through purposive sampling, were **i**nterviewed. The interviews were arranged by the teachers of Tunas Permata. The headmistress was informed about the study and the interviews. Permissions from parents were obtained and the interviews were held in one of the classrooms in Tunas Permata. The interviews were recorded and transcribed. The data about the cause of fear were then analyzed based on phenomenological analysis by Collaizzi (1973, 1978), Giorgi (1975), and Tesch (1980).

Quantitative Approach

Parents' responses to a questionnaires which consisted of two questions that required them to rate the answers according the likert scale; 1- Totally disagree, 2- Disagree, 3- Unsure, 4- Agree, 5- Totally agree. The data were analysed using SPSS and were subjected to frequency distribution. The parents names were kept anonymous. Tunas Permata administrator and respondents' parents were informed about the study. The headmistress was told about the questionnaires to the parents.

The purpose of the interviews and survey were both to find out the cause of fear of medical procedures in pre-school-aged children and the coping strategies that can be carried out to help the children to overcome their fear. However, the interviews focused more on finding out the cause while the questionnaires zoomed into coping strategies and actions. The interviews were done in a way that it did not pressurize and burden the child. In a case where the child refused to talk to the interviewer, a toy bunny was given and it managed to make the child talks.

Instrumentation

Questions for the children:

1. Is there anything frightening in the doctor's?
2. Were the children scared during the medical procedure?
3. Will the children be scared if they go alone?

Questions for the parents:

1. In your perspective, what causes the children to be afraid of going to medical procedure?

    a) Separation from parents
    b) Unfamiliar environment
    c) Control of medical officers over the children
    d) Pain or body injuries
    e) Injections and suturing
    f) Unrealistic fears
    g) Lack of information about the post-procedure

2. In your perspective, how can the fears been coped?

    a) Distraction
    b) Presence of family members
    c) Good interactions with medical officers
    d) Music or art therapy
    e) Playing doctor and nurse
    f) Presence of toys
    g) Giving child presents

During the interview, the children were also observed by the interviewer and the findings were written in the research diary. The children sometimes responded to the questions with gestures and movements. Before the main questions were asked, the interviewer started a conversation so that the children were allowed to speak and ready to listen.

RESULTS

The results showed that nine causes of fears were able to be identified from the interviews. These causes can roughly be categorized as follows; (1) Separation from parents or guardian, (2) Pain or body injuries, (3) Taking medicine, (4) Injections, (5) Common fears, (6) Unfamiliar environments, (7) Child-staff relations, (8) Sense of responsibility, and (9) Mass media. The results also showed that there are many strategies had been taken to cope with the fear including; (1) the company of family members or guardians, (2) child-friendly environments, and (3) good child-staff relations.

Using Colaizzi's method of analyzing qualitative data, the information from the interviewees were viewed and analyzed by understanding the perspective of interviewees and produce an explanation out of the data. This method is used to describe the cause of fears of medical procedures in 36 of 4 to 6 years old students of Tunas Permata.

Table 1.0 Deductive analysis [Positive feedback: Yes, I'm scared]

Identified significant statements	Translation	Category
1) "Ibu kat luar." "Ayah dengan ibu." 2) "Mama" 3) "Umi hantar Fofi masuk sorang-sorang" 4) ". . . Mama . . ." 5) "Ibu ayah kita takde"	Admits fear and explains that parent/s is outside or not with them.	Separation from parents/guardian
1) "Sakit" 2) ". . . tapi Amsyar takut . . . sakit"	Admits fear and describe pain	Pain (Body injuries)
1) "Sebab, doctor bagi Alya ubat" 2) "Doktor tu bagi ubat kat mama"	Admits fear and explains about medicine.	Taking medicine
1) "Inject sakit" 2) "Kita kena cucuk dengan nurse. Sakit. Kita . . . nangis." 3) "Takut sangat. Darah keluar" 4) *Injection gesture* "pschh" 5) "Jarum tu masuk kat tangan kita"	Admits fear and describes injections and needles	Injections
1) ". . . Takut." 2) "Kita tak suka"	Admits fear but did not specifically describe the cause	Common fears
1) "Takde mainan kita." 2) "Meja dia banyak barang' 3) "Bilik doctor senyap. Putih je."	Admits fear and describes the environment in the medical centers	Unfamiliar environment
1) "Sebab takde orang. Doktor tu sorang dalam bilik dia." 2) "Doktor tu garang. Dia tak senyum kat kita pun"	Admits fear and describe the poor relationship between child and medical officers.	Child-staff relations

Table 2.0 Deductive analysis [Negative feedback: No, I'm not scared]

Identified significant statements	Explanation	Category
1) "Tak. Kita pergi dengan ayah. Ayah tengok doctor check kita" 2) "Ada teacher so kita tak takut" 3) "Mama teman kita pergi jadi kita	Denies fear and explains presence of parents or guardian	Separation from parents/guardians

	tak takut.”			
4)	“Hari tu umi teman”			
1)	“… I’m not afraid of the doctor but my friends are”	Denies fear but explains the fear in her friends.		Separation from parents/guardians
	“Their umi was not there”			
2)	“Takut. Adik kita nangis je.”			
	“Doktor tu, dia check”	Admits fear but explains the pain of her sister		Pain (Body injuries)
3)	“… teman adik kita kena cucuk”		Transferring the fear	
	“… adik kita nangis”			
4)	“Tak takut, tak takut. Adik kita takut”	Admits fear in her sister and explains about injection.		Injection
	“Tak tau. Tapi hmm . . . tapi adik kita takut laa”			
		Denies his fear but admits his brother’s fear without explaining the cause.		Common fear
1)	“Kita abang laa”	Denies fear as he is the older brother.		Sense of responsibility
1)	“Upin Ipin tak takut jumpa doctor”	Denies fear as his favorite cartoon characters do not have the same fear.		Mass media
1)	“Doktor tu bagi gula yang ada batang”			
2)	“Hari tu doctor tu bagi kita gula”	Denies fear and explains the good child-staff relations.		Child-staff relations
3)	“Doktor tak cakap”			
4)	“Doktor tu baik sangat”			
5)	“Doktor kita baik”			

Table 3.0 Tabulation of data

Category (Cause)	Number of child	Percentage (%)
1) Separation from parents/guardians	10	27.77778
2) Pain (Body injuries)	3	8.333333
3) Taking medicine	2	5.555556
4) Injection	6	16.66667
5) Common fear	3	8.333333
6) Unfamiliar environment	3	8.333333
7) Child-staff relations	7	19.44444
8) Sense of responsibility	1	2.777778
9) Mass media	1	2.777778
Total	36	100

It can be concluded that, the most stated cause of fear by the children is separation from parents or guardians with 27.77778%. The interviewer expected to obtain the highest frequency at injection or taking medicine but the children stated that those procedures are easily done with the companion of their parents or guardian.

Table 4.0 Percentages of the question about causes of fear of medical procedures in 4 to 6 years old children

Causes of fear	Percentages
1) Separation from parents	13.67521
2) Unfamiliar environment	17.09402
3) Pain or body injuries	17.94872
4) Control of medical officers over them	10.25641
5) Injection and suturing	19.65812
6) Unrealistic fears	7.692308
7) Lack of information about the post procedure	13.67521

In this case, most parents still think that injection and suturing are the biggest cause of fears in children, hence the cause with highest frequency. This is followed by unfamiliar environment and pain or body injuries, and then separation from parents.

Table 5.0 Percentages of the question what strategies/actions can be taken to cope with the fear

Coping strategies	Percentage
1) Distraction	14.07407
2) Presence of family member	15.55556
3) Good interaction with medical officers	16.2963
4) Music or art therapy	11.85185
5) Playing doctor and nurse	15.55556
6) Presence of toys	14.07407
7) Giving child presents	12.59259

Data collected show that god interaction with medical officers are the best coping strategies as it makes the children feel at ease during the medical procedures. The coping strategy with the least percentage is music or art therapy with 11.85185 %.

As a conclusion, from the interview data collection, it was found that separation from parents has the highest percentage. Followed by the survey (questionnaire answered by the parents) showed that injection and suturing has the highest percentage. From the parents' opinions, good interaction with

medical officers is the best coping way to control the fear of medical procedure in children from 4 to 6 years old.

CONCLUSION

It is hoped that this study can assist medical officers in attending children. It also allows and implementing therapeutic interventions for children with fear of medical procedures. Although the causes and coping strategies varies with each other, the best way is to produce a child-friendly environments where the children do not feel any threat that will cause fear of medical procedures. The coping strategies should be included in the care of every pre-school-aged child in hospital.

This study may also have a social impacts. If the fears are reduced or overcome, the child may experience less pain and faster recovery. Also, there is less need for medication and sedation to ease the process of medical procedures. This may cut down the medical fees and charges, decrease the stress and fear of children and families during the medical procedures, and also influence their well-being after the procedures.

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HEART SCREENING FOR RISK OF FUTURE CORONARY ARTERY DISEASE

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ABSTRACT

The risk of getting heart disease among the teenagers is getting serious as heart disease becomes the leading causes of death in the world. The aim of this study is to analyze the impact of lifestyle practiced among the students of PERMATApintar National Gifted Student Centre that might lead to a higher probability of getting coronary artery disease. A questionnaire consists of three parts was distributed to the 143 students of PERMATApintar National Gifted Student Centre from the age of 16 to 17 years old about their family background and their lifestyle. A two-day heart screening was conducted with the help from HUKM that involved the same 143 students from PERMATApintar National Gifted Student Centre. The heart screening test included the collection data for weight, height, waist circumference, blood pressure, dextrostick and electrocardiography (ECG). Electrocardiography (*ECG*) process, is a medical test that detects heart abnormalities by measuring the electrical activity generated by the heart as it contracts. The result of this study showed that there were some of the students have an unhealthy way of lifestyle that may lead them to coronary heart disease in the future and were advised to get further consultation with cardiologists. The students should know the importance and adopt a healthy lifestyle to reduce the risk of getting heart disease. Therefore, this study have developed awareness among young people to practice healthy lifestyle for a better and healthier future generation.

KEYWORDS: Lifestyle; Coronary Artery Diseases; Heart Diseases; Heart Screening; Young People; Teenagers

INTRODUCTION

Young people nowadays is exposed to a higher probability of getting heart disease as heart disease becomes the leading causes of death in the world. Lifestyle is one of the major causes in this problem. According to the National Cardiovascular Disease Database (NCVD) 2006, 23% of people admitted to hospital with acute coronary syndrome were below the age of 50. From this statistic, about 6% of all acute ST elevation myocardial infarction (serious form of heart attack) occur in people at the age of 40 or below. An unpublished report (Osama et. Al, UKM 2011) stated that 35% of young people (< 45 years old) with coronary artery disease were found to have multivessels disease. The seemingly increasing incidence of CAD among young people may be attributed to the increasing prevalence of risk factors such as metabolic syndrome, hypertension and diabetes, the onset which may start as early as at adolescent.

Since many of these risk factors have been present at a very young age, early detection may help to prevent and hence to reduce the probability of developing future coronary artery disease. At the same

time, the opportunity in undertaking a heart screening can also be used to detect the less common cardiac abnormalities (mainly cardiomyopathies, congenital or valvular diseases and proarrhythmias) that may predispose to sudden cardiac death or serious disability associated with sports or physical activities.

In this project, the risk factors of CVD among a selected group of young students of the PERMATApintar National Gifted Student Center was discussed. The respondents taken, represent the population of gifted youngsters from all over the country. They are from the age of 16 to 17 years old, many would have been deemed generally healthy through a basic form of health check prior to entry to the school. Their lifestyle and background including their family history of CVD were observed. This research is very useful for the targeted group in highlighting cardiovascular risk factors among the young people, as well as a comprehensive cardiac screening for their diet, physical fitness and participation in sports.

METHODOLOGY

A medical survey about the related factor that might cause cardiovascular disease (CVD) was carried out. The medical survey consist of three parts, there are family background, lifestyle and heart screening. The heart screening was conducted for 2 days for approximately six hours per day. The participants involved 143 students from the gifted school. The students found to have particular risk factors of CVD were urged to get further advices from cardiologists.

Inclusion Criteria:

Students who are undergoing education at the PermataPintar School of UKM, Bangi who fulfill the following criteria:

1. Male and female aged 16 to 17 years old
2. Consented by parents to undergo examination under the study

Exclusion Criteria:

1. Inability to complete the questionnaire
2. Established diagnosis of heart disease
3. Inability to obtain consent from parents

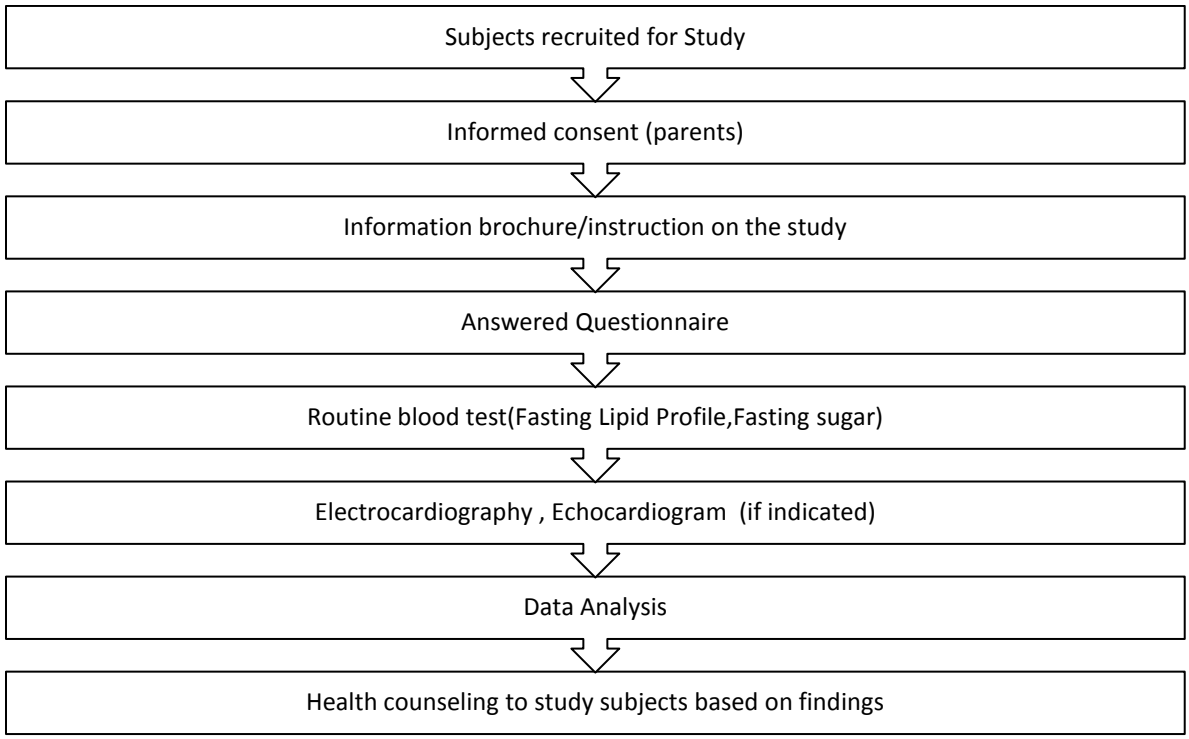
STUDY PROTOCOL

Following informed consent, the students are asked to complete questionnaire which can be answered in either Malay or English language. The students are requested to fast from midnight for the blood test the following day. Blood is drawn for (finger prick) for Dextrostick (glucose) and Total Cholesterol.

The students then have their anthropometry taken including weight, waist circumference, height and blood pressure which will be taken using electronic BP set (2 readings 5 minutes apart). Then the

students subsequently will undergo ECG. Echocardiography is performed among the students with abnormal ECG.

STUDY DESIGN SCHEMATIC



STUDY MATERIAL AND METHODS

Variable of interest

1. Weight
   All measurements were made using a standard weighing scale. Weight was recorded in kilograms to the nearest 0.1 kilogram (kg)
2. Height
   Height was measured using a standard stadiometer. It was recorded in meter.
3. Waist circumference
   Measurements were made with the subjects standing with feet apart and weight evenly distributed. Waist measurement was made at the midway from the last rib and iliac crest, which was exposed using a plastic measuring tape. The measurement was recorded to the nearest centimeter (cm).
4. Blood pressure
   Blood pressure was measure in seated position, 10minutes after resting. The reading was taken using a calibrated automated sphygmomanometer with an appropriate cuff on the right arm. The reading was recorded in mmHg.

5. Electrocardiography (ECG)
   All students were subjected to ECG in ECG Room UKMMC by trained staff that used the same ECG machine (Mortara INSTRUMENTS ELI 250 CARDIOGRAPH). 12 lead ECG was performed and the results were later analyzed to determine LVH using Soklow Lyon Index and Cornell index.

RESULT

There were 74 female students (51.7%) and 69 male students (48.3%), a total amount of 143 students had participated in the screening test. In terms of ethnicity, Malays ranked the highest (128, 89.5%), followed by Chinese (8 , 5.6%), Indians (4, 2.8%) and others ethic groups (3, 2%).

Table 1 The body measurements and health level of students

	Systolic	Diastolic	BMI	WC	Chol	Glucose
Number of Healthy Participants	139	125	129	85	119	116
Percentage	97%	87%	90%	59%	83%	81%
Number of Unhealthy Participants	4	18	14	58	24	27
Percentage	3%	13%	10%	41%	17%	19%

*BMI = Body Mass Index, WC = Weight Circumference, Chol = Cholesterol

Based on the data obtained from Table 1, more than 80% of the students have average blood pressure. Readings beyond 130 for systolic and 80 for diastolic are considered high and high probability to get hypertension. 90% of the students maintain safety level for BMI reading, which is below the pointer of 25. However, the data shows around 60% students have huge waist circumference, which indicates the presence of fats in their body. For both cholesterol and glucose test, more than 80% of students are healthy. Above 5 for cholesterol and 5.5 for glucose level are considered unhealthy.

Table 2 Part One – Self and Family History

	Answered Yes	Percentage	Answered No	Percentage
Fainted or Passed Out during Exercising	4	3%	139	97%
Experienced Chest Pain while Running	86	60%	57	40%

Family Member Died Suddenly and Unexpectedly	4	3%	139	97%
Family Member Underwent Heart Surgery	19	13%	124	87%

Based on the data obtained from the questionnaires given (Table 2), only 3% of students who ever fainted and passed out while doing exercise. However, it is found that more than half of the students experienced chest pain while doing vigorous activities such as running. As for the family part, there is only 4 positive feedbacks for having family member died suddenly and unexpectedly. Furthermore, only 13% of the students in Permata have closed family members who underwent heart surgery before.

Table 3 Part Two – Lifestyle

	Answered Yes	Percentage	Answered No	Percentage
Do You Exercise	76	53%	67	47%
Do you have breathing difficulties when doing vigorous activity?	48	34%	95	66%
Do you eat between meals?	26	18%	117	82%
Do you eat instant food?	54	38%	89	62%
Do you drink carbonate drinks?	20	14%	123	86%

The family history part is followed by the lifestyle part. From the table 3, it is found that only half of the students (around 53%) in the gifted school do exercise regularly. Most of the students prefer to stay indoor than doing outdoor activities. 34% of respondents have breathing difficulties when doing vigorous activities such as running and climbing the stairs. 18% of students normally eat between their meals. There are 38% of students eat instant food such as instant noodles and frozen foods. On the contrary, only 14 % of students drink carbonated drinks frequently.

DISCUSSION

This present research aims to determine the lifestyle practiced by the students in PERMATApintar which affects their health level. Measuring tests such as blood pressure, height and weight, waist circumference, dextrotick and ECG are taken to obtain the readings of the students. Overall, the reading of the blood pressure for the students is considered healthy. Only a few students who were detected unhealthy and immediate medical checkup was given to those students. The overall reading for the BMI is good.

The study shows that the most obvious health problem occurs among the students is having a huge waist circumference. Based on the standard measurements, the reading for girls should not exceed 70 cm and for boys should not exceed 80 cm. There is 58 students (41%) who exceeded the borders. This indicates that most students have extra fats in their body. For the rest of the measurements, it is considered still healthy as the percentage of unhealthy students does not more than 20%.

One of the factors that leads to high reading of waist circumference among the students is lack of exercise. Based on the questionnaire, 67 out of 143 students do not exercise regularly. They are not aware of their health and prefer to stay indoors. They like to spend most of their time on reading and playing computer games. Besides, diet is one of the factor affecting their health. A number of students like to have pizza as their dinner and instant noodles as their supper. Hence, the health level of the students is deteriorated.

Based on the data obtained, quite a number of students experienced chest pain while doing vigorous activities. This is due to the lack of exercise of the students. The heart is pressured to supply more oxygenated blood to the body, therefore causing chest pain.

In order to maintain a healthy lifestyle, students are encouraged to play sports and involved in outdoor activities more often. It is recommended that the students should do exercise at least twice a week. Besides, the students are advised to control their diet by taking the food pyramid as a reference so that they will not consume too much of sugar and cholesterol. The students should also avoid eating between meals to maintain a healthy lifestyle. Furthermore, they should eat more vegetables and fruits. It is also advised that the students should drink more mineral water instead of carbonated drinks.

CONCLUSION

To conclude, it can be found that almost half of the students approached their limitations of their BMI and waist circumference. Lacking of doing exercises and practicing bad eating are the factors affecting their healthy lifestyle. Besides, taking in high cholesterol foods and no regular exercises, can affect the blood circulation that will give impacts to breathing difficulties. In nutshell, practicing a healthy lifestyle is important to keep the students healthy and to overcome the heart disease that might lead young people to the coronary heart disease. The young people are advised and urged to keep adopting a healthy lifestyle and avoid bad eating habits.

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CAN TERMITE AGGREGATION IN MOUNDS BE DETECTED BY ABIOTIC PARAMETERS?

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ABSTRACT

Termites build thermoregulated and ventilated mound by regulating the temperature inside the mound (Korb J 2003). *Globitermes sulphureus* is a mound-building termite where its mound is dome-shaped. In this study, five *Globitermes sulphureus* mounds at varies sites in Universiti Kebangsaan Malaysia were examined for the conditioning of mound environment. The objectives of this study were identifying various environmental parameters i.e. pH, organic composition (carbon, hydrogen and nitrogen-CHN), temperature and humidity as well as determining the stratum of the mound where termites aggregate. Measurement of pH and organic composition were conducted in a lab by using pH meter and CHN analyser while soil temperature and humidity were measured using soil thermometer and humidity meter on site. Measurements of parameters were compared between sites and the soil of mounds and adjacent soil (sample). The results showed that pH within the range 3-5 for sites and sample; nitrogen in the range 1-3 units between sites and sample; relative humidity value was 63% between sites, were not significantly different ($P>0.05$) between sites and sample. For carbon in the range of 1-6 units between sites and sample and hydrogen between sites and samples in the range of 0.5-1.2 units, were significantly different ($P<0.05$) only between samples. Temperature within the range 27^{o}C-35^{o}C between sites and samples was significantly different between sites and sample. It was concluded that temperature is a suitable parameter to indicate the termite activities; however distinction between strata of mounds where termite aggregate was not clearly evident.

KEYWORDS: Globitermes sulphurous; termites; organic composition; temperature; relative humidity; pH

INTRODUCTION

Termites build thermo regulated and ventilated mound by regulating the temperature inside the mound (Korb J 2003). Termite mounds have inspired people in buildings. The Eastgate building in Harare, Zimbabwe has no air-conditioning yet stays cool due to termite-inspired air conditioning concept where the inspiration was from *Macrotermes michaelseni*. This termite-inspired building saved the building owners over $3.5 million dollars for the air conditioning costs within the first five years and it uses only 10% per cent of energy for ventilation than the other conventional buildings about the same size. It was stated in a research that the survival and distribution of insects especially termites were related to the existences of abiotic factors for example temperature, pH and rainfall (Michael K. Rust and Brian J. Cabrera). Additionally, foraging behaviour of subterranean termites is affected by biotic and abiotic

factors, as stated in (Mugerwa et al. 2011). Termites have their own preferences on biotic and abiotic factors for their survival. Michael K. Rust and Brian J. Cabrera had proposed that temperature was significant different in figuring out the tendency of termites to aggregate. Furthermore, they suggested that the size of the group, caste and age composition of termite group may affect intensity of termite aggregation. Problem arises, how to determine the stratum in mounds where termite aggregate without disturbing the routine of termites since the mound is opaque and closed? Logically, there will be bigger amount of energy, carbon dioxide and water vapour when termites aggregate while this statement supported the involvement of abiotic parameters in this study.

LITERATURE REVIEW

Termite mounds are thermo regulated and ventilated by the thermoregulation of termites in mound (Korb J 2003). Termites produce metabolic heat and the fungi will increase the temperature to the actual nest temperature (J Korb, KE Linsenmair 2000). Therefore, thermoregulation and ventilation in mounds are very important to the survivability of termites. Thermoregulation is an action acting upon by an organism keeping its internal temperature at certain limits rather than changing the external environment temperatures (Badarnah L, Nachman Farchi Y, Knaack U 2010). Abiotic parameters including pH, organic composition (carbon, hydrogen and nitrogen-CHN), temperature and humidity were used in this study to identify the stratum in mounds where termite aggregate. Smith and Rust (1994) mentioned that *Reticulitermes hesperus* has a preference of temperatures between 29^{o}C and 32^{o}C and they were never appeared at the temperatures of 40^{o}C. One of the research showed that *C. formosanus* is unable to adapt in dry saturated soil but can adapt to a big range of sand moisture levels (Bal Krishna Gautam 2011). It also stated that 28^{o}C with the highest moisture wood is the preference of *C. formosanus* as well and suggested that both temperature and moisture, among the abiotic factors are suitable in determining the area in mounds where desiccation prone termites prefer to stay. Termites need to stay in the environment with humidity $\leq$ 16%. (McManamy et al. 2008). Both temperature and humidity play the same role as the factors affecting the survivability of termites. Even as temperature increases then the feeding rate increases, higher temperature combine with low RH will cause water loss and hence lead to the small probability of survival for termites (BJ Cabrera, MK Rust 1996). A research was conducted to determine if the intensity of aggregation was influenced by temperature, relative humidity (RH) or saturation deficit (Michael K. Rust and Brian J. Cabrera). The research showed that termites aggregated closer together at higher temperatures; RH and the interaction between RH and temperature did not show significant differences but barely temperature showed significant difference. Hence, the intensity of aggregation was affected by temperature. The main objective of this study is to determine whether termite aggregation in mounds can be detected by abiotic factors.

MATERIALS AND METHODS

Site description and mound studied

This study was carried out in the campus of National University of Malaysia, Bangi, Selangor (2°55′11″N 101°46′53″E). Among those five mounds, three mounds (001 TPP, 002 TPP, 003 TPP) are located in fern garden, 004 PK is located nearby to Health Centre and 005 KIZ is located at Kolej Ibu Zain. Fern garden is located next to the road but those three mounds there are not directly located nearby to the road, they

are surrounded by trees. 001 TPP and 002 TPP are both surrounded by trees and do not expose to the sunlight, however, the canopy of 001 TPP is lesser than 002 TPP. 003 TPP is surrounded by many trees, the canopy is packed but the mound somehow is exposed to the sunlight at certain parts. 004 PK is located nearby Health Centre, it is not surrounded by trees, it is sited near to the road and the drain; it exposed to the sunlight all the time. 005 KIZ is not surrounded by trees because the trees are far apart from each other so it exposed to the sunlight.

Figure 1 Termite mounds (005 KIZ)

Soil processing

Ten soil samples were collected from those five targeted termite mounds, where 5 soil samples were from the soils of mounds and another 5 soil samples were collected from adjacent soils. Soil samples were air dried for four days to remove the water content. Then, they were ground into smaller substances and next they were sieved to obtain 2 mm soil samples for organic composition analysis and pH measurement.

Field work

Measurements of temperature and humidity were conducted at sites. Temperatures of mounds were taken according to the top, middle and bottom parts of each mound along with adjacent soils using soil thermometer. Temperatures at three points of the three strata which are top, middle and bottom and the temperatures of adjacent soils were taken at the same day. Soil thermometer was left inside the soils for one minute when measurements were taken to obtain the stable temperatures. Humidity of each mound was measured using humidity meter by placing it at the top surface of mounds for a few minutes. Humidity meter recorded the surface temperature of mounds as well.

Figure 2 Temperature measurement on one of the mounds

Laboratory work

Organic composition analysis and pH measurements were taken in lab. The prepared soil samples were used only around 3 g for organic composition analysis using CHN analyser. Soil samples were broken down into simple compounds using a combustion process which are then reckoned by infrared spectroscopy. Carbon, hydrogen, and nitrogen were quantified in organic composition analysis. For the pH measurements, 10 g of each soil sample was weighed using electronic balance and then was put into a 50 ml beaker. 50 ml of distilled water was poured into the beaker and it was stirred and left for 30 minutes for each soil sample. After 30 minutes, the probe of pH meter was dipped in the ten soil solutions and the pH value was shown at the pH meter.

Figure 3 Measurement of pH of one of the soil samples in lab using pH meter

RESULTS

Parameters measurements

Five termite mounds were coded as 001 TPP, 002 TPP, 003 TPP, 004 PK and 005 KIZ to represent the soil samples of mounds while the code of mounds added with TB showed the adjacent soils of that mound. The pH value of the soil samples were within the range 3-5 for sites and sample where 002 TPP recorded the lowest pH value 3.6 while the highest pH value was 5.49, as shown by 001 TPP. Values of nitrogen were in the range of 0.5-3.7 units between sites and sample, the adjacent soils of 001 TPP mound namely 001 TPP TB had the lowest nitrogen value, 0.5186 unit where the highest nitrogen value 3.6708 units was shown by 004 PK TB, the adjacent soils of 004 PK mound. The average RH value of five mounds was 63%. Carbon values in soil samples were in the range of 0.76-7.00 units for sites and sample. 005 KIZ TB recorded the lowest carbon value among the others, 0.7608 unit and the highest carbon value 6.992 units belonged to 005 KIZ mound. The values of hydrogen between sites and samples were in the range of 0.13-6.12 units where 0.1372 unit was shown by 005 KIZ TB and the highest value of hydrogen 1.6107 units was recorded by 003 TPP. Temperatures of mounds were measured at the surface of mounds, adjacent soils and also according the top, medium and bottom parts of mounds. The internal temperatures of mound were in between the range of 28.3^{o}C-35.35^{o}C where they were the normal temperatures in termite mounds after regulating the temperatures. The surface temperatures of those five mounds were recorded from 28.9^{o}C-46^{o}C due to the places where the mounds located. Temperatures of adjacent soils were in between 25.8^{o}C-29.6^{o}C, which were the lowest temperatures recorded among the internal temperatures and surface temperatures. For the internal temperature, surface temperature and adjacent soils temperature, 004 PK has recorded the highest temperature among the others due to its location at opened area, near to the road and it does not have tree canopy whereas the lowest temperature of those three types of temperatures recorded by 003 TPP which has tree canopy.

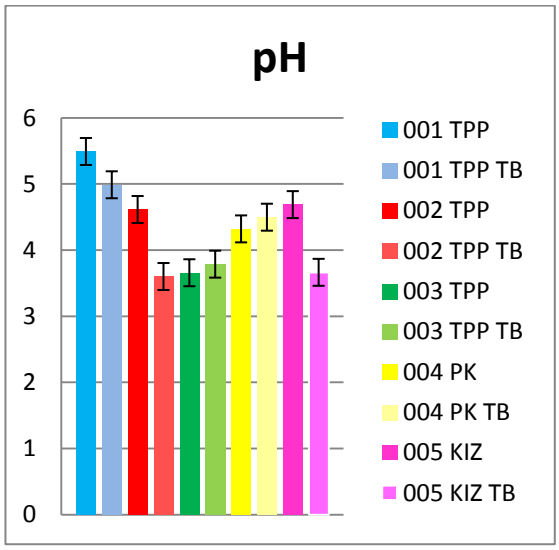


Figure 4 The pH value of mound soil and adjacent soils

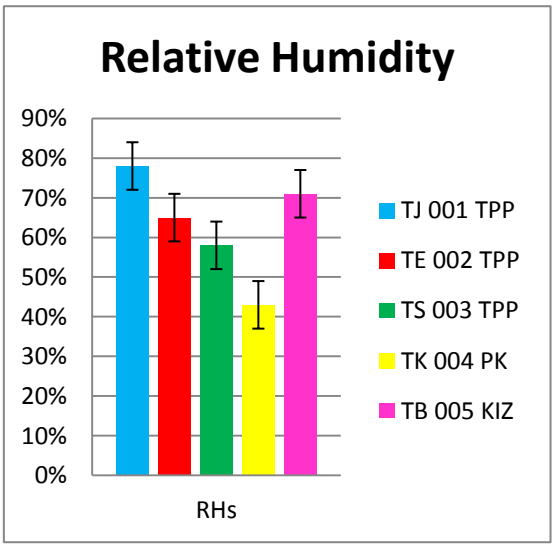


Figure 5 The RH of five termite mounds

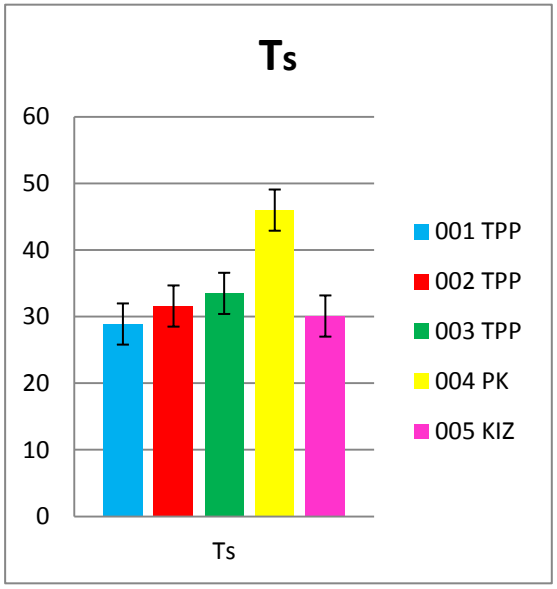


Figure 6 The surface temperature (Ts) of mounds

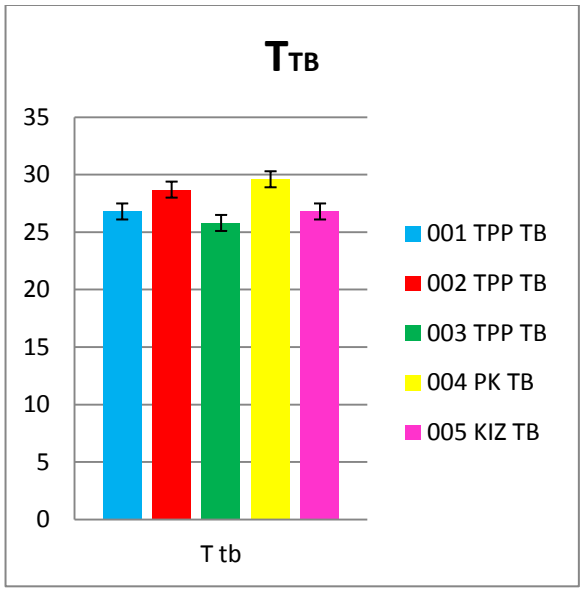
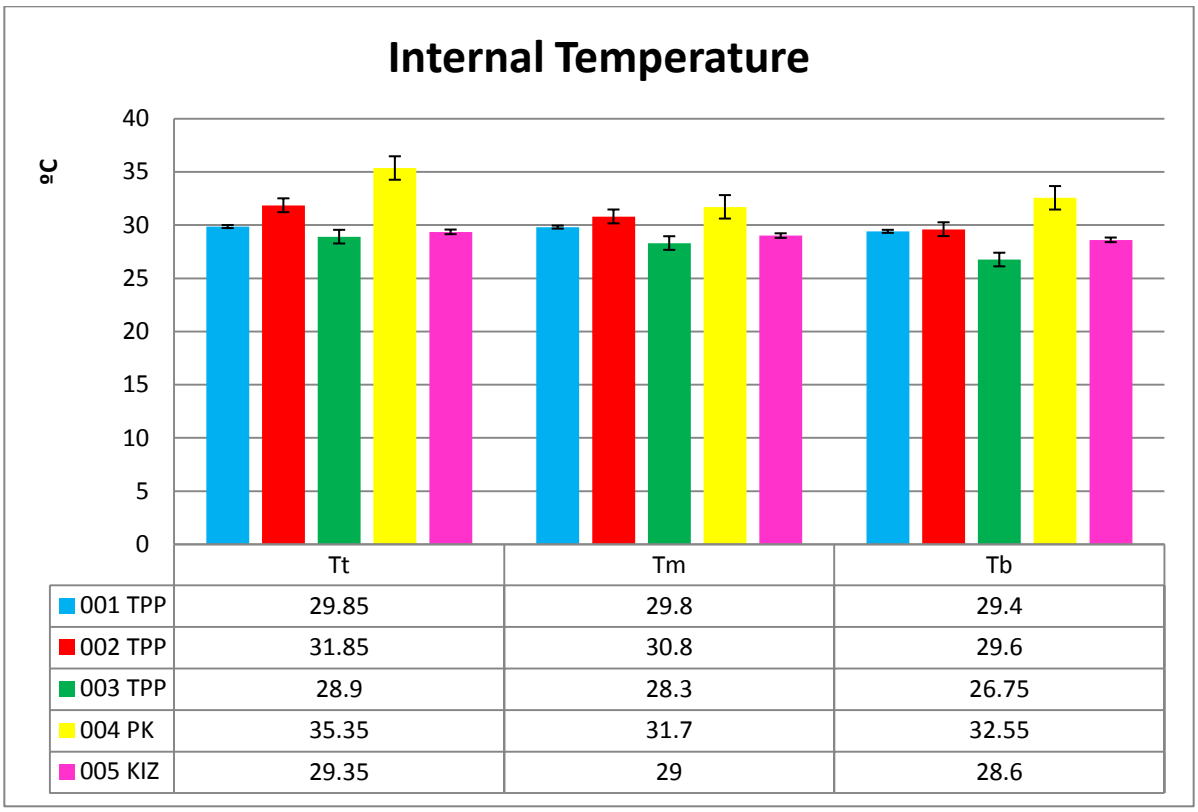


Figure 7 The temperature of adjacent soils (TTB) of each mound



	Tt	Tm	Tb
001 TPP	29.85	29.8	29.4
002 TPP	31.85	30.8	29.6
003 TPP	28.9	28.3	26.75
004 PK	35.35	31.7	32.55
005 KIZ	29.35	29	28.6

Figure 8 The temperatures in termite mounds according the top (Tt), medium (Tm) and bottom (Tb) parts

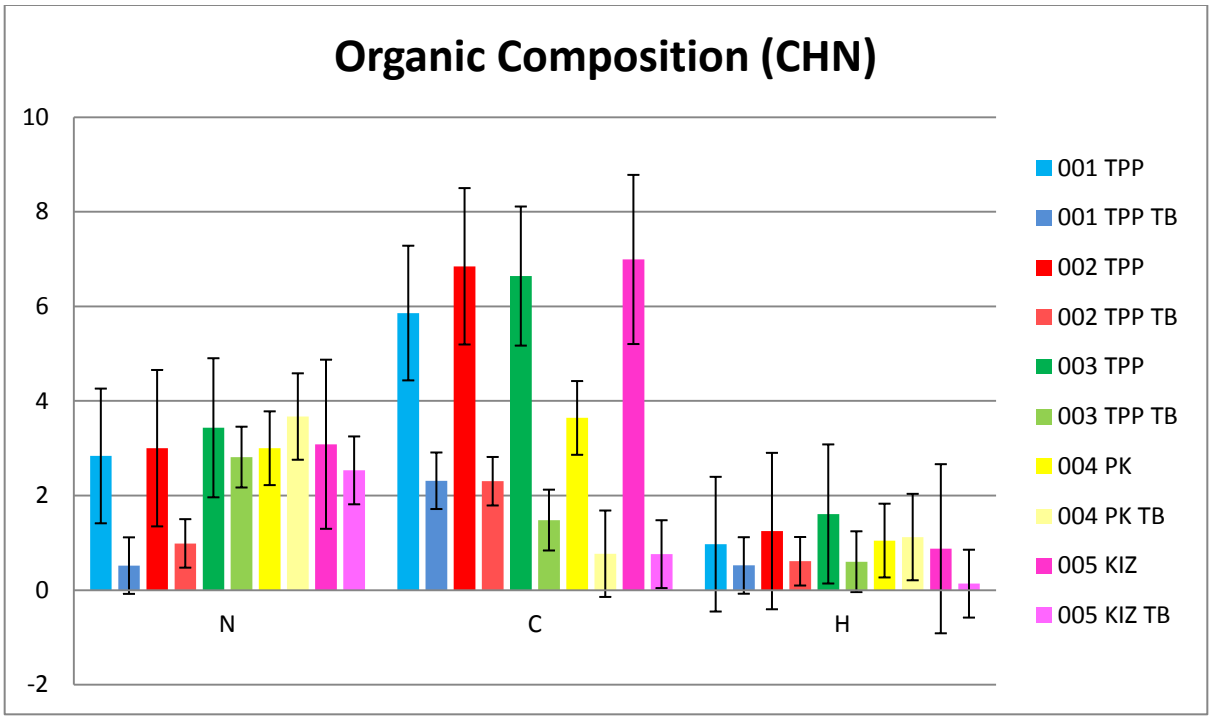


Figure 9 The value of organic composition (carbon, hydrogen and nitrogen) in soil of mounds and adjacent soil

ANOVA analysis

Results were analysed by ANOVA in Minitab® 16 computer software. The parameter ($P<0.05$) showed that it is significant different while ($P>0.05$) revealed that the parameter does not show a significant effect. Among the parameters, pH, nitrogen and relative humidity as shown in figure were not significantly different ($P>0.05$) between sites and sample. However, carbon and hydrogen were significantly different ($P<0.05$) only between samples but not between sites. The only parameter which showed significant different between sites and sample was temperature.

Table 1 pH ANOVA two-way analysis

Source	DF	SS	MS	F	P
SITE	4	2.55058	0.637646	3.70	0.116
SAMPLE	1	0.49876	0.498763	2.90	0.164
Error	4	0.68902	0.172255		
Total	9	3.73836			

Table 2 Nitrogen ANOVA two-way analysis

Source	DF	SS	MS	F	P
SITE	4	4.14730	1.03683	1.41	0.374
SAMPLE	1	2.33772	2.33772	3.17	0.150
Error	4	2.94835	0.73709		
Total	9	9.43337			

Table 3 Carbon ANOVA two-way analysis

Source	DF	SS	MS	F	P
SITE	4	6.5833	1.6458	1.88	0.277
SAMPLE	1	49.9652	49.9652	57.17	0.002
Error	4	3.4962	0.8740		
Total	9	60.0447			

Table 4 Hydrogen ANOVA two-way analysis

Source	DF	SS	MS	F	P
SITE	4	0.50571	0.126426	1.55	0.341
SAMPLE	1	0.76281	0.762809	9.33	0.038
Error	4	0.32697	0.081742		
Total	9	1.59548			

Table 5 Temperature ANOVA two-way analysis

Source	DF	SS	MS	F	P
SITE	4	146.812	36.7029	5.47	0.006
SAMPLE	4	114.946	28.7364	4.29	0.015
Error	16	107.261	6.7038		
Total	24	369.019			

Table 6 Relative humidity ANOVA analysis

		Poisson		Contribution
RH	Obser-ved	Probability	Expected	to Chi-Sq
<=65	3	0.630742	3.15371	0.00749
66 - 70	0	0.197609	0.98805	0.98805
>=71	2	0.171648	0.85824	1.51894

DISCUSSION

The pH value, nitrogen and RH value were not significantly different (P>0.05) at all between sites and sample. The results showed that the pH, nitrogen and RH value of mounds were almost the same among the mounds, those five termite mounds recorded that the suitable pH value was around 3 to 5; nitrogen value is about 0.4 to 4.0 units; RH was near to 63%. Carbon and hydrogen were significantly different (P<0.05) between samples but not between sites showing that the carbon and hydrogen values between the soil of mound and the adjacent soil were difference. This is reasonable because living things like termites will release carbon dioxide and water vapour during their activities. However, temperature was significantly different between sites and sample. One of the termite mounds, 004 PK recorded the highest temperature between sites due to its location at opened area and it was exposed to sunlight all the time.

CONCLUSION

The temperature between samples was significantly different where the internal temperatures were higher than adjacent soils temperatures. It was due to termites release heat energy during activities in mounds. To conclude, temperature was the only parameter that was significantly different between sites and samples, but the stratum where termite aggregate was not evidently recorded.

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THE CAUSES THAT INCREASES THE RISK FACTORS OF ENDOMETRIAL CANCER AMONG THE MALAYSIA WOMEN

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ABSTRACT

The risk factors of endometrial cancer had been increasing nowadays which had lead an endometrial cancer among the women. There are causes that affecting the risk factor. The goal of this project is to determine the causes that increase the risk factors of the endometrial cancer among the women who have experienced menopause or not. A quantitative method was used to collect the data in the research. This study used a survey and questionnaires about the cancerous patients. The collected data then was being analyzed by using a statistic. The finding showed that the main causes that increase the risk factor are the women's age which had reached above 55 years old (74.48%) followed by the nulliparity or infertility (71.88%), the late menopause (70.83%) and the women's weight which had reached the obesity level (69.79%). To conclude, the nulliparity or infertility is the main cause of the increasing risk factors of endometrial cancer among the Malaysian women after the age. Thus, the Malaysian women nowadays have to take care and mind their fertility to avoid the endometrial cancer among them.

KEYWORDS: awareness; risk factors; endometrial cancer; menopause

INTRODUCTION

The endometrium is the inner lining of the womb and the endometrial cancers occur at endometrium. It is also called as uterine cancer. Uterine cancer is the second most important cancer in the reproductive organs of women after cervical cancer. According to data from the National Cancer Statistics 2003, the incidence rate of endometrial cancer was 6.9 in 100,000 populations. The incidence rate of endometrial cancer is not as high as in Western countries. In Western countries such as America, uterine cancer is the leading female cancer after breast cancer. In Malaysia, the incidence of endometrial cancer is the highest among women aged 60-69 years with a rate of 29.7 in 100,000 populations. It was found to be more common among Chinese and Indian women compared to Malay women.

There are various factors that might increase the risk of developing endometrial cancer. Having a risk factor does not mean that a women will develop cancer. Simultaneously, a women who is not

having any risk factors does not mean that she will not develop cancer. Many of the risk factors for endometrial cancer are related to the body's exposure especially female sex hormone, oestrogen or to the balance between types of the two female sex hormones, oestrogen and progesterone. Oestrogen without progesterone to balance it increases the risk of endometrial cancer and called as unopposed oestrogen. The body will stop making progesterone after the menopause, yet produces a small amount of oestrogen. So this explains why endometrial cancer is much more common in women after the menopause.

There were many researches that had been conducted by most of the country based on this issue. Some studies have found a positive association between infertility and endometrial cancer, but only in younger and premenopausal women. Other studies have found no association or that only infertility associated with progesterone deficiencies or anovulatory cycles is associated with increased risk of endometrial cancer. A recent case-control study noted that infertility was associated with a relative risk of 1.8 for endometrial cancer, but this estimate was not statistically significant. Although the issue of infertility has been investigated frequently, results remain inconsistent.

Furthermore, the previous research on the role of spontaneous and/or induced abortions has yielded inconsistent findings. Many studies have failed to find any association between abortion and endometrial cancer. Others have reported an inverse association with endometrial cancer, but the influence of parity and/or gravidity on these findings has been unclear. Recent research has focused on the role of ages at first and last pregnancy in the etiology of endometrial cancer. Although most studies found no association with age at first pregnancy, two studies did report an inverse association. Age at last pregnancy has generally been found to be inversely associated with endometrial cancer. However, in many of these studies, adjustments for parity were not described in sufficient detail to evaluate the findings fully.

The present study examined the independent association of infertility, incidence, and timing of spontaneous and induced abortion and ages at first and last pregnancy with endometrial cancer incidence with proper control for gravidity. Unique observations are presented on the timing of miscarriages and their association with endometrial cancer.

METHODOLOGY

Participants

This cross-sectional study was conducted among 64 endometrial cancerous patients in Malaysia who were based at Hospital Universiti Kebangsaan Malaysia (HUKM). Out of 64 patients, 64 patients participated in this research.

Materials

The respondents were assessed through Risk Factor of Endometrial Cancer Questionnaire.

Demographic Information

Patients were asked to state their sex, age, height and weight, disease history, family history, smoking history, reproductive history and their medical history in the questionnaire.

Instruments

The baseline questionnaire was included the demographic information such as race, occupation, education, health conditions and medical history. Included were items about known endometrial risk factors (exogenous hormone use, parity/gravidity, and body weight) and other gynecologic and reproductive factors, such as ages at menarche and menopause, numbers of miscarriages and/or induced abortions, and history of infertility (defined as trying without success for 1 year to get pregnant). Body mass index (BMI) was calculated as weight (kg)/height (m). The measurements obtained by this protocol have been shown to have good accuracy and reliability (20).

RESULTS

In the previous study, there were more than 200 women in the cohort at risk developed endometrial cancer. At baseline, cases were, on average, older and heavier and had a larger waist-to-hip ratio than did non-cases . Cases were less likely to be married or to have used oral contraceptives than were non-cases, but were more likely to report postmenopausal exogenous hormone use. Hypertension and diabetes mellitus were reported more often by cases, consistent with the observation that cases had greater BMI.

Table 1 Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Still in menstrual	15	23.4	23.4	23.4
	Premenopause	19	29.7	29.7	53.1
	menoupause	30	46.9	46.9	100.0
	Total	64	100.0	100.0	

The risk of endometrial cancer goes up with age. Most cases diagnosed in women over the age of 55. In this case, the main causes that increase the risk factor are the women's age which had reached above 55 (74.48%).

Table 2 BMI

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	underweight	23	35.9	35.9	35.9
	average	19	29.7	29.7	65.6
	overweight	22	34.4	34.4	100.0
	Total	64	100.0	100.0	

Besides, women who is not maintaining a healthy weight have a higher risk of endometrial cancer. One of the reason is the fat tissue will affect different hormone levels in the body. Too much of the fat tissue can lead to higher hormone levels and increase the risk of cancer. Based on the table 2, the obesity level has reached to 69.79 %.

Table 3 Family History

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NO	50	78.1	78.1	78.1
	DON'T KNOW	5	7.8	7.8	85.9
	YES	9	14.1	14.1	100.0
	Total	64	100.0	100.0	

Women who have a mother or sister with endometrial cancer have a higher risk of the disease cancer. This is because some endometrial cancer are linked to mutations in the genetic structure (DNA) of the body's cells that can be passed from the generation to generation.

Table 4 Smoking History

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NO	64	100.0	100.0	100.0

Women who smoke over a pack of cigarettes per day have moderate risk of endometrial cancer. Smoking has lead other harmful effects that the risk early death is increased overall.

Table 5 Birth Control Pills Taken

		Frequency	Percent	Valid Percent	Cumulative Percent

Valid	Never	60	93.8	93.8	93.8
	Less than 5 years	4	6.3	6.3	100.0
	Total	64	100.0	100.0	

Women who take birth control pills for 5 years or more have a lower risk of uterine cancer. The longer a woman takes the pill, the more her risk decreases. Birth control pills can have positive and negative effects on woman's health.

Table 6 Number of Births

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	>3	26	40.6	40.6	40.6
	1-3	12	18.8	18.8	59.4
	0	26	40.6	40.6	100.0
	Total	64	100.0	100.0	

Women who have never given birth have a higher risk of uterine cancer. One reason is that pregnancy changes hormone levels in a way that helps protect uterine cells from becoming cancerous.

Table 7 Menopause

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	19	29.7	29.7	29.7
	yes. stopped before the age of 55	25	39.1	39.1	68.8
	yes, stopped at the age 55 or more	20	31.3	31.3	100.0
	Total	64	100.0	100.0	

Women who go through menopause (when regular periods stop) at a later age have a higher risk of endometrial cancer. This is because a late menopause exposes a woman's body to greater amounts of the hormone estrogen over her lifetime. These higher levels of estrogen increase the risk that cells of the uterus will become cancerous.

Table 8 Estrogen and Progesterone Intake

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	61	95.3	95.3	95.3
	took estrogen alone	3	4.7	4.7	100.0
	Total	64	100.0	100.0	

Post-menopausal hormones are medications that help ease the symptoms of menopause, like hot flashes and vaginal dryness. They can contain hormones that are similar to the female reproductive hormones estrogen and progesterone, which the body stops making in large quantities after menopause. Women who take post-menopausal estrogen alone (without progesterone) have a higher risk of uterine cancer. This is because the high levels of estrogen in a woman's body may cause cells in the uterus to become cancerous.

From the table 8, we conclude that the main causes that increase the risk factor are the women's age which had reached above 55 (74.48%) followed by the nulliparity or infertility (71.88%), the late menopause (70.83%) and the women's weight which had reached the obesity level (69.79%).

DISCUSSION

The results of the current study suggest that the risk of endometrial cancer was higher among women who were older, had not experienced a pregnancy and obesity. Endometrial cancer risk was positively associated with older age at menopause, nulliparity or infertility, and weight of the women which had reach the obesity level. The results can be studied in the diagram below.

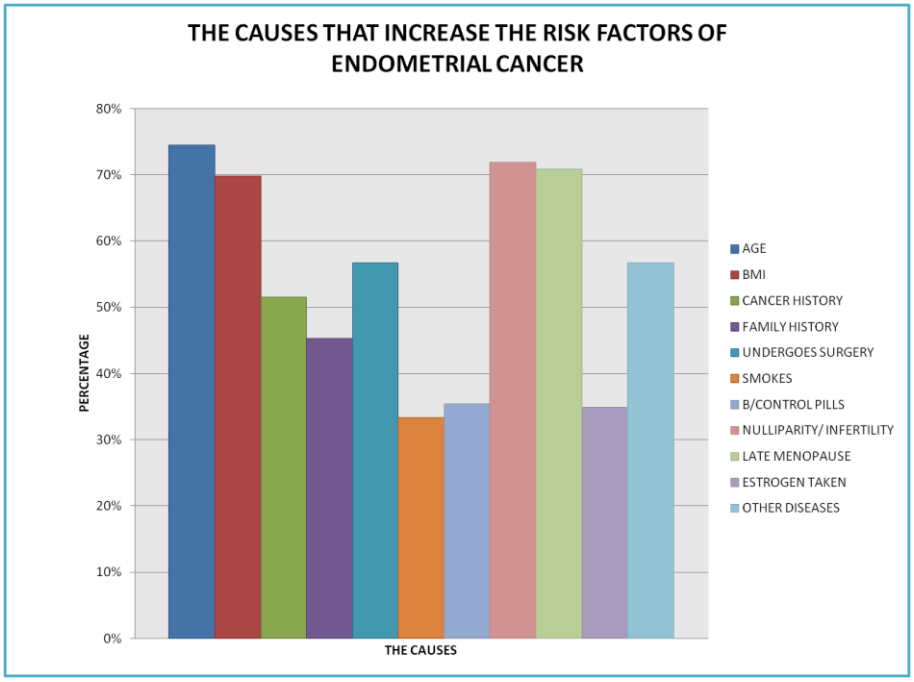

Diagram 1 The causes that increases the risk factor of endometrial cancer

Most women diagnosed with endometrial cancer have had their menopause. It occurs most commonly in women between the ages of 60 and 79. About 93 out of every 100 cases occur in women over 50, with the average age at diagnosis in the selected country, UK being 63. Fewer than 1 in 20 cases (5%) are diagnosed in women under 40. But women who have a particular gene fault called HNPCC are more likely than the general population to develop it at a younger age. This is same goes

to Malaysia where the study had shown that the age is the main risk factor that increased the endometrial cancer among the women.

Furthermore, nulligravidity or infertility also have been linked to increased risk of the endometrial cancer. A woman who was classified as "ever pregnant" had less than half the risk of endometrial cancer as a woman classified as "never pregnant." This finding is in agreement with previous reports on endometrial cancer and gravidity. During pregnancy, there is little mitotic activity in the endometrium, thus reducing the chances of abnormal cell differentiation or proliferation. There is also protection from anovulatory menstrual cycles with their corresponding low production of progesterone. In addition, parturition itself may be protective, as the endometrium undergoes a mechanical exfoliation of its surface cells, thus potentially eliminating any cells in stages of abnormal growth.

The third main risk factor is the late menopause among the women. A late menopause past age 50 had increased the risk factor of endometrial cancer. By 50, the estrogen levels may be very, very low. However, as long as the women are having their period, no matter how short, then they are producing estrogen. Taken together, our results lend support to the prevailing view that endometrial exposure to estrogen without the opposing effect of progesterone can increase the risk of endometrial cancer. Our cases were heavier, had an earlier menarche and a later menopause, experienced a longer ovulation span, were more likely to use exogenous estrogens, and had fewer births than did noncases. These findings are all consistent with a hormonally induced endometrial cancer risk hypothesis. This increasing level of estrogen will surely activate the cancer cells in the body which then lead the women to have an endometrial cancer.

Women who are very overweight (obese) are generally 2 or 3 times more likely to develop endometrial cancer than women of a normal weight. Women who are very obese may increase their risk by up to 6 times. A Cancer Research UK study published in 2011 found that being overweight or obese causes around a third of womb cancers. This is probably because fatter women have higher levels of oestrogen. Fat cells (also called adipose tissue) convert certain hormones into a type of oestrogen. So the more body fat you have, generally the more oestrogen you produce. When more oestrogen is produced the lining of the womb builds up. When more lining (endometrial) cells are produced, there is a greater chance of one of them becoming cancerous.

Another reason for the higher risk of endometrial cancer in overweight women may be related to insulin. Insulin helps the body to unlock and use the energy in food that we eat. People who are overweight can sometimes become resistant to insulin. This means that although the body produces insulin, the insulin doesn't work as well as usual. To make up for this, the body makes too much. Some studies show that higher levels of insulin are linked to an increased risk of endometrial cancer. This may be because the extra insulin can stimulate cancerous growth in the lining of the uterine.

Research has shown that daughters of women with endometrial cancer have double the risk of women in the general population. Most cancers are not caused by a gene that is inherited. They are caused by gene changes in the lifetime as cells divide and grow to repair or replace old or damaged

cells. Cancers due to these gene changes are called sporadic. But some cancers are caused by cancer genes that you were born with. If the woman has several close relatives on the same side of the family who has had bowel cancer or womb cancer, she may be at increased risk of endometrial cancer because of a faulty gene. But even if there is a faulty gene in her family, she may not have inherited it.

Hormone replacement therapy is used by many women to control the symptoms of menopause. There are different types of HRT. Oestrogen only HRT increases the risk of womb cancer and is normally only prescribed to women who have had their womb removed (a hysterectomy). Some studies show a small reduction in risk of womb cancer in women taking continuous combined HRT (containing oestrogen and progesterone). But a recent study looked at long term use of HRT. It found that normal weight women taking continuous combined HRT for 10 years or longer had an increased risk of womb cancer. Heavier women showed a slight reduction in risk with long term use of combined continuous HRT. We need further studies to check this. Women also need to take into account the risk of other cancers when choosing whether to take HRT. Women taking combined HRT have a slightly increased risk of breast cancer. So the women need to discuss the risks and benefits of the treatment with their doctor when considering using HRT.

Most types of birth control pills used today normally decrease the risk of endometrial cancer. These contain either a combination of oestrogen and progesterone (combination pills), or progesterone only (mini pills). Diabetes and high blood pressure are also both linked to being overweight and so may be connected with womb cancer for that reason. But several studies show a higher risk of endometrial cancer in women with diabetes, even after taking bodyweight into account. However, the results suggest a need to examine this further as the risk factors might always change from time to time.

CONCLUSION

In short, this project used to determine the causes that increase the risk factor of endometrial cancer among the Malaysian women. This is to increase their awareness towards the risk factors of the problem so that they could take the first step to avoid the matter. The result is obtained by using a statistic after the data is collected by surveying and through questionnaires. The finding showed that the main causes that increase the risk factor are the women's age followed by the nulliparity or infertility, the late menopause and the women's weight. Thus, the nulliparity or infertility is the main cause of the increasing risk factors of endometrial cancer among the Malaysian women after the age.

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SURVEY ABOUT AWARENESS AND ATTITUDE OF GIFTED HIGH SCHOOL STUDENTS TOWARD GENETIC TESTING AND GENETIC COUNSELING

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ABSTRACT

Malaysians have below-average awareness of healthcare services that promote the prevention over cure notion, effectively increasing their risk of developing chronic disease. Before steps can be devised to promote preventive medical services, this survey was conducted to understand the level of awareness and attitude of Malaysians towards said services. This survey chose gifted high school students as the target respondents because of their generally high exposure to mass media and their higher aptitude for retaining knowledge. Meanwhile, genetic testing and genetic counseling were chosen as the target services because they are newly introduced services that have yet to garner any generalized reputations. This survey was conducted using a questionnaire that measured respondents' knowledge about genetic testing and genetic counseling in addition to their opinions about these services. It is found that ~80% of the respondents had moderate level of awareness about inheritable diseases and genetic healthcare services, with the remainder split evenly between high and low levels of awareness. The survey also revealed that genetic predisposition testing is received more warmly among females. (Females showed more interest in learning more about genetic testing and are more likely to undertake genetic testing). The findings of this survey show that gifted high school students have elementary exposure to genetic testing and genetic counseling. We recommend future efforts to be centered on how genetic testing can contribute to well-being as well as inform a slightly disinterested male demographic.

KEYWORDS: Genetic testing; genetic counseling; awareness; attitude; students

LITERATURE REVIEW

Many investigations have been done about genetic testing and genetic counseling. Although the literature covers a wide variety of such research, this review will mainly focus on the public's awareness and attitude towards genetic testing and genetic counseling. Understanding public attitudes and interest in genetic counseling and testing for susceptibility to genetic disorders will help expand genetic services (Bluman, Rimer, Berry, Borstelmann, Iglehart, Regan, Schildkraut, and Winer (1990).

Firstly, Bluman et.al (1990) examined the baseline knowledge, beliefs, and risk perceptions among a group of 200 women with breast and/or ovarian cancer who participated in a trial designed to improve decision making about genetic testing for BRCA1 and BRCA2. Subjects completed baseline questionnaires and interviews that assessed knowledge, attitudes, and perceptions of risk of having an

alteration in BRCA1 or BRCA2. From this study, what they can conclude is that knowledge was limited about BRCA1 and BRCA2 mutations and cancer risk associated with gene mutations (Bluman et.al 1990). A high proportion of the high-risk women in this study had knowledge deficits about BRCA1 and BRCA2 and overestimated their risk of having a mutation. Although some degree of caution should be used in generalizing the results of this study to practice settings, the data provide insight into the challenges clinicians will face in communicating with patients about cancer genetics.

Next, another research which is 'Public Attitudes about Genetic Testing for Alzheimer's Disease' was done by Peter J. Neumann, James K. Hammitt, Curt Mueller, Howard M.Fillit, Jerrold Hill, Nii A. Tetteh, and Kenneth S. Kosik. The topic that was examined was many people would be willing to pay for genetic testing, but not necessarily for health reasons. In a general population survey (N = 314), 79 percent of respondents stated that they would take a hypothetical genetic test to predict whether they will eventually develop Alzheimer's disease. Respondents also stated that if they tested positive, they would sign advance directives get their finances in order (74 percent), and purchase long-term care insurance (69 percent). The results suggest that people value genetic testing for personal and financial reasons, but they also underscore the need to counsel potential recipients carefully about the accuracy and implications of test information.

Moreover, in view of the increasing availability of commercial internet-based Personal Genome Testing (PGT), this study aimed to explore the reasons why people would consider taking such a test and how they would use the genetic risk information provided. A self-completion questionnaire assessing public awareness and interest in PGT and motivational reasons for undergoing PGT was completed by 4,050 unselected adult volunteers from the UK-based TwinsUK register, aged 17 to 91 (response rate 62%). Only 13% of respondents were aware of the existence of PGT. After reading a brief summary about PGT, one in twenty participants (5%) were potentially interested at current prices (£250), however this proportion rose to half (50%) if the test was free of charge. Nearly all respondents who were interested in free PGT reported they would take the test to encourage them to adopt a healthier lifestyle if found to be at high genetic risk of a disease (93%). Around 4 in 5 respondents would have the test to convey genetic risk information to their children and a similar proportion felt that having a PGT would enable their doctor to monitor their health more closely. A TwinsUK research focus group also indicated that consumers would consult their GP to help interpret results of PGT. Therefore from this hypothetical study, the conclusion is that increasing publicity and decreasing costs of PGT may lead to increased uptake, driven in part by the general public's desire to monitor and improve their health. Although the future extent of the clinical utility of PGT is currently unknown, it is crucial that consumers are well informed about the current limitations of PGT. Our results suggest that health professionals will inevitably be required to respond to individuals who have undergone PGT. This has implications for health service providers regarding both cost and time.

INTRODUCTION

It is common for cancer to develop by chance in family lineages. Thus, it gives individuals with certain gene mutations an increased risk of getting cancer (Miesfeldt, Jones, Cohn, Lippert, Haden, Turner, Martin and Clark, 2000). About 10% of diabetes runs in family and causes patients to bear the disease for

their entire lives. These diseases are caused by abnormalities in an individual's gene and ranges from a single gene disorder to the mutation of entire chromosomes (Ausems, Berg, Sandkujl, Kroos, Bardoel, Roumelioti, Reuser, and Wijmenga 1998). In addition, this mutation, when being accompanied by environmental causes, might trigger the development of the disease and might also be inherited in families. Advances in molecular genetics have opened up many new diagnostic and potentially preventive ways. There are currently over 200 genetic conditions for which tests are available. Although this technology has primarily been used in research, it is gradually becoming more widely applied within clinical practice as a guideline of genetic counseling assessment and testing of high-risk patient. While, genetic counseling (Keller, Jost, Kadmon, Wüllenweber, Haunstetter, Willeke, Jung, Gebert, Sutter, Herfarth,. Büchler 2004) is performed by health care professionals to inform at-risk individuals about their health risks due to genetic disorder found in their genes. A genetic counselor also helps patients understand the impact and nature of the disorder and the probability of developing or pass it down their family lineage (Kristoffersson, Lundgren, and Olsson 1997). It is generally performed before and after a genetic test (Miesfeldt, et al. 2000) Since a few years back, there have been several companies who have begun offering company-to-consumer genetic testing such as Easy DNA Malaysia, Gribbles Pathology and FitGenes. There is little increase of acknowledgement of these methods due to their advertising.

Generally, people make choices to undergo genetic screening when they have the relevant knowledge, information and most importantly, when they are aware of genetic disorder risks. Despite the information brought by genetic screening, the awareness (Jonassaint, Santos, Glover, Payne, Fasaye, Oji-Njideka, Hooker, Hernandez, Foster, Kittles, Royal 2010) is still not in a healthy range. From our survey, we analyze the result about the level of awareness on genetic testing and genetic counseling towards gifted high school students. The number of respondents for this research is relatively small when compared to the total population (Ries, Hyde, and Caulfield 2010) of teenagers in Malaysia but it generally provides valuable information of awareness towards genetic testing and genetic counseling.

METHODOLOGY

Study Sample:

100 high school students aged 15 to 18 participated in the research as respondents. This survey targeted gifted high school students because high school students are commonly perceived to receive the highest volume of new information daily through various means, mainly the media. The level of awareness and the form of attitude they have towards our subject, coupled with their extended affinity to comprehend information, will show their level of interest about it which is reflected in the amount of the said information they retain and their opinion about it. On the other hand, genetic testing and genetic counseling were selected to be the focal point of the survey because one, they are relatively new branches of Malaysia's medical services industry; two, they have yet to establish a generalized niche or reputation among Malaysians, allowing for more personalized responses from the respondents regarding preventive medical procedures such as these.

Procedure - Questionnaires:

The respondents were given a self-directed standardized questionnaire each to answer by following the instructions given on the questionnaire. The questions were designed to measure their knowledge and attitude towards genetic testing and genetic counseling. The questionnaire consisted of three parts, which are demographic, awareness and attitude.

Demographic: To take note respondents' demographic information which are gender, race and age.

Awareness: To measure respondents' level of awareness about inheritable chronic diseases, genetic testing and genetic counseling. Several aspects of their knowledge were tested using multiple-response questions (degree of accuracy of knowledge), true-false questions (confidence of understanding) and free-response questions (depth of understanding). The questions measured respondents' level awareness through two levels of detail – simple questions to gauge basic understanding (e.g. briefly describe genetic testing), and questions that required more detailed knowledge (e.g. where can genetic counseling be undertaken?)

Attitude: To determine respondents' opinion about the effectiveness and importance of genetic testing and genetic counseling. This section also gauges their willingness to undertake these services and the factors that affect their decisions (e.g. is price a factor? How important is genetic testing to you?). The questions in this section are accompanied by multiple commonly perceived model responses that respondents could choose to tick if they agreed, but they were also encouraged to provide personal answers that better represent their opinion.

Data Analysis:

When interpreting data, we matched all the variables to find notable correlations. The relations between variables were analyzed to answer the questions we had determined when planning the questionnaire, by comparing the related variables to measure the significance of the correlation. Using the correlation of the variables, we can draw conclusions about factors affecting gifted high school students' awareness and attitude towards genetic testing and genetic counseling. All data analysis was run using the IBM SPSS Statistics Data Editor (v.21).

RESULTS

Study Sample Demographic

Demographic					
Gender		Age (Median-17)		Race	
Male	45	15	2	Malay	71
Female	55	16	18	Chinese	17
		17	79	Indian	5
		18	1	Others	6

Awareness about Genetic Testing

Respondents' answers to the questions were scored to measure their understanding of genetic testing. The level of awareness about genetic testing among students is moderate (Average score stands at 10.65 out of total of 19). Only eight respondents fell into the 'High Awareness' category with scores of 15 or higher (third quartile) while two respondents fell into the 'Low Awareness' category with scores of 4 and below (first quartile).

From the answers respondents provided for the free-response questions, it can be observed that most of the respondents understood the purpose of genetic testing while 53% of the respondents could provide an acceptable definition of genetic testing. Respondents showed a basic understanding about genetic testing while relying on assumptions to answer questions about any deeper details (e.g. where genetic testing is available).

Awareness about Genetic Counseling

The level of awareness among respondents about genetic counseling was moderate-to-high. On a test scale of 0 to 8, 40% of respondents scored 6 or higher, falling into the 'High Awareness' bracket while 27% of the respondents obtained a score of 3, which just falls into the 'Low Awareness' bracket. 44% percent of respondents were familiar with the purpose of genetic counseling while 43% were able to properly define genetic counseling.

Detailed understanding of genetic counseling was limited to respondents higher up the testing scale. Those who scored lower generally had below-average awareness about both the fundamentals and details of genetic counseling.

Respondents' Sources of Information

Respondents were asked: one, how they obtained information about genetic testing and genetic counseling; two, how they prefer to receive such information. The most used and preferred sources of information was electronic media. In both cases, the internet and television was the top two most mediums to obtain information about genetic testing and genetic counseling. They were followed by two closely related sources, which were friends and social media.

These results shed light on the pivotal role of electronic media in relaying information to the younger demographic. It supported the trend that high school students obtain large volumes of information from mass media as well as via sharing through social media or friends. Diagram 1 shows the distribution of the sources used by respondents.

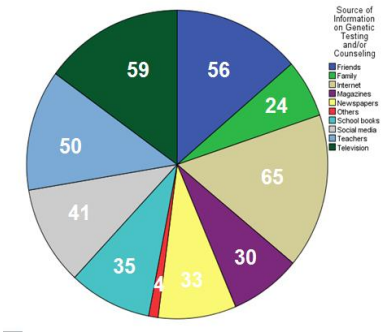


Diagram 1

Perceived Importance of Predisposition Genetic Testing

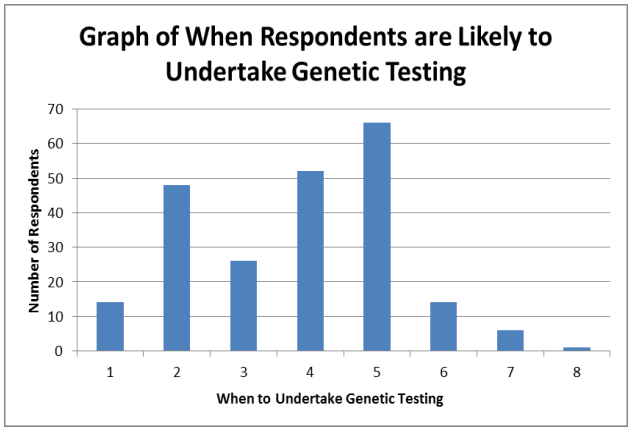
Table 1

Not important	4
Less important	15
Important	55
Very important	26

Respondents were asked how important undertaking predisposition testing is to them. 55% thought of it as important while 26% saw it as very important. A healthy total of 81% of respondents placed importance in testing, while the remaining 19% do not see it as important or effective in combating chronic and inheritable diseases.

Planned Time Frame for Undertaking Genetic Testing

Respondents were asked when they were likely to undertake genetic testing. Graph 1 shows the results.



Graph 1

1 – Now	4 – When I feel the need to	7 – When I retire
2 – Before having children	5 – Before marriage	8 – Others
3 – When I start working	6 – When I enter tertiary education	

Respondents showed greater urgency to undertake genetic testing (GT) when compelled by duty to oneself or family. As seen in Graph 1, GT is factored into the family planning of many respondents, as evidenced by the high number of respondents who would take GT before marriage and before having children. In addition, just over half of the respondents are willing to undertake GT when an obvious need arises.

While it is a good sign for high school students to recognize the helpfulness of genetic testing in family planning, efforts should still be made to encourage youths to take the initiative by undertaking predisposition genetic testing earlier in their lives, such as before tertiary education or before starting their careers. (Each of these time frames was chosen by less than 30 respondents each.)

ANALYSIS

Price as a Major Factor

In order to understand the impact of price on respondents' willingness to undertake genetic testing (especially predisposition testing), we presented respondents with three scenarios to see how their interest changes with the situation.

Scenario 1: You are rich. You can easily afford genetic testing.

Scenario 2: You have moderate income. It is difficult for you to afford genetic testing.

Scenario 3: You are poor. It is very hard for you to save up for genetic testing.

In Scenario 1, 87% of respondents are interested in undertaking genetic testing, indicating that when easily affordable, genetic testing is warmly welcomed by the respondents.

In Scenario 2, the responses were much more mixed. 33% were willing to spend on genetic testing, 29% were unwilling to pay for it while the remaining 38% were undecided.

In Scenario 3, the respondents were mostly unwilling to strain their tight finances by spending on genetic testing. 73% of respondents refused to save up for genetic testing. This is a major increase from the 3% that declined when rich. Table 2 shows the responses for all three scenarios.

Table 2

Scenario	Willing to spend on genetic testing? (%)		
	Yes	No	Not sure
Rich	87	3	10
Moderate	33	29	38
Poor	10	73	17

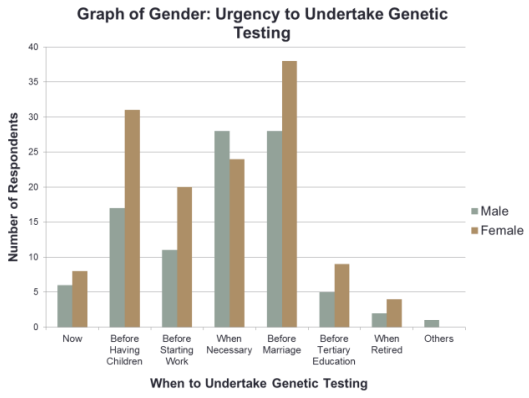
The results show that the affordability of genetic testing greatly influences respondents' interest in it. Our methods, although different from those of Lynn F. Cherkas and colleagues (2010), showed similar results. Respondents showed great interest in genetic testing when it is easily assessable (in Cherkas' study, this situation was represented by free genetic testing). Similarly, when genetic testing is financially out of reach, respondents tend to become disinterested in it, as shown in the mere 10% who would save up for it. For genetic testing to be easily accessible to everyone and raise interest in it, the current market price of genetic testing must be lowered.

Awareness Directly Increases Interest

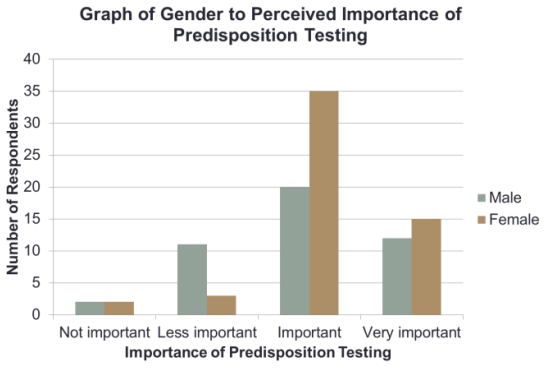
Respondents were shown a brochure containing important information about genetic testing and a sample genetic testing report. When they had finished browsing the material, we reassessed their interest in finding out more about genetic testing and their willingness to undertake it at some point in the future.

After browsing the information, respondents showed strong interest in finding out more about genetic testing. 75% of the respondents answered 'Yes' when asked if they would like to find out more about genetic testing. Meanwhile, 70% expressed willingness to undertake genetic testing in the future after reading the materials provided. These results show that providing people with information about genetic testing will increase their interest and willingness to undertake it.

Differences in Awareness and Willingness between Genders



Graph 2

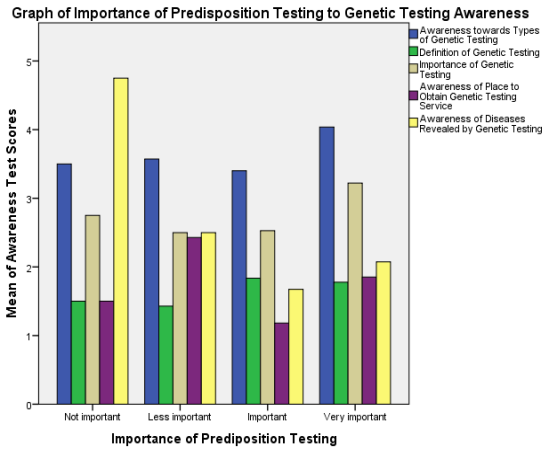


Graph 3

The above graphs show that females place more importance on undertaking genetic testing as compared to males. Females also show greater urgency to go for genetic testing. When the factors of these responses are analyzed, it can be observed that family history of diseases and higher levels of awareness are the main factors that set females apart from males.

Furthermore, in the financial scenarios test, females show a higher willingness to pay for genetic testing, barring the 'Poor' scenario. After being shown information about genetic testing, females also show greater interest in learning more about genetic testing as well as becoming more willing to undertake genetic testing than males.

Correlations between Awareness and Attitude



Graph 4

Students who see genetic testing as 'Very important' have higher understanding of its types and importance. Meanwhile, students who know much about diseases revealed by genetic testing seem to become very unconvinced of its effectiveness.

It can be concluded that knowledge about genetic testing and its importance raises acceptance of it. At the same time, awareness about the types of diseases revealed by genetic testing can work both ways. On one hand, it can help convince a prospective consumer that genetic testing can help preventive the said diseases. On the other hand, it may also cause consumers to become unconvinced of its ability to help prevent such diseases. This problem can be proper countered by including statistical data or explanations about the effectiveness of genetic testing as a preventive measure against inheritable diseases.

CONCLUSION

Our study sample, gifted high school students, have moderate levels of awareness about genetic testing and genetic counseling. They know the fundamentals but lack understanding about the finer details of these services.

Gifted high school students obtain information about genetic testing and genetic counseling from various sources. No single medium of communication stands out as the most effective means of conveying information to these students.

Female students show higher awareness about genetic testing and genetic counseling. The leading factors for this difference between the sexes are: family history of genetic testing, level of awareness and perception of importance.

Price is a major factor that strongly influenced respondents' interest in undertaking genetic testing. The gradual decrease in interest is proportional to the decrease in ability to afford genetic testing.
Awareness improves attitude. When respondents know more about chronic diseases, inheritable diseases, genetic testing and genetic counseling, they are more likely to undertake genetic testing and genetic counseling.

Awareness about chronic and inheritable diseases can work both ways. It both convinces and also causes skepticism about the effectiveness of genetic testing and genetic counseling.

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THE UV-VISIBLE AND INFRARED SPECTRA OF COBALT AND NICKEL COMPLEXES

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ABSTRACT

Nowadays, the study of thiourea derivative has drawn the attention of researchers due to their importance in chemistry. Benzoylthiourea, a thiourea derivative, containing both carbonyl and thion groups are versatile ambidentate donor ligands for transition metal ions such as cobalt and nickel metal or ions (Emen et al. 2005). Due to the presence of the O, N and S-donor atoms, benzoylthiourea ligands tends to react readily with transition metal ion, yielding metal complexes of benzoylthiourea. Herein, we propose a study of the synthesis of cobalt and nickel complexes containing benzoylthiourea containing pyrrolidine and piperidine moieties. The metal complexes will be characterize on the basis of UV- Visible and infrared spectroscopy, melting point and elemental analysis. The UV-visible spectrum of the complexes will reveal effect of different metal ions to the absorption bands of the electronic spectrum. The Spectrum Peak Pick Report is used a reference to study the effect of different metal ions to the absorption bands. Each complex compounds has their own characteristics and properties due to different molecular geometry. As a conclusion, new cobalt and nickel complexes with benzoylthiourea ligands are produced. So, based on the analysis we carried out, we can define the geometrical structure of the complexes. The FTIR analysis is carried out to recognize the functional group in our complexes. Herein, the effect of the metals on the structure of the ligands on the structure also been studied. Based on the UV-Vis analysis also we can conclude that the metals have affected the special structural and electronic features in the ligands.

KEYWORDS: metals; ligands; complexes; synthesis; spectroscopy; analysis; structure; geometry.

INTRODUCTION

To study the reaction of benzoylthiourea ligand with metal ion to produce a new complex metal. This research is mainly about the study of new copper (II) complex, cobalt (II) complex and nickel (II) complexes using pyrrolidine (C_4H_9N) and piperidine ($C_5H_{11}N$) and the study of its properties. Transition metals are used in this research because transition metal ions are usually able to switch between several oxidation states. For metal complex using copper (II) is by using ligand pyrrolidine. Metal complex using cobalt (II) is by using ligand piperidine. While for nickel (II) complexes, we did for both ligands: pyrrolidine and piperidine. The complexes were characterized by UV-vis, IR and MP. UV-Vis synthesized is carried out to identify the product/complexes to be filtered out from the solution. IR and

MP synthesis are carried out to study the properties of the complexes. The effect of metal ion to the colour of metal complexes is studied. UV-Vis spectroscopy is also used in studying the changes of colour in the complexes.

RESEARCH METHODOLOGY

Our research methodology requires us to conduct lab experiment for a couple of weeks. Since ligands are not required to be synthesis as it was provided, proceed to the step of making metal complexes by combining metals and ligands. Here, two types of metal, cobalt acetate tetrahydrate, $Co(CH_3COO)_2.4H_2O$ and nickel acetate tetrahydrate, $Ni(CH_3COO)_2.4H_2O$ that will be combined with two types of benzoylthiourea ligands, piperidine and pyrolidine. Here, 4 types of metal complexes can be obtained that will be run a few analysis to study the properties of this metal complexes. The analysis that had been done was the UV-Vis spectroscopy, melting point and IR spectroscopy (FTIR).

Preparing Apparatus and Material & Synthesizing Metal and Ligand Solution

For the method, firstly prepare all the apparatus and material that was required in our experiment. Apparatus that used are two 500ml beaker, two 250 ml beaker, two 10 ml measuring cylinder, two double neck round bottomed flask, two droppers, two gas jars glass rod and microcapillary. For the materials, cobalt sulphate, copper sulphate, silica gel, Thin Layer Chromatography (TLC) plate, Column Chromatography, dichloromethane (DCM), n-Hexane, methanol, ethanol, chloroform and acetone were prepared. For the first step, mix each of the ligands and metal salts in the methanol. Then, use a machine name Sonicator to sonicate or dissolve the ligands and metal salts to observe whether they dissolve in the solution. If not, change the solution in order to dilute the solution. This method is repeated until all the metal salts and ligands are dissolve in a solvent.

The Thin Layer Chromatography (TLC) process

Next process is the TLC. First step, cut the TLC plate into several strips. Before the process to drop the metal and ligand solution on the TLC start, prepare a volatile solution to enable the metal and ligand solution to travel up the plate by capillary action. The correct way is by using 70% of DCM and 30% n-Hexane for the solvent. The solvent ratio could varies depend on what type of complexes that been observed. Then, some of the solvents are poured into a container for the TLC process. Next, proceed to the dropping the ligands and metal solution. For the first time, put a few drop of the both solution on the same end of TLC side by side to observe where the both solutions will stop at the TLC strips for further comparison. A competition is set up between the silica gel plate and the development solvent for the spotted material. The very polar silica gel tries to hold the spot in its original place and the solvent tries to move the spot along with it as it travels up the plate. The outcome depends upon a balance among three polarities - that of the plate, the development solvent and the spot material. If the development solvent is polar enough, the spot will move some distance from its original location. Different components in the original spot, having different polarities, will move different distances from the original spot location and show up as separate spots. When the solvent has travelled almost to the top of the plate, the plate is removed, the solvent front marked with a pencil, and the solvent allowed to evaporate. Then, the TLC

strips are put under a short wave ultra violet light and observe the result. Theoritically, there is a spot at the metal line while nothing can be observe at the ligands. This results was important for us to differentiate which spot is ligand or metal complex for the synthesizing of the metal complexes later.

Synthesizing The Metal Complexes

The next step is synthesizing the metal complexes. For the first complexes, make two sets of metal complexes by mixing up each cobalt (II) solution and nickel solution with pyrrolidine in a double neck round bottomed flask. Then, reflux the solution for about 5 hours to obtain an optimum result of the metal complexes. During the 5 hours periods, the TLC process of the metal complexes are repeated for 30 minutes each, and observe each of the TLC under the ultraviolet. From the observation under the UV ray, many spot can be seen on the TLC. The spot will represent the separation of metal complexes for the next step that is the column chromatography. Then, identify which spot is the ligand or the complexes by comparing it with the first TLC. After the best result of the TLC process is obtained, stopped the reflux process and prepare to rotavap the metal complex to dry the solution for the next step that is column chromatography.

Column Chromatography

For column chromatography, this process was done to get pure metal complexes. Firstly, identify any solvent that can dissolve the metal complexes that had dried after been rotovap. Usually methanol is used as the solvent. Then, sonicate the solution to ensure it is completely dissolve in the solution. Next, prepare a silica solution by mixing the silica gel with the same concentration of solvent of DCM and n-Hexane that is 70% and 30% respectively. Some of the solvents are kept for further some of the solvent for the column chromatography process. After the right mixture of the silica solution is obtained, the solution is transferred into the column that had been clamp with a retort stand. This is the toughest part to ensure that there is no cracking when the solution is transferred as it can affect the result of the experiment. Then, make sure that the silica has completely settled down at the lower part of the column and there were excess solvent solution at the upper part of the column. Then, drop the metal complexes solution little by little by using dropper into the column. Make sure that the metal solutions settle below the excess solvent solution for the process to occur. If the solvent is not enough, manually add the fresh solvent to the top of the column, trying to disturb the packing material as little as possible. Then, open the tap of the column so that the solvent can flow down through the column, collecting it in a beaker at the bottom. As the solvent runs through, keep adding fresh solvent to the top so that the column will not dries out. This process of washing a compound through a column is known as elution.

Crystallization

This process is done when the metal complexes solution that had been rotavap is dissolve again in a solvent and put into several small bottles. Then, add the n-Hexane solution with the amount of ratio 1:1 to the metal complexes. Then, the small bottles are left for a few days with the caps are not fully closed for it to evaporate and produce crystal.

Melting Point

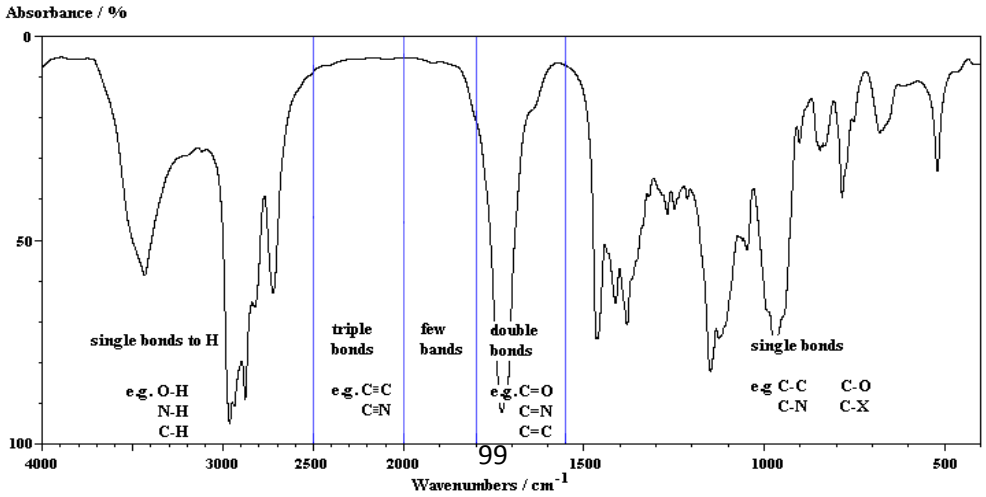
This process is done after the metal complexes has been synthesis and done the crystallization process. This process is one of the tests used to test the purity of the metal complexes obtained. The process is done by using a machine called Digital Melting Point 9100. This process need a small amount of the metal complexes that had been synthesized to record the temperature that the metal starts to melt and finish to melt. Usually, a pure metal complex only has 0.1 - 0.2 $^{\circ}$C differences between the start and finish of melting points. The more gaps between the two condition, the more impurities that can be identified.

UV-Vis Spectroscopy

This is the second process of analysing the purity of the metal complexes. This process is done by using the machine called UV 2400 PC Series and a software called UV probe. The process is start with calibrating the machine by using 100 % DCM. The DCM is put into a small container that will be put in the machine. After calibration process is done, the analysis process started. Some of the metal complexes are used for the analysis. The metal complexes are diluted with the DCM as the solvent. The concentration of the metal complexes and DCM must be correct in order to get a nice graph result. A very concentrated solution will make the graph is difficult to be analyse, so a less concentration of solution is better. After the right solution is made, the solution is put into another small container and also been put into the machine. Both of the small containers are put in the machine where the UV light will be emitted and pass through the both container to analyse it. The graph obtained will determine the electronic transition of the metal complexes. The possible transition is n - π^* or π - π^*

Fourier Transform Infrared (FTIR)

Nicolet 6700 is the name of the machine that is used for this process. This process is specialized to identify the functional group the metal complexes. The functional group of the metal complexes can be identifies by analysing the wavenumbers and absorbance from the graph obtained. Different wavenumber will show different type of functional group and the bonding appear in the complexes. The standard graph for the functional group is:



RESULT AND ANALYSIS

FTIR ANALYSIS

The FTIR spectra and absorption bands data of all synthesized complexes are shown in Figure and Table. This FTIR analysis was recorded by using Nicolet 6700 FTIR machine.

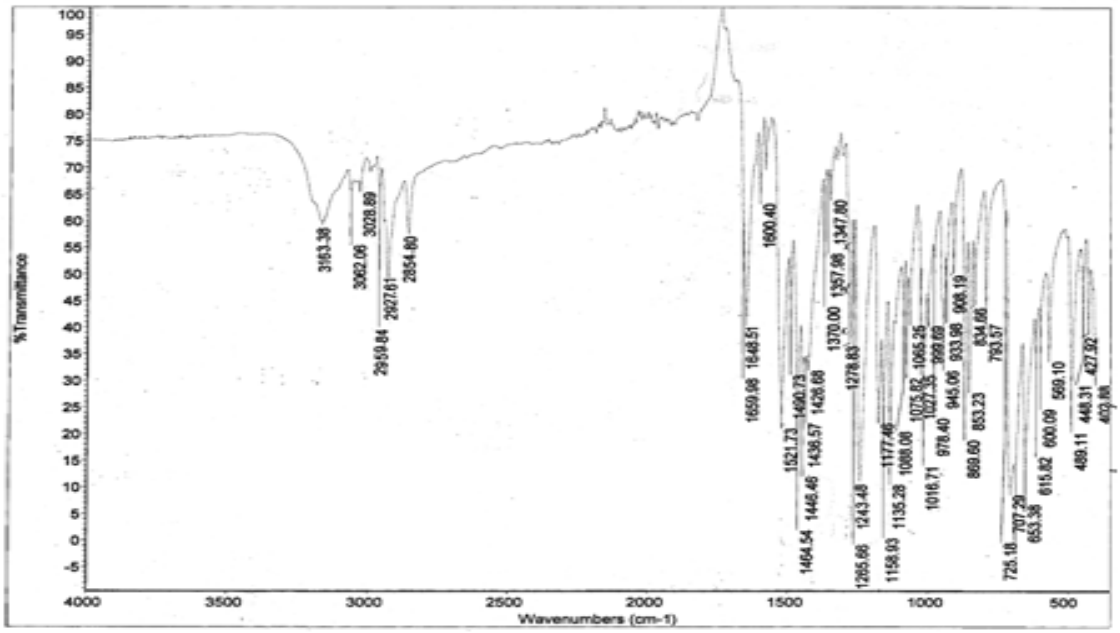


Figure 1 FTIR spectrum

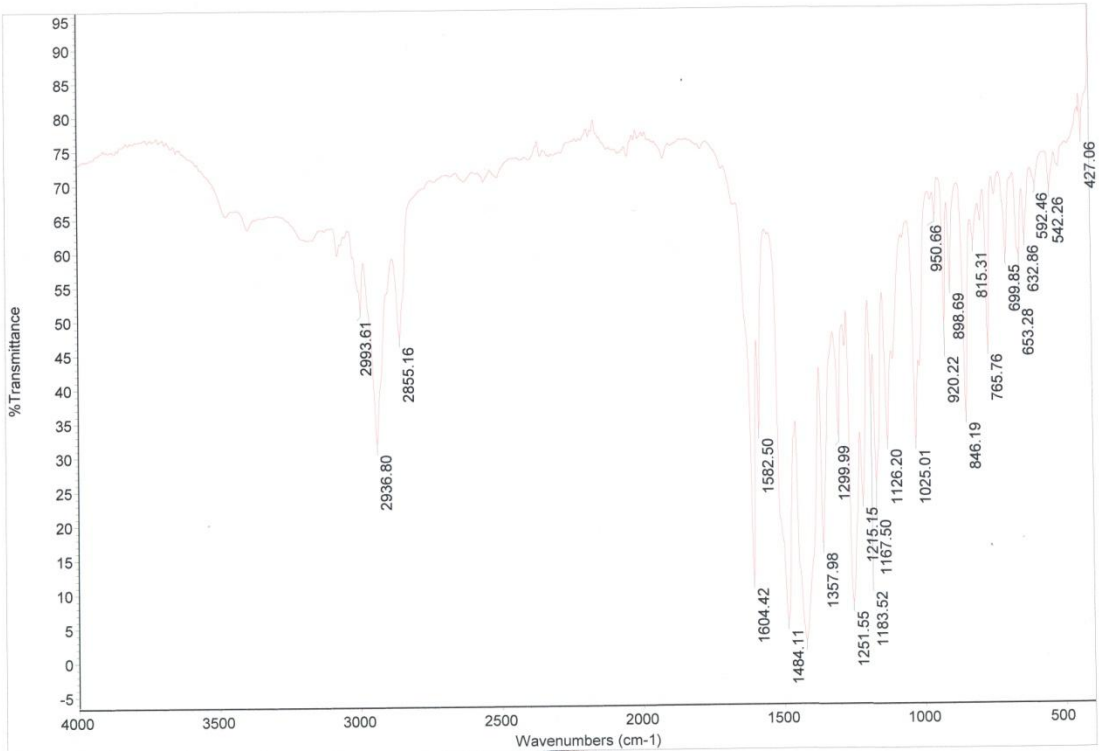


Figure 2 FTIR spectrum

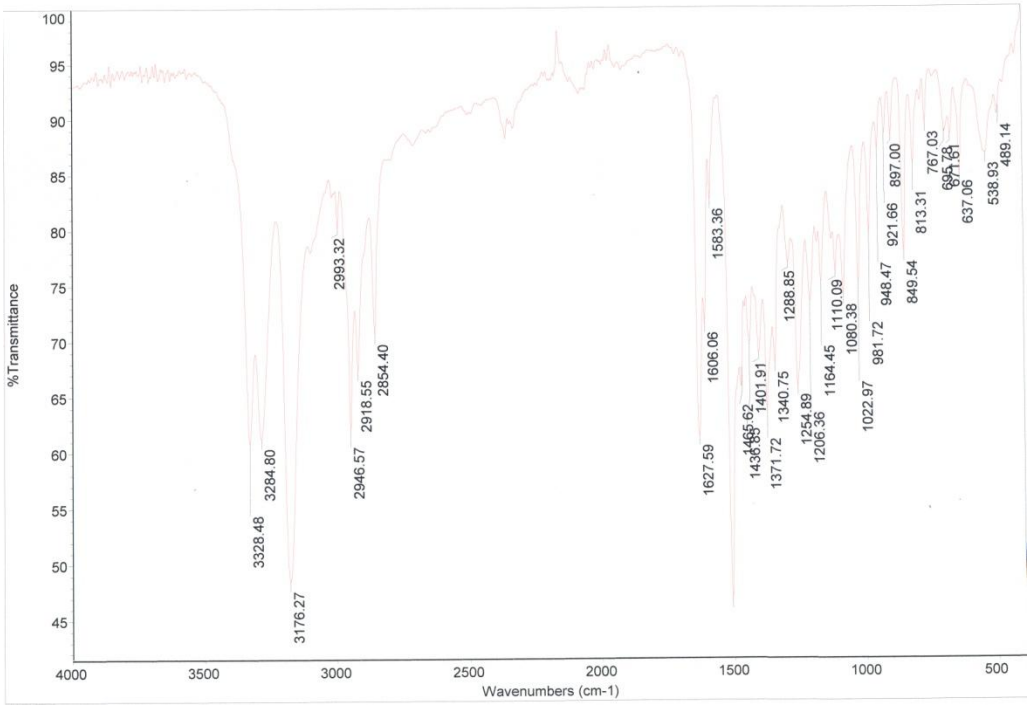


Figure 3 FTIR spectrum

The FTIR spectra in Figure 1 shows spectra for benzoylthiourea piperidine (HL^2). It is used to recognise the functional group in the ligands. While the Figure 2 & 3 shows the FTIR spectra for nickel and cobalt complexes with ligand benzoylthiourea piperidine respectively. Below are the table of FTIR spectra for ligands pyrrolidine, piperidine and nickel and cobalt complexes.

Table 1 FTIR Analysis

	FTIR/cm^{-1}				
	v(N-H)	v(C=O)	v(C-S)	v(C-H)arom	v(C-N)
HL^1	3145	1645	1252	2857	1162
HL^2	3163	1649	1244	2855	1159
$Ni(L^1)_2$	-	1603	1156	2900	1032
$Ni(L^2)_3$	-	1604	1168	2936	1025
$Co(L^1)_3$	-	1606	1171	2969	1026
$Co(L^2)_3$	-	1627	1165	2946	1022

UV-Vis Spectroscopy

All the absorption bands of these compounds are shown in Figure and Table. The electronic absorption spectra of the complexes I, II, III, and showed some absorption peaks and were recorded in Dichloromethane (DCM). The UV-Vis spectrophotometer used in this research is UV 2400PC Series and was interpreted by a software which is UV Probe.

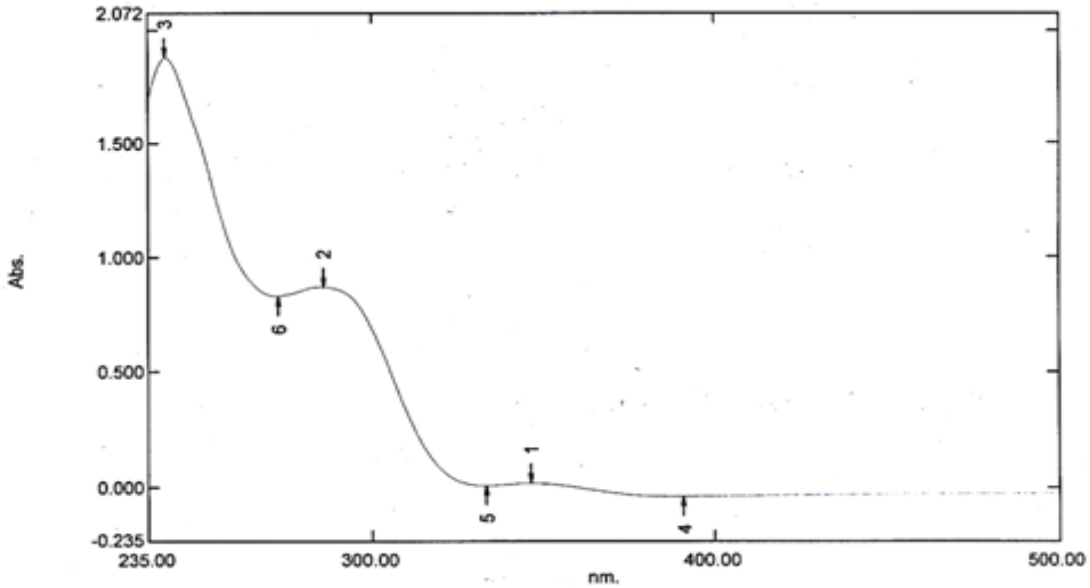


Figure 4 UV-Vis Spectrum

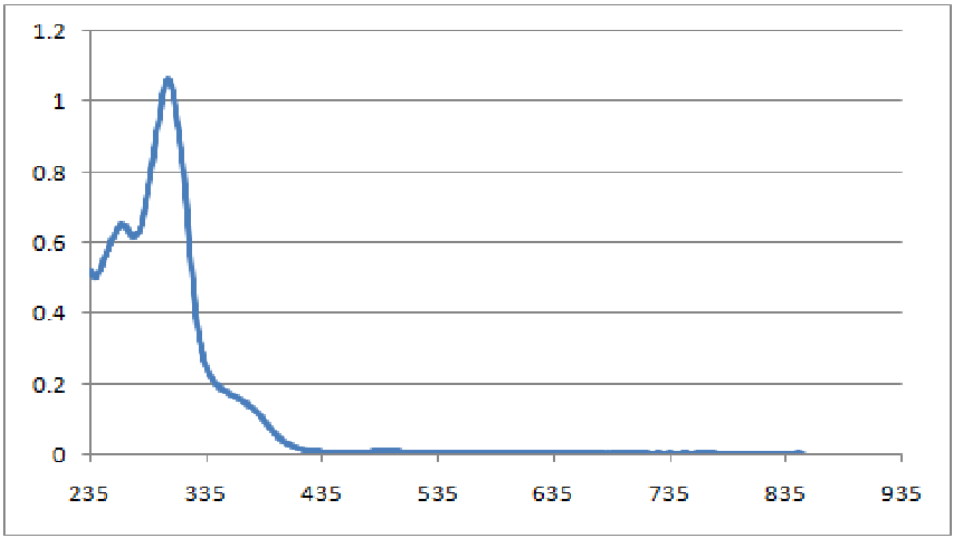


Figure 5 UV-Vis spectrum

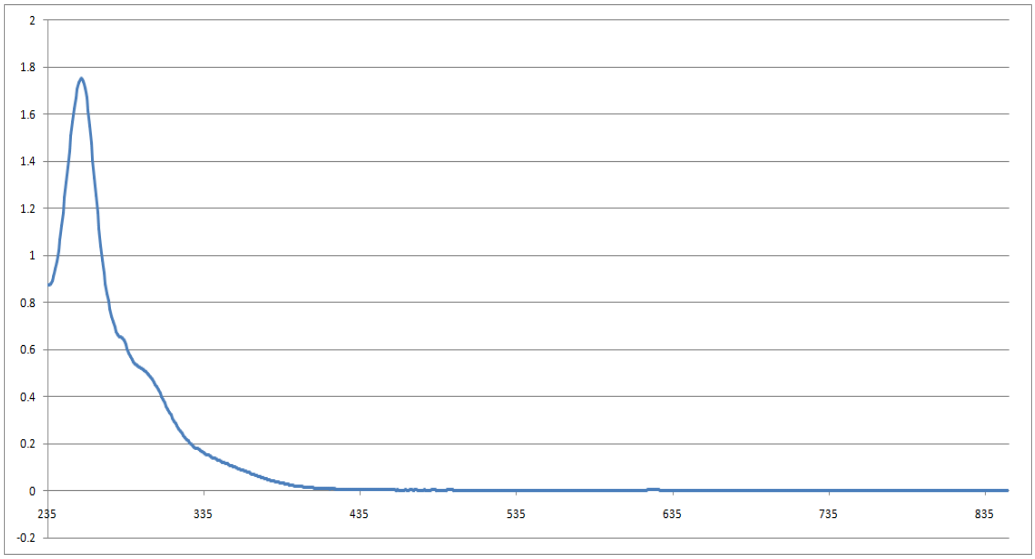


Figure 6 UV-Vis Spectrum

Figure 4 shows the uv-vis spectrum for ligands piperidine, HL_2. Figure 5 and 6 shows the uv-vis spectra for nickel and cobalt complexes with ligands piperidine respectively. Below is the table for uv-vis spectra for ligands pyrrolidine, piperidine and nickel and cobalt complexes.

Table 2 Empirical formula and data UV-Vis of the compounds

Compund	Empirical Formula	λ/nm, ξ/Lmol^{-1} com^{-1}		
		n-π*	π-π*	d-d
HL^1	$C_{12}H_{14}N_2OS$	344	280	-
HL^2	$C_{13}H_{16}N_2OS$	343	286	-
$Co(L^1)_3$	$C_{36}H_{39}CoN_6O_3S_3$	275	478	610
$Co(L^2)_3$	$C_{39}H_{45}CoN_6O_3S_3$	280	475	618
$Ni(L^1)_2$	$C_{24}H_{26}NiN_4O_2S_2$	280	461	614
$Ni(L^2)_3$	$C_{39}H_{45}NiN_6O_3S_3$	277	465	624

DATA DISCUSSION

FTIR Analysis

This analysis is specialized to identify the functional group the metal complexes. The functional group of the metal complexes can be identifies by analysing the wavenumbers and absorbance from the graph obtained. Different wavenumber will show different type of functional group and the bonding appear in the complexes. The functional group that we identifies in our ligands and complexes are, ν(N-H), ν(C=O), ν(C-S), ν(C-H)arom and ν(C-N). As shown in the table 1 in 3.1.1, the ν(N-H) bands only can be observed in ligands pyrrolidine and piperidine. There is no ν(N-H) bands in the metal complexes, neither cobalt nor nickel complexes. This is because the H atom that attached to the N atom in the ligands is deprotonated as the ligands react with the metal.

For ν(C=O), the bands show a little changed when we compared the spectra of ligands and complexes. The bands for ν(C=O) shifted lower from 1649-1645(nm^{-1}) to 1627-1603(nm^{-1}) when it becomes complex because the O bonding with the C is now between double and single bond.

For ν(C-S), ν(C-H)arom and ν(C-N), we can still see the bands in the range 1252-1265(nm^{-1}), 1649-1645(nm^{-1}), 2969-2865(nm^{-1}) and 1162-1022(nm^{-1}) respectively. This shows the exsistence of this functional group in our complexes. Based on this analysis, the expectation structure are:

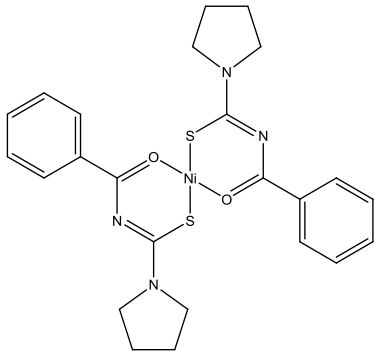


Figure 7 Complex $Ni(L^1)_2$

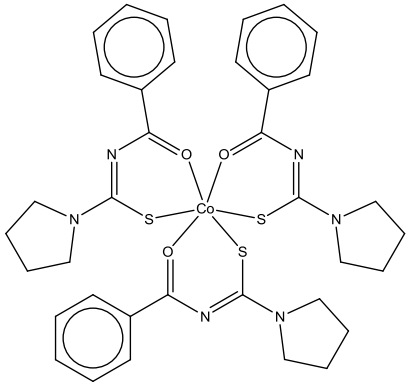


Figure 8 Complex $Co(L^1)_3$

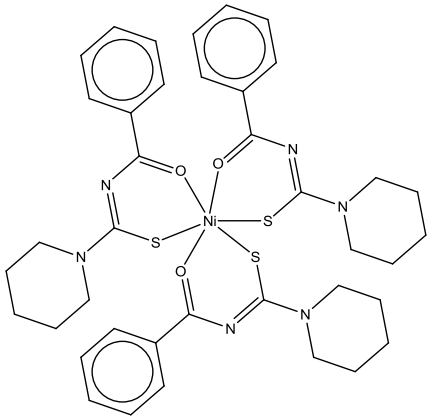


Figure 9 Complex $Ni(L^2)_3$

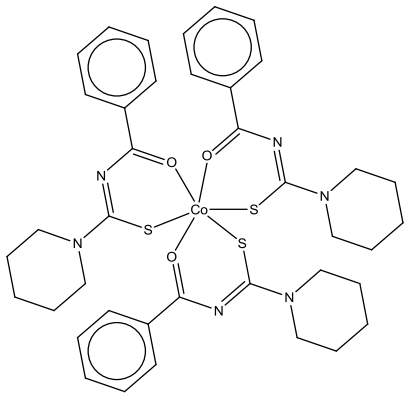


Figure 10 Complex $Co(L^2)_3$

UV-VIS Analysis

The spectra obtained will determine the electronic transition of the metal complexes. The possible transition is n - π* or π - π *.

Based on the spectra and table in 3.1.2 above, the absorption bands at 250-260 nm can be assigned to π→π* transition of the aromatic systems. It was shifted a little bit higher due to the interaction between the metal and the ligand. The absorption bands at 350 – 300 nm can be assigned as n – π* transition. There are different wavelength for both transition because they have different level of energy required for the p electron to become excited. For π – π* transition, it needs higher energy. Hence, it has a lower wavelength. The peak of this spectrum for this transition has range of 265-245 nm which for n – π* transition, it needs lower energy, so it has a higher wavelength. The peak of this spectrum has range of 380 – 300 nm.

CONCLUSION

In a nutshell, cobalt and nickel complexes with benzoylthiourea ligands were successfully synthesized. The analytical analysis concluded that the ligands behaved as bidentate chelate (O,S) in coordination with Co^{3+} and Ni^{2+} ion to give a neutral and stable complexes.

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WHEN DID THE BABY DIE: A STUDY OF BABY DECOMPOSITION LIKE ANIMAL MODEL

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ABSTRACT

Prevalence of baby dumping in Malaysia has lately increased dramatically. Estimation baby's time of death is difficult because of environmental variation, location of the dumping and the lack of muscles on the body. Thus, the objective of this research was to develop a visual database to identify changes that occur when a baby like carcass decompose at various conditions. A total of 6 dead adult New Zealand White rabbits weighing 2.2 $\pm$ 0.7 kg were used. Control group (2 carcasses) were placed on a grass field, 1 carcass in a sealed dustbin, 1 partially sealed dustbin and 2 in a sealed dustbin with organic materials. Carcass temperature, weather and visual changes were collected and analyzed. This study had noted that the carcasses decompose at a different rate based on where they were placed. The rate of decomposition of Group 1 was the fastest among other group followed by Group 3, Group 2 and the slowest was Group 4. All groups had undergone 5 general stages of decomposition, which are fresh, bloat, active decay, advanced decay and dry (skeletal). This study had developed a comprehensive visual database of decomposing carcass similar to a dead baby.

KEYWORD: baby dumping; rate of decomposition; visual database; carcass; visual changes

INTRODUCTION

Statistic has shown that the prevalence of baby dumping in Malaysia is rising at an alarming rate (Tan et al. 2012). Despite this, the prevalence of pre-marital sex amongst Malaysian youths is low as compared to those in developed countries. This is because pre-marital sex and pregnancy outside wedlock are largely socially unacceptable in Malaysia and may be kept hidden from others, the complications and social problems that may follow from this behaviour is indirectly reflected by the increasing report of baby dumping. A study had shown that pre-marital sex is highly likely when six predictor variables are present within a couple. They include religion, race, lover, reading or watching porn, masturbation and bullying (Manaf et al. 2013).

According to previous research, human decomposition is sequentially composed of 5 stages of decompositions - fresh, bloat, active decay, advanced decay and skeletal (Statheropoulos et al. 2007; Dent et al. 2004). Unfortunately, rate of decomposition is affected by weather, environment and size of the corpse (Moyce et al. 2009). Unfortunately, in Malaysia this database is lacking especially on baby decomposition.

Thus, a research was conducted to study the rate of baby like decomposition in 4 conditions – exposed and on the ground, partially sealed dustbin, fully sealed dustbin and dustbin with organic

materials. New Zealand White rabbit was used to represent a newborn baby as both of them have almost the same weight and muscle mass.

LITERATURE REVIEW

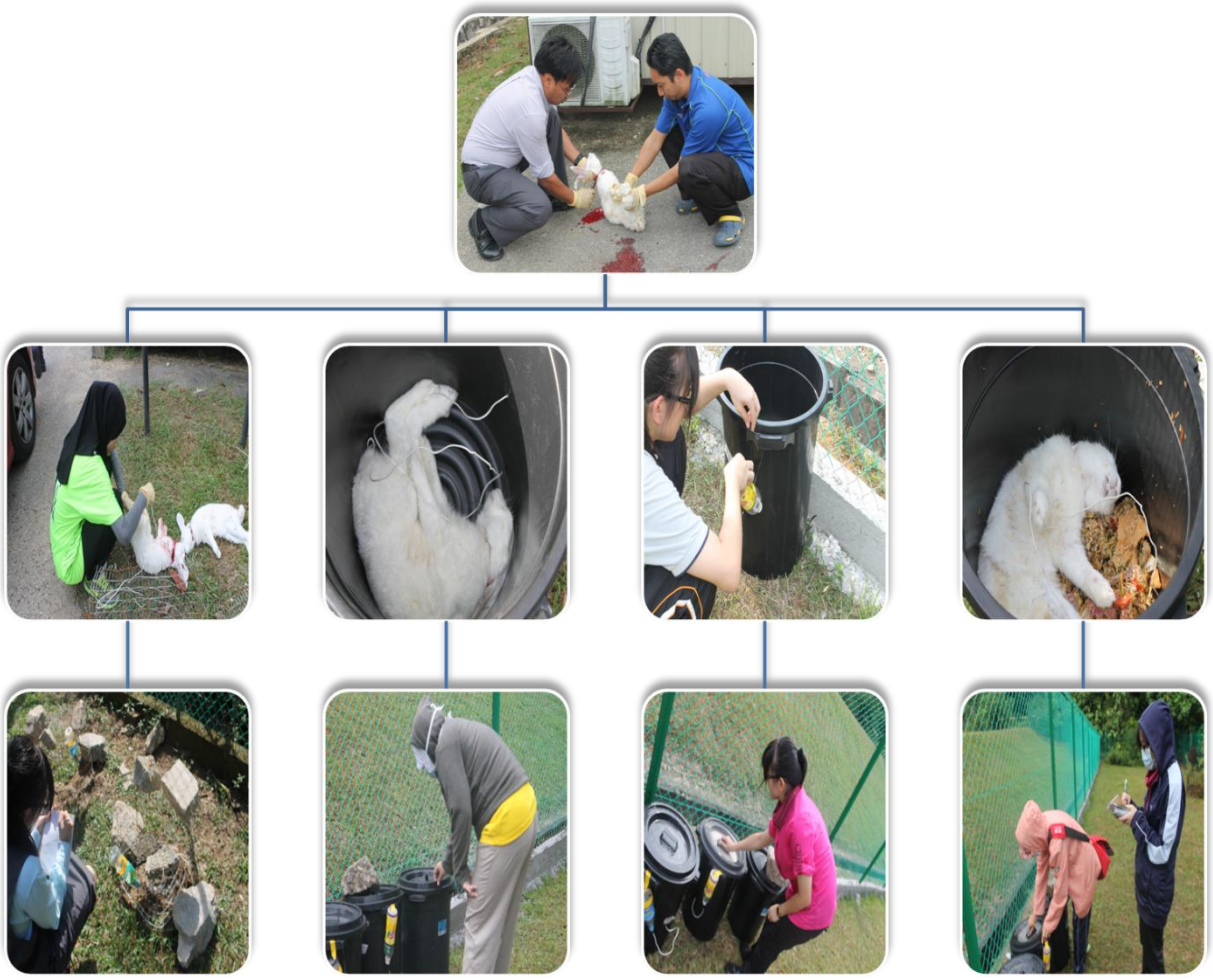
"The time of death is sometimes extremely important. It is a question almost invariably asked by police officers, sometimes with a touching faith in the accuracy of the estimate. Determining the time of death is extremely difficult, and accuracy is impossible" (Time of Death Journal, Department of Forensic Medicine, University of Dundee, Ref. 8 at p. 115.).

"Repeated experience teaches the investigator to be wary of relying on any single observation for estimating the time of death (or "duration of the postmortem interval"), and he wisely avoids making dogmatic statements based on an isolated observation". (Time of Death Journal, Department of Forensic Medicine, University of Dundee, Ref. 12 at p. 151.)

"Whatever method is used to calculate the estimated time since the death from body temperature, all the variable factors must be taken into account to modify any basic formula, though this adjustment is very arbitrary and can only be attempted in the light of previous experience. When a "favoured" time of death is decided upon this should never be offered to the investigating authorities as a single point in time. It must be used to construct a "bracket of probability", giving the earliest and latest time between which the doctor feels that death must have occurred. The width of this time bracket will depend upon the number and uncertainty of the variable factors known to the doctor and is likely to be longer the more remote the death was from the time of examination of the corpse. It is futile mentioning any time in units of less than an hour, even when the death was quite recent. A medical witness who attempts to determine the time of death from temperature estimation in minutes or fractions of hours is exposing himself to a severe challenge to his expertise which may well amount to near ridicule, thus degenerating the rest of his evidence". (Time of Death Journal, Department of Forensic Medicine, University of Dundee, Ref. 10 at p. 12.)

"The timing of the sequence of events concerned in the dissolution of the body cannot be done with accuracy and one must be cautious never to pronounce too readily that the decomposed state of the body is inconsistent with the time interval alleged". (Time of Death Journal, Department of Forensic Medicine, University of Dundee, Ref. 6 at p. 91.)

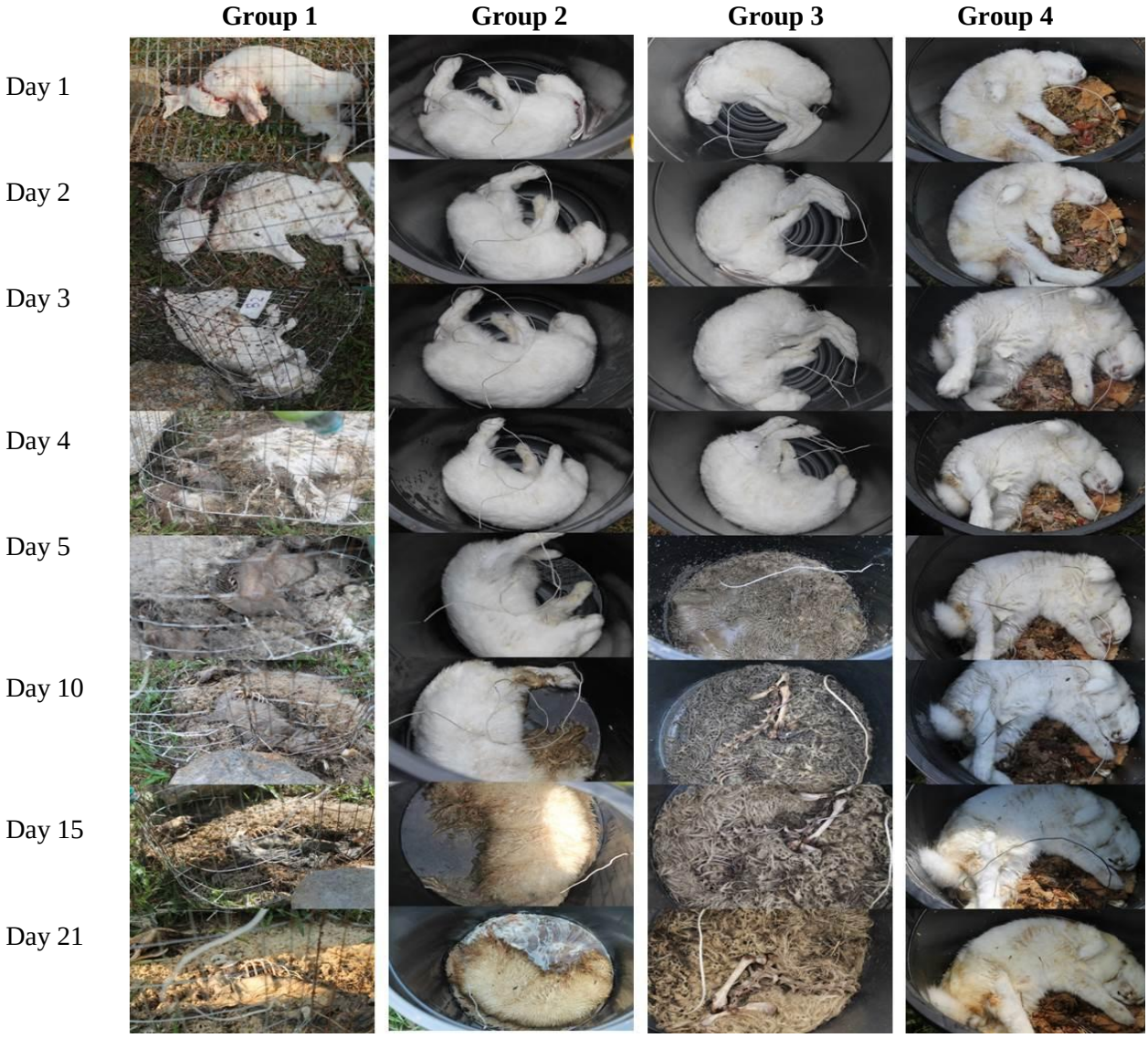
METHODOLOGY



To conduct our research, we slaughtered 6 adults New Zealand white rabbits in order to represent the dead baby. The reasons that we used New Zealand white rabbits is the characteristic of the baby and these rabbits which is lack of muscles. Then, we grouped these carcasses into four groups which are on the ground, in the dustbin partially sealed, in the dustbin fully sealed and in the dustbin fully sealed with organic materials. So, we set up the place of the carcasses and we also set up props for each group to record the temperature of the carcasses.

This research is being conducted for 3 weeks. We observed all the carcasses twice each day. Data is recorded by taking some photos and record all the changes of the carcasses during the three weeks. Apart from that we also observed the changes of the carcasses by relating the temperature with the changes.

RESULTS



From the observation, we can conclude that the carcasses of the rabbit had undergone the five stages of decomposition which are fresh stage, bloat stage, active decay, advanced decay and skeletal stage. Group 1 placed in exposed air experienced the higher rate of decomposition. The carcass undergoes the five stages earlier followed by Group 3, Group 2 and lastly Group 4.

The fresh stage of all of the rabbits started on the first day when the circulatory system of the rabbits stop functioning. On the second day, the carcass in group 1 started to bloat and released light odour but the other three remained in fresh stage and started to decay on the third day. The carcasses in group 2, group 3 and group 4 started to bloat on the third day with light pungent odour.

On the fourth day, insects such as maggots and flies infested the carcass in group 1 and released a very strong pungent odour. The other three carcasses remained bloating.

On the fifth day, there were only the fur and the skins left in group 1. The carcasses in group 3 undergo rapid decay. The maggots infested the carcasses. The carcass in group 1 is left drying until the 21st day and there are no insects after that.

Group 3 reached skeletal stage on the 15th day and left dried. The insects are also depleting. In group 2, the carcass started release liquid with the pungent smell on the tenth day. The maggots also started to appear. However, the maggots are found dead in the liquid of the carcass on the 15th day. The conditions of the carcass remain unchanged after that. Group 4 keeps in bloat stage until the 21st day.

Only group 1 and 3 reached all the five stages in 21 days while the others two remain unchanged. The observations are varied on the temperature, location and the condition of the carcasses.

DISCUSSION

Flies have the ability to smell death from up to ten miles (16 km). That is why flies approached the carcass in group 1 very fast. Insects colonize corpse in a predictable sequence, also known as insect succession. The first to arrive are the *necrophagous species*, drawn by the strong scent of decomposition. Blow flies can invade a corpse within minutes of death, and flesh flies follow close behind. Soon after come the *dermestid beetles*, the same beetles used by taxidermists to clean skulls of their flesh. More flies gather, including house flies. Predatory and parasitic insects arrive to feed on the maggots and beetle larvae. Eventually, as the corpse dries, hide beetles and clothes moths find the remains.

The result showed that group 1 reached active decay stage very rapidly than others experimental animals. The experimental animal in group 1 had not shown the characteristics of bloating stage such as increase in size of the body. This could be the decomposition of group 1 was occurred rapidly and the bloating stage occurred at night between the second day and the third day. Bloating due to the Gases produced by metabolic activity of anaerobic bacteria caused a slight inflation of the abdomen. This stage begins when gases start to accumulate in the carcass and ends when body deflates. Thus, gas from group 1 probably had leaked out faster because there were various opening in carcasses such as mouth, nose, ears, anus and lesion area where the sacrifice was done.

Anaerobic metabolism takes place, leading to the accumulation of gases. The accumulation of gases within the bodily cavity causes the distention of the abdomen and gives a corpse its overall bloated appearance. Now, the cells' own enzymes and bacterial activity cause the body to decompose. The group 4 undergo the slowest decomposition. The body of the experimental animals were still in bloating stage for three weeks. This happened because the microorganisms in their body became weaker when the temperature rises. Sealed condition made the hot temperature trapped inside the dustbin and the microorganism cannot survive well when the temperature keeps rising.

CONCLUSION

The rate of decomposition of a newborn like baby varies at various conditions. The rate of decomposition of carcass on the ground for active decay was the fastest among the experimental groups. Despite this, we noted that carcass placed in a partially sealed dustbin had reached early phase of skeletal much earlier than other groups. Carcass placed in a fully sealed dustbin had a significant delay in decomposition.

ACKNOWLEDGEMENTS

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CLONING AND PROTEIN EXPRESSION STUDY OF RECOMBINANT HYPOTHETICAL PROTEINS BPSS0812A AND BPSL0739 FROM *BURKHOLDERIA PSEUDOMALLEI*

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ABSTRACT

Burkholderia pseudomallei (BP) is a pathogen which is the main causes for the infectious disease melioidosis. *This pathogen organism c*an survive and grow in an oxygenated environment like soil and water. Literature review revealed that there is no discovery yet on how the BP can invade human. The biological factors that control the proliferation and survival of BP in the human body are also unknown. The vaccine that could go against it is also not available. The objective of this project is to study the BP conserved hypothetical proteins BPSS0812A and BPSL0739 to reveal the function of novel protein in BP. Both BPSS0812A (BP1) and BPSL0739 (BP2) genes were synthesised and cloned into pUC57 vector. The genes were sub-cloned into pET28b vector after HindIII and NdeI (restriction enzymes) digestion. The pET28b-BP1 and pET28b-BP2 clones were transformed into BL21-Rosetta E.coli expression cell. Soluble recombinant protein expression of BPSS0812a and BPSL0739 were obtained for the cultures that grown at the 16°C with a final concentration of 0.25 mM isopropyl-b-D-thiogalactoside (IPTG) as the induction agent. The obtained transfomants will be used for the production of the recombinant proteins for further biochemistry and structural studies of both hypothetical proteins.

Keywords: *burkholderia pseudomallei,* double RE Digestion, vector and plasmid, IPTG, hypothetical protein.

INTRODUCTION

Burkholderia pseudomallei, used to be known as *Pseudomonas pseudomallei* is an aerobic and motile rod-shaped bacterium. *Burkholderia pseudomallei* is normally found in an oxygenated environment like soil and water. The infection of *B. pseudomallei* is the main causes of melioidosis for man and animal, mainly restricted to tropical and non-tropical regions especially South East Asia and Northern Australia. Melioidosis, also known as Whitmore's disease and some of those who had affected were died.

The transmission of *B. pseudomallei* to humans and animals occurs through direct contact with the organism in the environment via ingestion, inhalation, or through open wounds and skin abrasions [3]. The role of insect bites is uncertain and the direct process of human-to-human and animal-to-human transmission is rare but can occur after contact with blood or body fluids. Depending on the site of the infection, contaminated body fluids may include urine, nasal secretions and milk. Infections may remain latent for years and the incubation period of infection can vary from two days to many years.

To date, very little is known about the climatic, physical, chemical and biological factors which control the proliferation and survival of *Burkholderia pseudomallei* species in the environment. They are also lack of studies on the structure and function of many genes and proteins that are specific to *Burkholderia pseudomallei*. Furthermore, vaccines for *Burkholderia pseudomallei* are yet to be developed. In this project, two B. pseudomallei specific hypothetical genes namely BPSS0812A and BPSL0739 were selected for the structural studies.

The objectives of this project are to investigate the biological function of the two *B. pseudomallei* (BP) conserved hypothetical proteins BPSS0812A (BP1) and BPSL0739 (BP2) through the 3D structure of the protein.

METHODOLOGY

The Burkholderia pseudomallei strain K96243 was used in this project. Both *BPSS0812A (BP1)* and *BPSL0739 (BP2)* genes were synthesised and cloned into pUC57 vectors. The pUC57-BP1 and BP2 clones were first transformed into the Top10 cell. The Top10-pUC57-BP1 and BP2 clone was cultured and subjected for miniprep. The plasmid that obtained from the miniprep was then used for restriction enzyme digestion.

The genes (BP, BP2) that have been inserted into pUC57 were cut using restriction enzymes (NdeI and HindIII) digestion and clone into pET28B plasmid to yield the pET28-BP1 and pET28-BP2 clone, respectively. The pET28-BP1 and BP2 clones were then transformed into *E.coli* Top10 competent cell. The Top10 cells that harboured pET28-BP1 and BP2 plasmid was grown on LB medium before subjected to miniprep. Plasmid was then extracted from the transformants using the Plasmid Miniprep Kit.. The pET28b-BP1 and BP2 genes were then transformed into the expression host BL21-DE3-Rosetta-Gami. A single colony of BL21-DE3-Rosetta-Gami clone that contains pET28-BP genes was cultured in 5 ml LB medium. After overnight growth, 250µl of the culture was transferred to the flasks containing 15 ml LB medium(50µg/ml kanamycin antibiotic). Cells were grown to a density of OD 0.5-0.8 and the over-expression of recombinant protein was induced by the addition of IPTG (Isopropyl β-D-1-thiogalactopyranoside) with a final concentration 0 (control), 0.25, 0.5, 0.75, 1.0 and 1.5 mM. The cultures were then incubated at 37^0C. The OD (Optical Density) of this culture was measured at intervals of 1 h. The sample was collected and lysed using sonication. The lysate was centrifuged to separate pellets (insoluble) and supernatant (soluble protein). The pellets were resuspended in 200 µl of lysis buffer (25 mM Tris-HCL pH7.5, 100 mM NaCl and 5mM DDT) and 50 µl of 6X-SDS sample buffer (0.5 M Tris-HCl, pH=6.8, Glycerol, 10% SDS, 2.9 mM β-mercaptoethanol and 0.5% bromophenol blue). 20 µl of each sample was loaded into a 12% SDS-polyacrylamide gel to verify the protein expression level and solubility of the targeted hypothetical protein.

Expression of BPSS0812A and BPSL0739 at different temperatures

To examine the effects of different temperatures on protein over expression, the same process as outlined above was conducted (2). The cultures were incubated at 16, 20, 25 and 37^0C respectively. At the end of

the incubation, the OD of cultures was measured and cells were harvested by centrifugation. Pellets and the supernatant along with the total protein were then prepared and analyzed by SDS-PAGE.

RESULT

Isopropyl β-D-1-thiogalactopyranoside (IPTG), is a molecular biology reagent. It is used to induce protein expression where the gene is under the control of the lac operator. IPTG is an effective inducer of protein expression in the concentration range of 100 μM to 1.5 mM. The concentration used were differed depends on the strength of induction required, the genotype of cells or type of plasmid used.
For the optimization of protein expression of BPSS0812A and BPSL0739, these proteins were induced with different concentrations of IPTG to the growing culture at various times of incubation.

The maximum production of the recombinant proteins was observed when 0.25mM of IPTG was used. The protein expressions were determined by SDS-PAGE analysis of cell, followed by the staining with Coomassie Blue. The effect of different temperatures on recombinant expressions was examined by induction at different incubation temperature. The most intense band for both genes on SDS PAGE was detected at 16^0C.

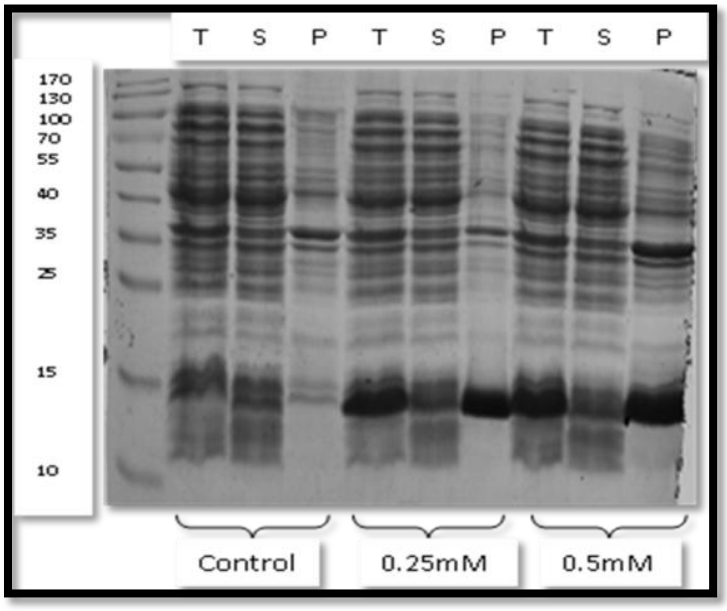

Figure 1 The SDS-PAGE showed the optimum expression of soluble BPSL0739 protein at temperature 16^0C with 0.25mM of IPTG by induction.

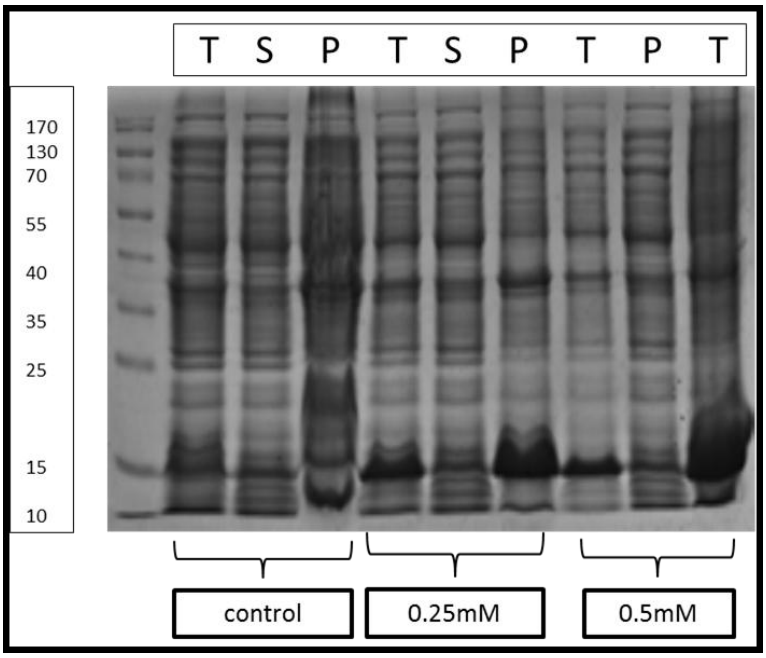

Figure 2 The SDS-PAGE showed the expression of soluble BPSL0739 protein at temperatures 20^0C with control, 0.25mM and 0.5mM of IPTG induction.

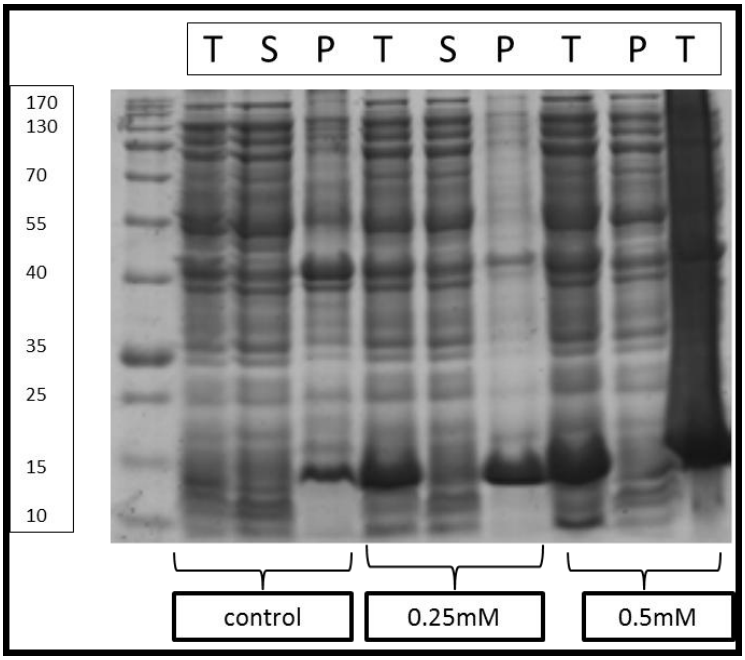

Figure 3 The SDS-PAGE showed the expression of soluble BPSL0739 protein at temperatures 25^0C with control, 0.25mM and 0.5mM of IPTG induction.

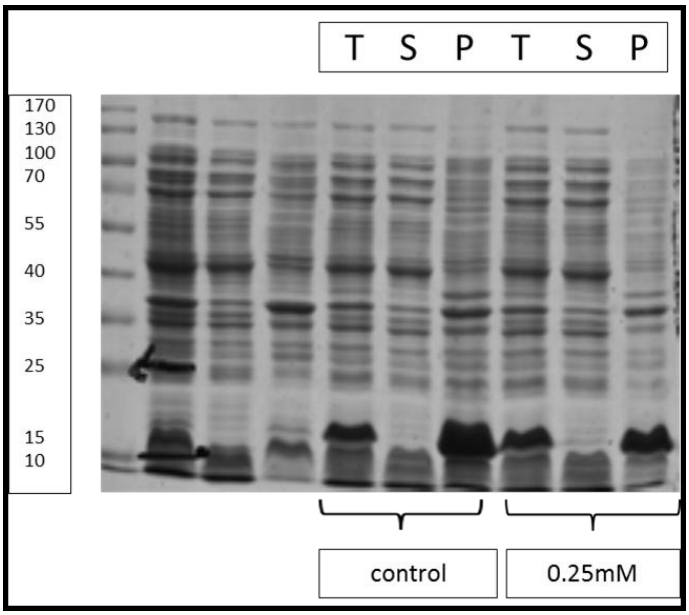

Figure 4 The induction process of the gene expression of BPSL0739 by different concentrations of IPTG (0 Mm as control, 0.25mM and 0.5mM) in pET28b cells at a temperature 37^0C analysed using SDS PAGE.

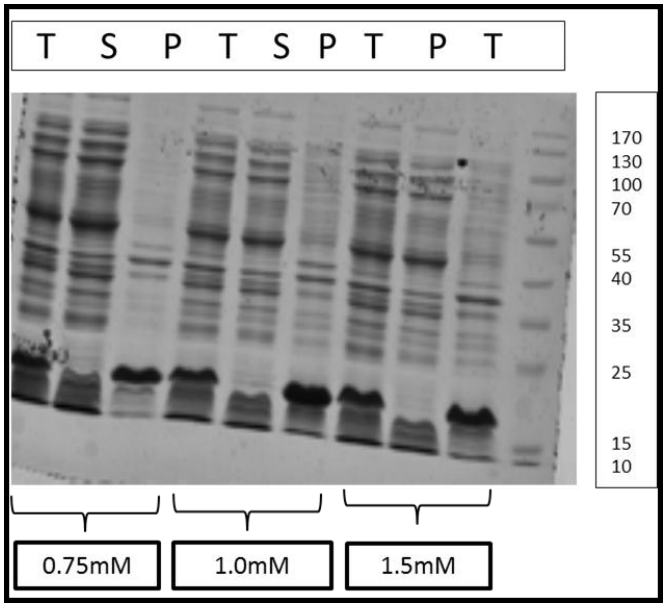

Figure 5 The induction process of the gene expression of BPSS0812A by different concentrations of IPTG (0.75mM, 1.0mM and 1.5mM) in pET28b cells at a temperature 37^0C analysed.

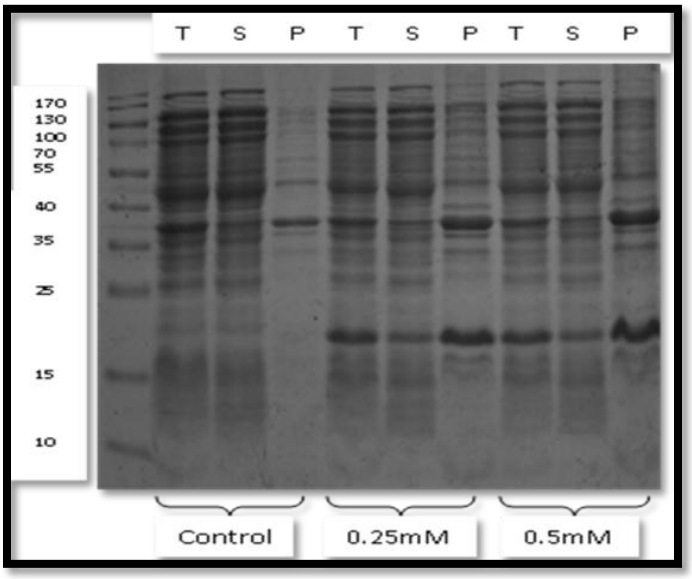

Figure 6 The SDS-PAGE showed the optimum expression of soluble BPSS0812A protein at a temperature 16^{0}C with 0.25mM of IPTG induction.

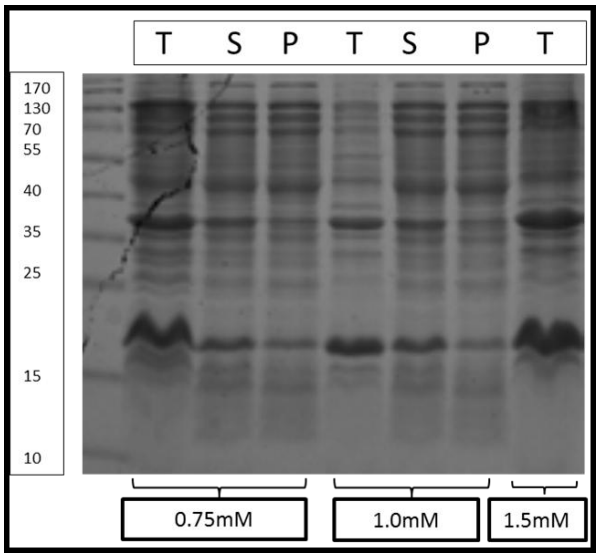

Figure 7 The SDS-PAGE showed the expression of soluble BPSS0812A protein at a temperature 37^{0}C with 0.75mM, 1.0mM and 1.5mM of IPTG induction.

DISCUSSION

The purpose of this investigation was to reveal the function of *Burkholderia Pseudomallei* (BP) conserved hypothetical proteins BPSS0812A (BP1) and BPSL0739 (BP2). BP is the main cause of the infectious disease Melioidosis. BP can survive and grow in an oxygenated environment like soil and water. To date, very little is known about how BP infect human. The biological factors that control the proliferation and survival of BP in the human body are also unknown. Furthermore, the vaccine that could against BP is also not available.

In this experiment, we are investigating about the solubility of both BP1 and BP2. Overnight culture of the transformed bacteria was induced by the addition of isopropylthio-ß-D-galactoside (IPTG) to the final concentrations of 0.25, 0.5, 0.75, 1 and 1.5 mM. Protein expression was also tested in different temperatures (16, 20, 25 and 37°C).

By testing the concentration of IPTG, expression of proteins can be regulated at different levels, lower level expression can increase the solubility and activity of some target proteins. The concentration of IPTG used to induce *lac* repressor-regulated promoters may also influence protein expression level.

The results show that the optimal temperature for protein expression of BP1 and BP2 was at 16°C with the concentration of IPTG at 0.25 mM. Both BP1 and BP2 were shown to be expressed as soluble protein.

CONCLUSION

We have investigated the conditions that suitable for the protein over expression of BP1 and BP2 using different concentration of IPTG (0.25, 0.5, 0.75, 1 and 1.5 mM and control) as inducing agent at various temperatures (16, 20, 25 and 37°C). Soluble recombinant protein expression of BPSS0812A and BPSL0739 were obtained for the cultures that grown at a temperature of 16°C with the concentration of 0.25 mM isopropyl-b-D-thiogalactoside (IPTG) as inducer.

The soluble protein that we obtained for BPSS0812A and BPSL0739 would allow us to further study the function of these novel proteins of Burkholderia pseudomallei. Hence finding the vaccines of melioidosis.

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WILDFIRE DETECTING PROGRAMME FOR UNMANNED AERIAL VEHICLE

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ABSTRACT

As of now, the application of UAV (Unmanned Aerial Vehicle) is scarcely seen in forest protection in Malaysia. Therefore, this research is carried out to develop the usage of colour-based object recognition in UAV to detect forest fire. Aerial views of fire, forest, field, and other landscapes are analysed. Then, the RGB (Red, Green, and Blue) models of the pictures are compared and the characteristics of the colour of the fire are determined. The definition of the fire is set by generating a programme with MATLAB R2009b. After that, photos of fire and plants are taken with a Quadcopter, and the captured images are processed by the programme. It is found that the programme successfully detects fire that is not too small.

Keywords: Forest fire, Quadcopter, programming, unmanned aerial vehicle, nature conservation.

INTRODUCTION

Nowadays, we protect our forest by enactment of laws and setting reserved forests. However, wildfires happening in the woods are huge challenges to overcome. Furthermore, dense forests and precarious landscapes make it harder to locate forest fire. In the age of modernisation, countless steps have been taken to conserve and preserve nature. However, the application of UAV (Unmanned Aerial Vehicle is scarcely seen in forest protection in Malaysia. In fact, UAV is a field with high potential to be developed.

"Forest fires cause noteworthy environmental demolition while menacing human lives. In the last two decades, a significant effort was made to develop automatic detection tools that could aid the Fire Management Systems (FMS)." (Radhakrishnan and Angayarkkani 2010). UAVs like have functions to capture photographs and videos. With that, locating forest fire would be made easier. Nevertheless, researches regarding UAV are now more focused on military and transportation purposes. So far, there has been no extensive research about the utilisation of UAV in forest conservation in Malaysia.

Despite that, UAVs are very suitable to locate forest fires with colour-based object recognition. With the application of UAVs, we no longer need to locate forest fires by flying airplanes. This can reduce the cost for forest conservation profoundly. Actually, several countries have taken the lead of applying UAV to detect forest fire (Ambrosia et al. 2005, Merino et al. 2006). The purpose of this project is to develop a working programme to encourage the application of UAV in Malaysia's forest conservation.

LITERATURE REVIEW

Many researchers, for instance Liu and Ahuja (2004), Radhakrishnan and Angayarkkani (2010) and Gaurav et al. (2012) have worked to detect fire visually. Two of them, whose work is briefly presented here, was carried out by Elston and Qi (2004).

Elston and Qi began by converting a four dimensional video frame into a two dimensional image. Then, they converted the image into the hue spectrum, and value (HSV) colour space to identify the pixels that are fire coloured.

After that, they used the "imerode" function to reduce noise and remove small seed regions. Next, they dilated the the image to grow the seed regions with the "imdilate" function. Then, by using the function "conncomp" to find the connected components, they identified the biggest connected region.

The next step was to represent the shape of the region in the frequency domain. With that, they normalised the Fourier coefficients by taking the first value of the matrix containing the Fourier coefficients and dividing each remaining value by that first value. They stored the normalised values into a matrix of size 64×1 and used the "mean" function to calculate the mean of each row of the matrix.

They used the mean vector as the Fourier descriptor input into the support vectormachine. They also created an autoregressive model using the function "arburg". Finally, they sent the normalised matrix into the autoregressive model and chose an order of 1 for the autoregressive model.

METHODOLOGY

In this project, we used MATLAB R2009b to generate our programme. In order for the programme to detect fire by colour recognition, we must analyse the colour of fire by image histogram. We used the code below to generate the histograms for the RGB colour channel.

(Internet 1)

```
img=imread('Input.jpg'); %Read Image

figure(1),subplot(4,2,1),imshow(img)
;
title('Original RGB Image');
red = img(:, :, 1);
figure(1),subplot(4,2,3),imshow(red)
;

title('Red Channel Image');
figure(1),subplot(4,2,4),imhist(red)
;
[rcounts,r]=imhist(red);
green = img(:, :, 2);
figure(1),subplot(4,2,5),imshow(gree
n);
title('Green Channel Image');
figure(1),subplot(4,2,6),imhist(gree
n);
```

Firstly, we classified fire into two types – yellow fire and red fire. We plotted the image histograms for several samples of fire images and other landscapes. We included a few examples here. Figure 1.1 is an example of yellow fire.

Figure 1.1 Yellow fire (Internet 2)

As we were only interested in the colour properties of fire, we cropped a small piece of the image into Figure 1.2.

Figure 1.2

Then, we plotted the image histograms.

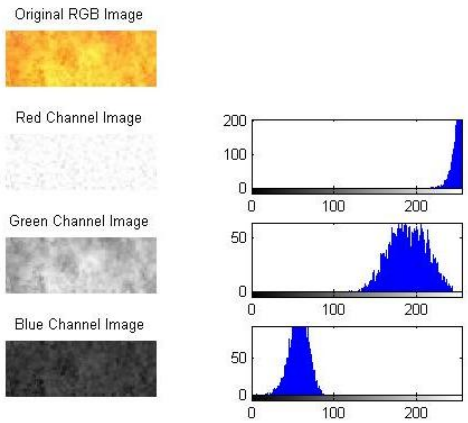

Figure 1.3 Image histograms for Figure 1.2.

We found that yellow fire has a high mean and minimum for the red channel image. Similarly, we analysed the image of red fire with the same method we used on Figure 1.1.

Figure 2.1 Red fire (Internet 3).

After that, we cropped Figure 2.1 into the required portion of fire as in Figure 2.2.

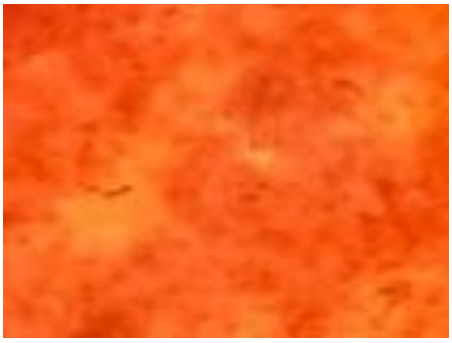

Figure 2.2

We then processed Figure 2.2 with the code.

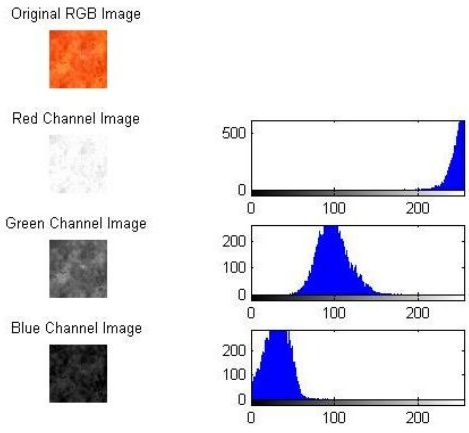

Figure 2.3 Image histograms for Figure 2.2.

Just like in Figure 1.3. We can see that red fire also has high mean and minimum in the red channel image. We also processed several images to act as controls that help us differentiate fire with natural landscapes. For example Figure 3.1.

Figure 3.1 Forest (Internet 4).

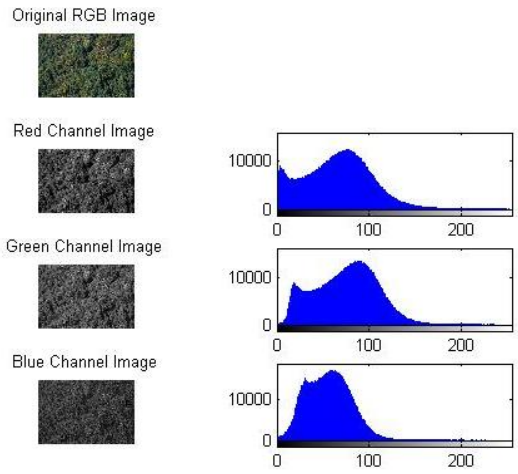

Figure 3.2 Image histograms for Figure 3.1.

After comparing the histograms between yellow fire, red fire, and natural landscapes, we can easily spot the difference between the mean and minimum in the red channel images for images of fire and images of natural landscapes. This is an important aspect for us to build our programme. Although the forest and fields have very low tonal range for the red channel image, there is a landscape that has some similarities in colour with fire – the red soil. Hence, we constructed the image histograms for red soil to differentiate it with fire. Figure 4.1 shows one of the samples we used.

Figure 4.1 Red soil (Internet 5).

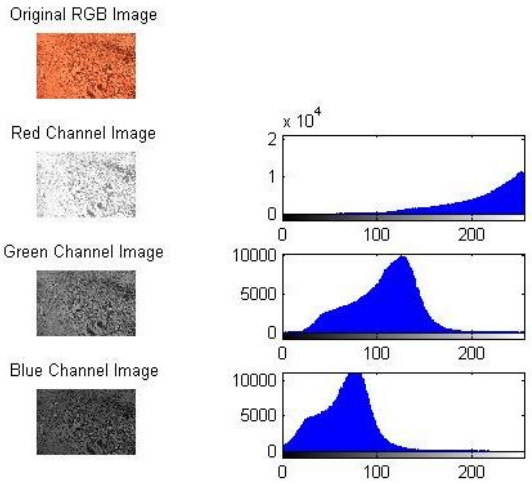

Figure 4.2 Image histograms for Figure 4.1.

The results display a clear difference in the minimum value for the red channel image compared to that of fire. Since that red soil has very low minimum for the red channel image, we can set a definition of fire by defining the ranges of mean and minimum in the red channel. After comparing the data we collected, we estimated that fire has a minimum value higher than or equals to 180 and a mean higher than or equals to 225 in the red channel.

```
img1=imread('Input.jpg'); %read the image
img=imresize(img1, [720 1280]); %resizing
I1=imcrop(img, [0 0 128 90]); %segmentation
I2=imcrop(img, [128 0 128 90]);
I3=imcrop(img, [2*128 0 128 90]);
I4=imcrop(img, [3*128 0 128 90]); I5=imcrop(img, [4*128 0 128 90]);
I6=imcrop(img, [5*128 0 128 90]); I7=imcrop(img, [6*128 0 128 90]);
I8=imcrop(img, [7*128 0 128 90]); I9=imcrop(img, [8*128 0 128 90]);
I10=imcrop(img, [9*128 0 128 90]); I11=imcrop(img, [0 90 128 90]);
I12=imcrop(img, [128 90 128 90]); I13=imcrop(img, [2*128 90 128 90]);
```

```
I14=imcrop(img, [3*128 90 128 90]); I15=imcrop(img, [4*128 90 128 90]);
I16=imcrop(img, [5*128 90 128 90]); I17=imcrop(img, [6*128 90 128 90]);
I18=imcrop(img, [7*128 90 128 90]); I19=imcrop(img, [8*128 90 128 90]);
I20=imcrop(img, [9*128 90 128 90]); I21=imcrop(img, [0 180 128 90]);
I22=imcrop(img, [128 180 128 90]); I23=imcrop(img, [2*128 180 128 90]);
I24=imcrop(img, [3*128 180 128 90]); I25=imcrop(img, [4*128 180 128 90]);
I26=imcrop(img, [5*128 180 128 90]); I27=imcrop(img, [6*128 180 128 90]);
I28=imcrop(img, [7*128 180 128 90]); I29=imcrop(img, [8*128 180 128 90]);
I30=imcrop(img, [9*128 180 128 90]); I31=imcrop(img, [0 270 128 90]);
I32=imcrop(img, [128 270 128 90]); I33=imcrop(img, [2*128 270 128 90]);
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I36=imcrop(img, [5*128 270 128 90]); I37=imcrop(img, [6*128 270 128 90]);
I38=imcrop(img, [7*128 270 128 90]); I39=imcrop(img, [8*128 270 128 90]);
I40=imcrop(img, [9*128 270 128 90]); I41=imcrop(img, [0 360 128 90]);
I42=imcrop(img, [128 360 128 90]); I43=imcrop(img, [2*128 360 128 90]);
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I46=imcrop(img, [5*128 360 128 90]); I47=imcrop(img, [6*128 360 128 90]);
I48=imcrop(img, [7*128 360 128 90]); I49=imcrop(img, [8*128 360 128 90]);
I50=imcrop(img, [9*128 360 128 90]); I51=imcrop(img, [0 450 128 90]);
I52=imcrop(img, [128 450 128 90]); I53=imcrop(img, [2*128 450 128 90]);
I54=imcrop(img, [3*128 450 128 90]); I55=imcrop(img, [4*128 450 128 90]);
I56=imcrop(img, [5*128 450 128 90]); I57=imcrop(img, [6*128 450 128 90]);
I58=imcrop(img, [7*128 450 128 90]); I59=imcrop(img, [8*128 450 128 90]);
I60=imcrop(img, [9*128 450 128 90]); I61=imcrop(img, [0 540 128 90]);
I62=imcrop(img, [128 540 128 90]); I63=imcrop(img, [2*128 540 128 90]);
I64=imcrop(img, [3*128 540 128 90]); I65=imcrop(img, [4*128 540 128 90]);
I66=imcrop(img, [5*128 540 128 90]); I67=imcrop(img, [6*128 540 128 90]);
I68=imcrop(img, [7*128 540 128 90]); I69=imcrop(img, [8*128 540 128 90]);
I70=imcrop(img, [9*128 540 128 90]); I71=imcrop(img, [0 630 128 90]);
I72=imcrop(img, [128 630 128 90]); I73=imcrop(img, [2*128 630 128 90]);
I74=imcrop(img, [3*128 630 128 90]); I75=imcrop(img, [4*128 630 128 90]);
I76=imcrop(img, [5*128 630 128 90]); I77=imcrop(img, [6*128 630 128 90]);
I78=imcrop(img, [7*128 630 128 90]); I79=imcrop(img, [8*128 630 128 90]);
I80=imcrop(img, [9*128 630 128 90]);
R1=I1(:,:,1); %convert into red channel.
R2=I2(:,:,1); R3=I3(:,:,1); R4=I4(:,:,1);
R5=I5(:,:,1); R6=I6(:,:,1); R7=I7(:,:,1); R8=I8(:,:,1); R9=I9(:,:,1); R10=I10(:,:,1); R11=I11(:,:,1);
R12=I12(:,:,1); R13=I13(:,:,1); R14=I14(:,:,1); R15=I15(:,:,1); R16=I16(:,:,1);
R17=I17(:,:,1); R18=I18(:,:,1); R19=I19(:,:,1); R20=I20(:,:,1);
R21=I21(:,:,1); R22=I22(:,:,1); R23=I23(:,:,1); R24=I24(:,:,1);
R25=I25(:,:,1); R26=I26(:,:,1); R27=I27(:,:,1); R28=I28(:,:,1);
R29=I29(:,:,1); R30=I30(:,:,1); R31=I31(:,:,1); R32=I32(:,:,1);
R33=I33(:,:,1); R34=I34(:,:,1); R35=I35(:,:,1); R36=I36(:,:,1);
```

```
R37=I37(:,:,1); R38=I38(:,:,1); R39=I39(:,:,1); R40=I40(:,:,1);
R41=I41(:,:,1); R42=I42(:,:,1); R43=I43(:,:,1); R44=I44(:,:,1);
R45=I45(:,:,1); R46=I46(:,:,1); R47=I47(:,:,1); R48=I48(:,:,1);
R49=I49(:,:,1); R50=I50(:,:,1); R51=I51(:,:,1); R52=I52(:,:,1);
R53=I53(:,:,1); R54=I54(:,:,1); R55=I55(:,:,1); R56=I56(:,:,1);
R57=I57(:,:,1); R58=I58(:,:,1); R59=I59(:,:,1); R60=I60(:,:,1);
R61=I61(:,:,1); R62=I62(:,:,1); R63=I63(:,:,1); R64=I64(:,:,1);
R65=I65(:,:,1); R66=I66(:,:,1); R67=I67(:,:,1); R68=I68(:,:,1);
R69=I69(:,:,1); R70=I70(:,:,1); R71=I71(:,:,1); R72=I72(:,:,1);
R73=I73(:,:,1); R74=I74(:,:,1); R75=I75(:,:,1); R76=I76(:,:,1);
R77=I77(:,:,1); R78=I78(:,:,1); R79=I79(:,:,1);R80=I80(:,:,1);
r1=mean(mean(R1)); %find the mean value
r2=mean(mean(R2)); r3=mean(mean(R3)); r4=mean(mean(R4)); r5=mean(mean(R5));
r6=mean(mean(R6)); r7=mean(mean(R7)); r8=mean(mean(R8)); r9=mean(mean(R9));
r10=mean(mean(R10)); r11=mean(mean(R11)); r12=mean(mean(R12)); r13=mean(mean(R13));
r14=mean(mean(R14)); r15=mean(mean(R15)); r16=mean(mean(R16)); r17=mean(mean(R17));
r18=mean(mean(R18)); r19=mean(mean(R19)); r20=mean(mean(R20)); r21=mean(mean(R21));
r22=mean(mean(R22)); r23=mean(mean(R23)); r24=mean(mean(R24)); r25=mean(mean(R25));
r26=mean(mean(R26)); r27=mean(mean(R27)); r28=mean(mean(R28)); r29=mean(mean(R29));
r30=mean(mean(R30)); r31=mean(mean(R31)); r32=mean(mean(R32)); r33=mean(mean(R33));
r34=mean(mean(R34)); r35=mean(mean(R35)); r36=mean(mean(R36)); r37=mean(mean(R37));
r38=mean(mean(R38)); r39=mean(mean(R39)); r40=mean(mean(R40)); r41=mean(mean(R41));
r42=mean(mean(R42)); r43=mean(mean(R43)); r44=mean(mean(R44)); r45=mean(mean(R45));
r46=mean(mean(R46)); r47=mean(mean(R47)); r48=mean(mean(R48)); r49=mean(mean(R49));
r50=mean(mean(R50)); r51=mean(mean(R51)); r52=mean(mean(R52)); r53=mean(mean(R53));
r54=mean(mean(R54)); r55=mean(mean(R55)); r56=mean(mean(R56)); r57=mean(mean(R57));
r58=mean(mean(R58)); r59=mean(mean(R59)); r60=mean(mean(R60)); r61=mean(mean(R61));
r62=mean(mean(R62)); r63=mean(mean(R63)); r64=mean(mean(R64));
r65=mean(mean(R65));r66=mean(mean(R66)); r67=mean(mean(R67)); r68=mean(mean(R68));
r69=mean(mean(R69));
r70=mean(mean(R70)); r71=mean(mean(R71)); r72=mean(mean(R72)); r73=mean(mean(R73));
r74=mean(mean(R74)); r75=mean(mean(R75)); r76=mean(mean(R76)); r77=mean(mean(R77));
r78=mean(mean(R78)); r79=mean(mean(R79)); r80=mean(mean(R80));
m1=min(min(R1)); %find the minimum value
m2=min(min(R2)); m3=min(min(R3)); m4=min(min(R4)); m5=min(min(R5));
m6=min(min(R6)); m7=min(min(R7)); m8=min(min(R8)); m9=min(min(R9));
m10=min(min(R10)); m11=min(min(R11)); m12=min(min(R12)); m13=min(min(R13));
m14=min(min(R14)); m15=min(min(R15)); m16=min(min(R16)); m17=min(min(R17));
m18=min(min(R18)); m19=min(min(R19)); m20=min(min(R20)); m21=min(min(R21));
m22=min(min(R22)); m23=min(min(R23)); m24=min(min(R24)); m25=min(min(R25));
m26=min(min(R26)); m27=min(min(R27)); m28=min(min(R28)); m29=min(min(R29));
m30=min(min(R30)); m31=min(min(R31)); m32=min(min(R32)); m33=min(min(R33));
m34=min(min(R34)); m35=min(min(R35)); m36=min(min(R36)); m37=min(min(R37));
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m38=min(min(R38)); m39=min(min(R39)); m40=min(min(R40)); m41=min(min(R41));
m42=min(min(R42)); m43=min(min(R43)); m44=min(min(R44)); m45=min(min(R45));
m46=min(min(R46)); m47=min(min(R47)); m48=min(min(R48)); m49=min(min(R49));
m50=min(min(R50)); m51=min(min(R51)); m52=min(min(R52)); m53=min(min(R53));
m54=min(min(R54)); m55=min(min(R55)); m56=min(min(R56)); m57=min(min(R57));
m58=min(min(R58)); m59=min(min(R59)); m60=min(min(R60)); m61=min(min(R61));
m62=min(min(R62)); m63=min(min(R63)); m64=min(min(R64)); m65=min(min(R65));
m66=min(min(R66)); m67=min(min(R67)); m68=min(min(R68)); m69=min(min(R69));
m70=min(min(R70)); m71=min(min(R71)); m72=min(min(R72)); m73=min(min(R73));
m74=min(min(R74)); m75=min(min(R75)); m76=min(min(R76)); m77=min(min(R77));
m78=min(min(R78)); m79=min(min(R79)); m80=min(min(R80));
if ((r1>=225) || (r2>=225) || (r3>=225) || (r4>=225) || (r5>=225) || (r6>=225) || (r7>=225) || (r8>=225) ||
(r9>=225) || (r10>=225) || (r11>=225) || (r12>=225) || (r13>=225) || (r14>=225) || (r15>=225) ||
(r16>=225) || (r17>=225) || (r18>=225) || (r19>=225) || (r20>=225) || (r21>=225) || (r22>=225) ||
(r23>=225) || (r24>=225) || (r25>=225) || (r26>=225) || (r27>=225) || (r28>=225) || (r29>=225) ||
(r30>=225) || (r31>=225) || (r32>=225) || (r33>=225) || (r34>=225) || (r35>=225) || (r36>=225) ||
(r37>=225) || (r38>=225) || (r39>=225) || (r40>=225) || (r41>=225) || (r42>=225) || (r43>=225) ||
(r44>=225) || (r45>=225) || (r46>=225) || (r47>=225) || (r48>=225) ||
(r49>=225) || (r50>=225) || (r51>=225) || (r52>=225) || (r53>=225) || (r54>=225) || (r55>=225) ||
(r56>=225) || (r57>=225) || (r58>=225) || (r59>=225) || (r60>=225) || (r61>=225) || (r62>=225) ||
(r63>=225) || (r64>=225) || (r65>=225) || (r66>=225) || (r67>=225) || (r68>=225) || (r69>=225) ||
(r70>=225) || (r71>=225) || (r72>=225) || (r73>=225) || (r74>=225) || (r75>=225) || (r76>=225) ||
(r77>=225) || (r78>=225) || (r79>=225) || (r80>=225)) &&((m1>=180) || (m2>=180) || (m3>=180) ||
(m4>=180) || (m5>=180) || (m6>=180) || (m7>=180) || (m8>=180) || (m9>=180) || (m10>=180) ||
(m11>=180) || (m12>=180) || (m13>=180) || (m14>=180) || (m15>=180) || (m16>=180) || (m17>=180) ||
(m18>=180) || (m19>=180) || (m20>=180) || (m21>=180) || (m22>=180) || (m23>=180) || (m24>=180) ||
(m25>=180) || (m26>=180) || (m27>=180) || (m28>=180) || (m29>=180) || (m30>=180) || (m31>=180) ||
(m32>=180) || (m33>=180) || (m34>=180) || (m35>=180) || (m36>=180) || (m37>=180) || (m38>=180) ||
(m39>=180) || (m40>=180) || (m41>=180) || (m42>=180) || (m43>=180) || (m44>=180) || (m45>=180) ||
(m46>=180) || (m47>=180) || (m48>=180) || (m49>=180) || (m50>=180) || (m51>=180) || (m52>=180) ||
(m53>=180) || (m54>=180) || (m55>=180) || (m56>=180) || (m57>=180) || (m58>=180) || (m59>=180) ||
(m60>=180) || (m61>=180) || (m62>=180) || (m63>=180) || (m64>=180) || (m65>=180) || (m66>=180) ||
(m67>=180) || (m68>=180) || (m69>=180) || (m70>=180) || (m71>=180) || (m72>=180) || (m73>=180) ||
(m74>=180) || (m75>=180) || (m76>=180) || (m77>=180) || (m78>=180) || (m79>=180) || m80>=180))
fprintf('Fire Detected');else
fprintf('Not a Fire');end
```

RESULTS AND DISCUSSION

In order to test the programme, we captured photographs with the Quadcopter. Figure 6 is an example of a picture of fire taken by the Quadcopter.

Figure 6 Image of fire taken by Quadcopter.

The programme successfully detected fire from Figure 7 and displayed 'Fire Dectected'. Moreover, we also took some images of plants with the Quadcopter to act as controls. For example Figure 7.

Figure 7 Image of plants taken by Quadcopter.

Here, the system displayed 'Not a Fire' as it did not detect any characteristics of fire.

CONCLUSION

The constructed system works with reasonable accuracy to detect fire with the application of colour-based object recognition. However, a lot of work remains to be done to perfect it. In fact, a reliable and efficient way to detect fire with UAV must include several different methods. Detection by shape and motion should be included to perfect the system.

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CRYSTAL PYRO-CARBON

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ABSTRACT

Crystal Carbon Biotech System is a magical instrument which uses beneficial and effective microorganisms that can give lots of benefit especially in environment. This system contains two main products which are the Super Activated Carbon and Pyro Liquid Acid by converting raw materials through elevated temperature process. The Super Activated Carbon comes with at least 800 m^2 /g surface absorption value and Pyro Liquid Acid contains more than 20% organic substance with 3.0 – 3.5 pH value. This system can be classified as a proportional process which involves anabolism and catabolism process. The Super Activated Carbon operates using anabolism process whereby an organic substance is converted into a non-organic substance. Catabolic process oppositely involves the process of converting a non-organic substance to an organic substance. This cycle continues until the presence of unwanted substances is minimized. This product can be applied solely on waste water treatment which can help to save the environment. In this project it is scientifically proven when the result shows the amount of Biological Oxygen Demand, Chemical Oxygen Demand and Total Suspended Solid are completely decreased. It also indicates that the absorption power of Super Activated Carbon combine with Pyro Liquid Acid in waste water treatment. Thus it can be concluded that Super Activated Carbon and Pyro Liquid Acid are an achievement in biotechnology especially in our effort to save the environment.

INTRODUCTION

Water pollution in agricultural area is a major problem nowadays. Agricultural area does not have modern sewerage system to drain out the waste product to water treatment plant. Farmers tend to throw the waste product into rivers resulting to water pollution. These rivers have been the very important source of daily water supply for the surrounding people.

The water pollution is mainly caused by animal waste products such as the pig faeces. Farmers throw the faeces into the rivers due to lack of sewerage system. The government needs to provide a high budget planning to equip all the farms with sewerage system. The modern commercial water treatment plants require large areas to accommodate them and this has become the obstacle to the geological properties of the land.

With that we have came out with the solution to fix this problem by using the Crystal Pyro-Carbon which is more efficient and eco-friendly. Commercial active carbon are only used to absorb faulty smell but the Super Active Carbon that we have successfully created is more efficient and can absorb Suspended Solid (TSS) of water. With the enhancement of Pyro Liquid Acid, effective micro-organisms [EM] are also involved in the reactions of breaking and absorbing the pollutant. The EM always exist in

water but do not have a place to reproduce in large numbers. When the Super Active Carbon is present tiny pores from the super active carbon will provide a suitable environment for the EM to reproduce in large numbers. This will benefit in a way to reduce the pollution. For example the *salmonella sp.* can break oil molecules making it easier to be absorbed by the Super Active Carbon. This technology requires only a small area and does not involve sophisticated technology. It is indeed a major advantage to be used in agricultural areas.

We have come out with an alternative plan to fix the water pollution problems in agriculture areas and that it is also very low in cost and only requires simple steps. The main objective of this experiment is to test whether Crystal Pyro-Carbon can decrease Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), and Total Suspended Solid (TSS) inside polluted water samples.

The hypothesis of this experiment is if Crystal Pyro-Carbon is used the Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), and Total Suspended Solid (TSS) of water will decrease.

METHODOLOGY

Treatment of water pollution to reduce Biological Oxygen Demand (BOD) of water

Principle

The presence of crystal pyro-carbon can reduce biological oxygen demand. High BOD is caused by harmful microorganisms that consume oxygen dissolved in water for respiration. We used the manometric method. This method is limited to the measurement of the oxygen consumption that only due to carbonaceous oxidation. Ammonia oxidation is inhibited. The sample is kept in a sealed container fitted with a pressure sensor. A substance that absorbs carbon dioxide (typically Lithium Hydroxide) is added in excess into the container until it reached above the sample level. The sample is stored in conditions identical to the dilution method. Oxygen is consumed and as ammonia oxidation is inhibited, carbon dioxide is released. The total amount of gas as well as the pressure decreases because carbon dioxide is absorbed. The drop of pressure indicates consumed quantity of oxygen before and after it has been filtered, as a result of the treatment using Pyro Liquid Acid.

Materials

- Super Active Carbon
- Pyro Liquid
- Waste/polluted water
- Lithium Hydroxide

Procedure

- 100 liters of polluted water is collected from pond A and B made by digging up the ground and covered it with granite.
- 10 kilograms of super active carbon that has not been immersed in pyro-liquid is then put inside pond A.

- 10 kilograms of super active carbon that has been immersed inside 5 liters pyro-liquid is then put inside pond B.
- Pond A and pond B are constantly monitored for 5 weeks.
- Biological oxygen demand of the water inside pond A and pond B are measured and recorded using monometric method (calculation of pressure of oxygen inside water).

Treatment of water pollution to reduce Chemical Oxygen Demand (COD) of water

Principle

The presence of crystal pyro-carbon can reduce chemical oxygen demand. The Chemical Oxygen Demand (COD) of water test is commonly used to indirectly measure the amount of organic compounds in water. Most applications of COD determine the amount of organic pollutants found in surface water, making COD a useful measure of water quality. Strong oxidizing agent Potassium Permanganate ($KMnO_4$) is used to measure Chemical Oxygen Demand (COD) of the polluted water before and after it has been filtered by manipulating the usage of pyro-liquid.

Materials

- Super Active Carbon
- Pyro Liquid
- Waste/polluted water
- Potassium permanganate ($KMnO_4$)

Procedure

- 100 liters of polluted water is collected inside pond A and B made by digging up the ground and covered it with granite.
- 10 kilograms of super active carbon that has not been immersed in pyro-liquid is then put inside pond A.
- 10 kilograms of super active carbon immersed inside 5 liters pyro-liquid is then put inside pond B.
- Pond A and pond B is constantly monitored for 5 weeks.
- Biological oxygen demand of water from pond A and pond B is measured and recorded by using Potassium Permanganate ($KMnO_4$).

Treatment of water pollution to reduce Total Suspended Solid (TSS) of water

Principle

The presence of Crystal Pyro-Carbon can reduce Total Suspended Solid (TSS) of water. TSS of a water sample is determined by pouring a carefully measured volume of water (typically one litre, but it can be less if the particulate density is high or as much as two or three litres for very clean water) through a pre-weighed filter of a specified pore size. It is followed by weighing the filter again after drying to remove

all water. The gain in weight is a dry weight measure of the particulates present in the water sample expressed in units derived or calculated from the volume of water filtered before and after it has been filtered by manipulating the usage of pyro-liquid.

Materials

- Super Active Carbon
- Pyro Liquid
- Waste/polluted water

Procedure

- 100 liters of polluted water is collected from pond A and B made by digging up the ground and covered it with granite.
- 10 kilograms of super active carbon that has not been immersed with pyro-liquid is then put inside pond A.
- 10 kilograms of super active carbon that has been immersed inside 5 liters pyro-liquid is then put inside pond B.
- Pond A and pond B are constantly monitored for 5 weeks.

RESULT

Table 1 Treatment of water pollution to reduce Biological Oxygen Demand (BOD) of water

Pond	A					B				
Week(s)	1	2	3	4	5	1	2	3	4	5
Biological Oxygen Demand (BOD) (mg/l)	120	116	108	101	92	102	86	69	44	18
	123	112	107	102	90	103	88	66	45	19
	119	115	106	104	93	101	84	67	46	17

Table 2 Treatment of water pollution to reduce Chemical Oxygen Demand (COD) of water

Pond	A					B				
Week(s)	1	2	3	4	5	1	2	3	4	5
Chemical Oxygen Demand (COD) (mg/l)	1500	1376	1245	1057	900	800	534	389	134	33
	1510	1409	1345	1035	913	765	566	360	143	32
	1490	1360	1205	1060	909	782	520	390	125	34

Table 3 Treatment of water pollution to reduce Total Suspended Solid (TSS) of water

Pond				A					B	
Week(s)	1	2	3	4	5	1	2	3	4	5
Total Suspended Solid (TSS) (mg/l)	175	120	101	89	82	105	76	45	23	5
	170	124	105	90	86	99	70	49	19	2
	174	119	94	93	81	103	74	39	21	4

Figure 1 Condition of pond for the first, second and fifth weeks.

DISCUSSION AND ANALYSIS

Based on this experiment, Crystal Pyro-Carbon was used to treat polluted water from a pig farm. The experiment was conducted to see the effect of pyro-liquid in reducing the Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Total Suspended Solid (TSS) of water.

The experiment is conducted to investigate the effect of super active carbon immersed in pyro-liquid on water treatment. It is found that the super crystal carbon immersed in pyro-liquid is more effective in reducing water pollution. This is indicated by the reduction of Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), and Total Suspended Solid (TSS).

In investigating the pollution of water, BOD, COD and TSS are used to determine the level of the pollution. When the super active carbon is immersed with pyro-liquid, it is found that the level of pollution dropped more drastically than the super active carbon which is not immersed with pyro-liquid.

The difference in final reading of BOD in the super active carbon immersed with pyro-liquid is 54% less than the super active carbon that has not been immersed.

COD level of water treated with super active carbon as well as crystal pyro-carbon has a difference of 58% less compared to as using the crystal pyro-carbon. This is a large amount to compare with. For the TSS, crystal pyro-carbon is 56% more efficient than super active carbon. This result will give more positive reading if it is applied in a larger scale.

CONCLUSION

As a conclusion, we have observed that if super active carbon is immersed with pyro-liquid by a ratio of 0.5 liters of pyro for every kilogram of super active carbon, it can increase the efficiency of water treatment than commercial super active carbon by 50%. The presence of super active carbon inside the polluted water can biologically purify the polluted water. This method is cheap and eco-friendly.

The hypothesis that if crystal pyro carbon is used, then BOD, COD and TSS can be reduced is proven. This showed that crystal pyro-carbon can be used to treat polluted water. This can greatly reduces the water pollution in agriculture especially in the rural area.

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APPENDIX

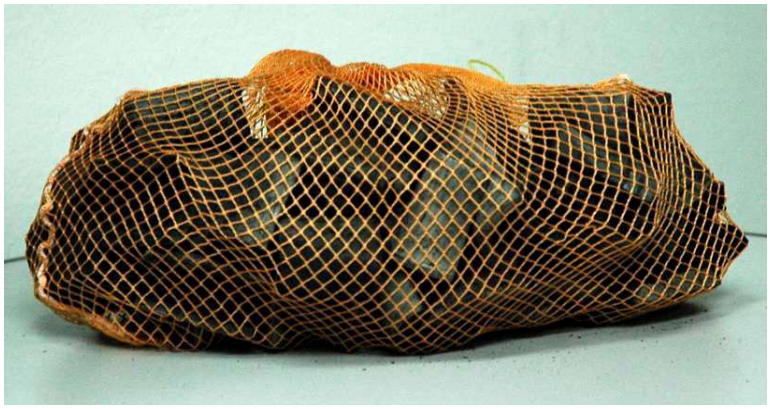

Diagram 2 Samples of carbon used for pond treatment

Diagram 3 The furnaces that were used to heat the bamboos until they turned into super active carbon.

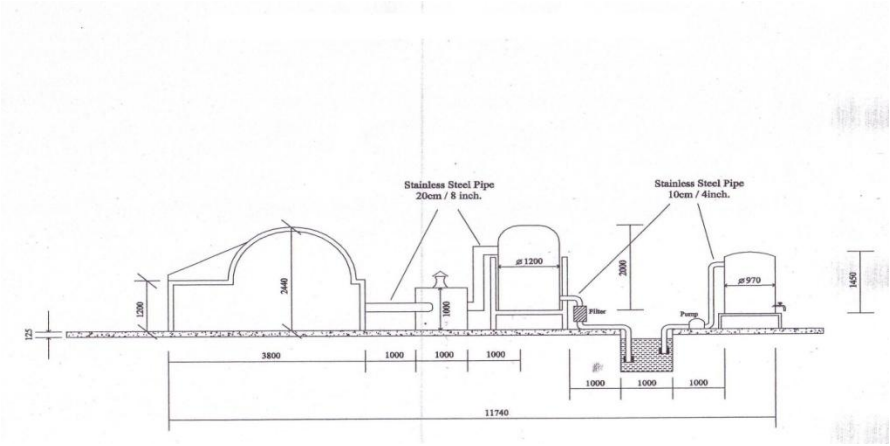

Diagram 4 The cross sectional view of crystal pyro-carbon processing plant.

APPLICATION OF ECONOMICS IN SIMPLE GAMES

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INTRODUCTION

Stock is a share in the ownership of a company. Shares have been introduced since the last century but back then, paper was used instead of computers to buy shares. Shares are essential to companies as they are the source of money to expand their company. If the company were to depend solely on bank loans, the debts would rocket sky high. However, with shares, the company is not indebted with anyone but they have to provide profits to the shareholders through dividends. Before selecting a company to buy shares from, the price development of the company must first be analyzed by the shareholders to ensure a frugal investment. Although it is easy to gain profits, it is just as easy to plunge if the company is not doing so well.

Being a shareholder of a company means that he or she owns a part of the company, albeit it is very small. As the shareholder of the company, we are entitled to give one vote to elect the board of directors but we do not get to run the company. That duty is done by the board of directors. Supply and demand controls the price of the shares. If there is a high demand, the price will rise but alternately, when there is a low demand , the price decreases. The most common type of stock is common stocks where the dividend varies according to the supply and demand. There are many other factors that affects the share price including the media and also the economy.

Shares are much more lucrative than bonds or fixed deposits as shareholders do not lose their personal assets but only loses the money invested. However, there are also risks involved. If a company bankrupts, the debtors would be paid off first and the shareholders last. This leads to only a sliver of the money returned to the shareholders.

LITERATURE REVIEW

This board game made by Robert Kiyosaki teaches financial education. The objective of Cashflow 101 is to get out of the rat race and into the fast track to achieve the player's dream, that is, to achieve financial freedom. In the game, the player will be required to fill in his or hers financial statements (balance sheet and income statement) with the right items, so as to get them familiar with balancing their cashflow accounts and differentiating assets from liabilities.

PAYCHECK

Each time a player lands on or pass paycheck they receive the amount of their monthly cashflow from the

bank. If this amount is negative or minus they must pay it to the bank.

OPPORTUNITY

The small deals and big deals cards are their opportunity cards. They inlcude a variety of investment opportunities that may help them in their quest to get out of the rat race. When they land on an opportunity space they may choose either small deal or big deal card. The largest small deal is $5000 to get into and the big deals begin at $6000.

THE MARKET

The Market cards are where they'll find buyers for their investments. The market cards also include economic events, which may affect their financial position.

DOODADS

Doodads are the unexpected and often unnecessaryitems which they spend their money on. When they land on a doodads space draw a doodads card and follow the directions.

CHARITY

Charity is optional. Upon landing on charity, they may choose to give 10% of their total income to charity in exchange for the use of 2 dice on each of their next 3 turns.

BABY

When they land on baby do the following: Increase the number of children on their game card Add the Per Child Expense on your game card to their Child Expenses in the expense column. As their per child expenses to their total expenses. Reduce their monthly cash flow by the per child expense. Have your game card audited.

DOWNSIZED

Landing on downsized means they have temporarily lost their job. Pay the amount of their total expenses.

METHODOLOGY

1. We went surfing the Internet and peruse books to find more information pertaining to economics to further corroborate our knowledge about it.
2. We tried to come out of ideas to create a game which could educate teenagers about economics basically, stock market.
3. We tried playing the first prototype that we came up with our friends.
4. The flaws were taken into account and were fixed and the second prototype was made.

5. We then asked our friends to play the game numerous times until no more flaws were detected.
6. We printed the questionnaires to utilize the pre-test and post-test method to find a correlation between the effectiveness of our game with the enhancement of knowledge.
7. We asked our respondents to play the game and test their knowledge before and after the game by giving them the questionnaires.
8. We analyzed the data received and presented it in a bar graph.

RESULTS

Table 1 Pre-Test and Post- Test results of students who are knowledgeable about economics

Students	Pre-Test results	Post-Test results
A	7	9
B	6	9
C	7	7
D	8	8
E	6	9
F	8	10
G	8	10
H	9	10
I	7	9
J	6	7
K	7	7
L	7	9
M	8	9
N	6	10

Table 2 Pre-Test and Post-Test results of students who are not familiar with economics

Students	Pre-Test results	Post-Test results
O	4	8
P	3	8
Q	2	9
R	5	6
S	4	7
T	3	6
U	2	8
V	1	5
W	4	8
X	5	9
Y	4	6
Z	4	7
Z1	5	7

DISCUSSION AND SUMMARY

We split the respondents into 2 groups based on the pre-test results to eliminate biasness. Those who scored 6 and above are categorized as students who are knowledgeable about stock market and for those who scored below 6 are categorized as students who are not familiar with economics. The pre-test and the post-test questions were the same to see the changes in the results to show the effectiveness of the game. The minimum number of players for this game is 2 and the maximum is 4. The risk cards indicate the current price of the shares and the game ends when the deck finishes. When a player lands on a joy column, they can either choose to have a spouse or a child but they have to pay expenses every round. The upside of having a spouse or a child is that the happiness units owned by a player increases and this could increase the amount of money gained when the player receives a luck card. The reference sheet is provided to showcase the worth of each company and also the company's price movements the previous year. The minimum amount of shares that a player could buy is 200 and the maximum is 2000. Each player has to buy 1 house and one car within 3 rounds or they will be fined $5000. No salary is given in each round and the player can only buy the assets when they land on the company column.

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WAVES: SAVE YOUR HOME

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ABSTRACT

A wave is a disturbance or oscillation that travels through space and matter, accompanied by a transfer of energy. The aim of this study is to analyze the waves and used it to resolve a few occurrence that we faced in daily life. To begin with, three sensors were used to act as the application to solve the problems concerning fire, flood and burglar which are, smoke sensor, water sensor, and motion sensor. The circuits of the three sensors were integrated as one circuit and put in a house according to the specific logically location. Each sensors were in of their own uses and detect the danger that is occurring in the house. The result showed that all the three sensors did not beeping or making any suspend or sound of attractions. In fact, the sensors transmitted waves through some electronics components to the phone or the authorities to report that the house needs immediate help. As a conclusion, this technique was shown to be effective and favourable in daily humanity lives. Therefore, it is proven that this mechanism is convenience in asking for help from the authorities and resolve the difficulties that may overcome.

KEYWORDS: waves; three detectors; danger; transmitted; phone

INTRODUCTION

Since the dawn of mankind, as humanity ushers in this new millennium, the 21st century is being touted as a century of major change that will prove pivotal in deciding the destiny of mankind. In our research, we are going to apply the technology of waves and also detectors into the modern world. The idea to construct this technology is based on several problems, which are frequent occurrence of flood, difficulties to detect the significant rise in temperature at home and no early sign of thief breaking into house.

The first problem that we discover is the frequent occurrence of flood and causing loss of properties in house. Nowadays due the globalisation era, heavy downpour simply leads to flash floods. This is frequently seen in metropolitan towns. According to the Final Report for DREF Bulletin no. MDRMY001 on 24 July 2007, approximately 137,533 people are affected due this natural phenomena. Often, people will never know that their house is flooded till there is something to 'say'- "Evacuate Quick! Your house is flooded". So, this rover will help the mankind to do get informed of what is happening so the residence could take immediate actions. So, the rover, which has the ability to detect flood before the water level rise and enter the house, can save the dweller's lives. It will send the detection through the SIM in phone via message to the owner.

Subsequently, the next difficulty to combat is the rise in temperature or any presence of fire. A person might forget whether everything is switched off before leaving home, especially stove and other kitchen utensils. For instance, when there is a rise in temperature in the house, the person with this rover will know something is wrong via message in mobile phone even though he or she is asleep. The rover detects the increase in degrees by thermostat and smoke detector and helps the mankind to do get informed of what is happening so the residence could take immediate actions.

Lastly, the device can use the motion sensor to furtively identify the burglar when he or she has break into the house. The more impressive thing is that it will not hail a loud siren but on the other hand simply silently inform the house owner via Bluetooth or message. Then, the owner can take the active measures, maybe by contacting the neighbor for help or directly dial the police. Another magnificent element in this multi-purpose rover is that is can transport small stuff throughout the house on the same floor and also comes with a handy torchlight. As a whole, with our research on wireless technology and waves, we will solve all these problems by applying it on home security system. That is why this invention is a brilliant idea to the benefit of human and the future.

METHODOLOGY

Identify the Problem

This project began when we have learned the concept of waves and planned to apply them in making detectors, which can send wave signals to phone. This project was aimed to solve significant problems. The first problem that we discover is the frequent occurrence of flood and causing loss of properties in house. Then, the next problem is to combat with the rise the temperature or presence of fire. Next, is to overcome the burglar case when breaking into house.

Studying Block Diagrams and Circuits

In this study, we learned that in order to produce a new electronic project, block diagram is required as a fundamental unit. This is the block diagram planned and verified.

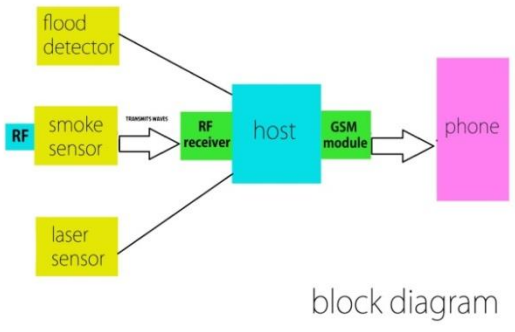

Figure 1 Summary of the project

Planning and Task specification

After making is done, we got a basic picture of the project. Then, we divided ourselves to different parts in order to complete them prior to the deadline. This is schedule that we follow until we manage to complete the whole project stage.

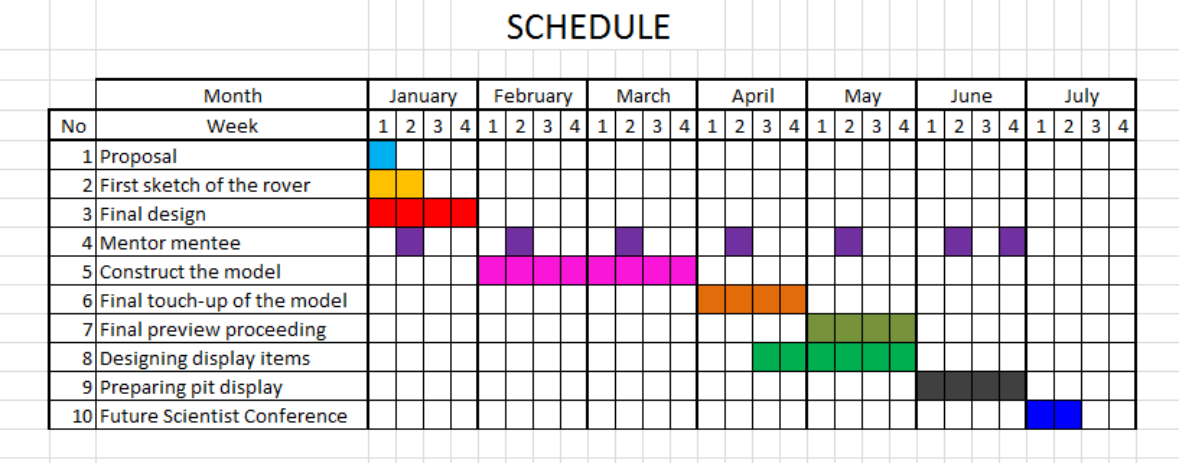

Figure 2 Schedule Planning

Identification on Products and Categorisation

Subsequently, we seek for the product, which is suitable for use. This is when our mentor suggested us to purchase them from Cytron Technologies. We identified the useful products that we can modify and put for integration in the circuit in order for each items to interact with one another.

Compiling and Programming Integrated Circuits

In this study, we undergo the process of electronics drill. Thus, we have had many readings and understanding on the C-Code programming in order to modify the electronic chips. The example of programming software that we had used is CCS C Compiler and also PIC Kit 2 v2.61.

Building Sub-Components for Project Site

Then, we built all the side projects to enhance the research. For instance, we build the house model and then put the device into that house for exhibition purpose.

Analysis and Troubleshooting

This process was to go all out and test to see whether the device is functioning or not besides interacting with the PIC18F4550, microcontroller used in this project.

RESULT AND DISCUSSION

As already indicated, detectors have sensing limitations. The detectors that we have invented, which have the ability to detect flood before the water level rise and enter the house, can save the dweller's lives. It will send the detection through the SIM in phone via message to the owner. It will send the detection through the SIM in phone via message to the owner. The next difficulty to combat is the rise in temperature or any presence of fire. When there is a rise in temperature in the house, the person with this rover will know something is wrong via message in mobile phone even though he or she is asleep. The detector detects the increase in degrees by thermostat and smoke detector and helps the mankind to do get informed of what is happening so the residence could take immediate actions. Lastly, the detector can use the modern technology laser to furtively identify the burglar when he or she has break into the house. The more impressive thing is that it will not hail a loud siren but on the other hand simply silently inform the house owner via Bluetooth or message. Then, the owner can take the active measures, maybe by contacting the neighbour for help or directly dial the police. Another magnificent element in this multi-purpose rover is that is can transport small stuff throughout the house on the same floor and also comes with a handy torchlight. As a whole, with our research on Wireless Tech. and astrophysics, we will solve all these problems by applying it on a detector. That is why the detector is a brilliant idea to the benefit of human and the future.

Wireless Smoke Detector

The smoke detector is a device that sense smoke and beep loudly when it detected smoke. It sent its status via RF transmitter when smoke is detected to RF receiver. Smoke detector is a wireless device where it uses a 9V battery to operate and send the signal via RF transmitter and remote control encoder inside the smoke detector. The interface between PIC16F876A and Smoke detector will involve a FR receiver to receive data from Smoke detector and a remote control decoder PT2272 to decode the received data.

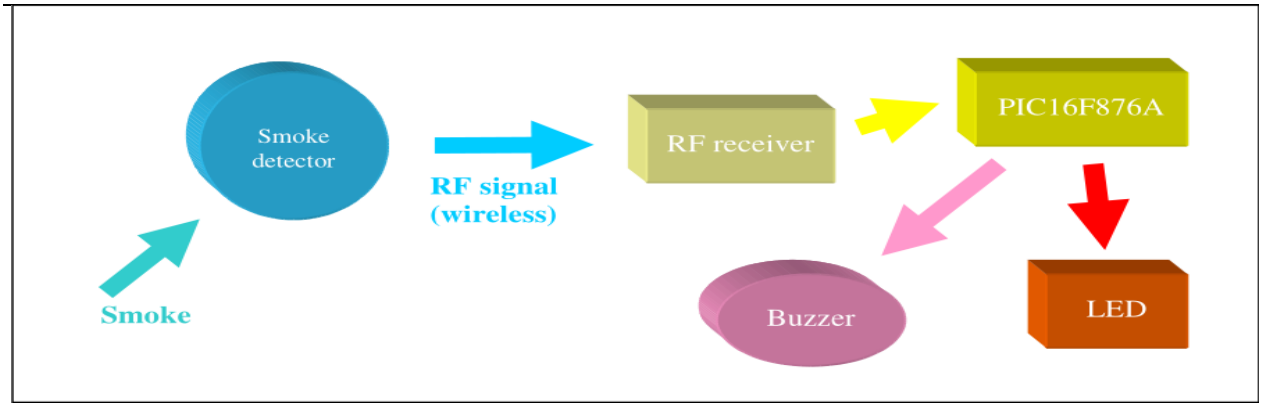

Figure 3 Block diagram for wireless smoke detector

Water Sensor

This system will function when the water touched the water level sensor. This water level sensor then will sent a signal to the control centre via the GSM Mobile. Actually, the GSM Mobile will be put in the

different places from water level sensor. When the flood occurs, this sensor will sent a signal to the microprocessor circuit and activate the Visual basic interface at control centre and LCD display. This system use to detect the flood around the house. This system will give information to the consumer that has still not passing the flooded areas also the control centre for the next location. The devices that will be used in this system are rise detector water, microcontroller, Global System for Mobile communication (GSM) and Liquid Crystal Display (LCD`S) Display.

Burglar Detector (PIR Sensor)

Burglar detector that known as PIR Sensor that function as motion detector that used to sense movement of people, animals or other object. PIR stands for Passive Infrared. In simple terms, it is a motion detector. This sensors measure infrared radiation emanating from objects in the field of view. It only has one output pin and another two pins is connected to 5V and GND separately. Apparent motion is detected when an infrared emitting source with one temperature, such as human body, passes in front of source with another temperature, such as wall. The unit output is high whenever there is motion detected. If the motion is continuous, the output remains high. After motion stops, the output remains high for a few seconds (depend on the variable resistor adjusted). It will remain high for longer if H from the jumper is selected. For this project, the resistant of variable resistor is adjusted to as low as possible so that the output of the sensor would not remain high for long time after motion stops.

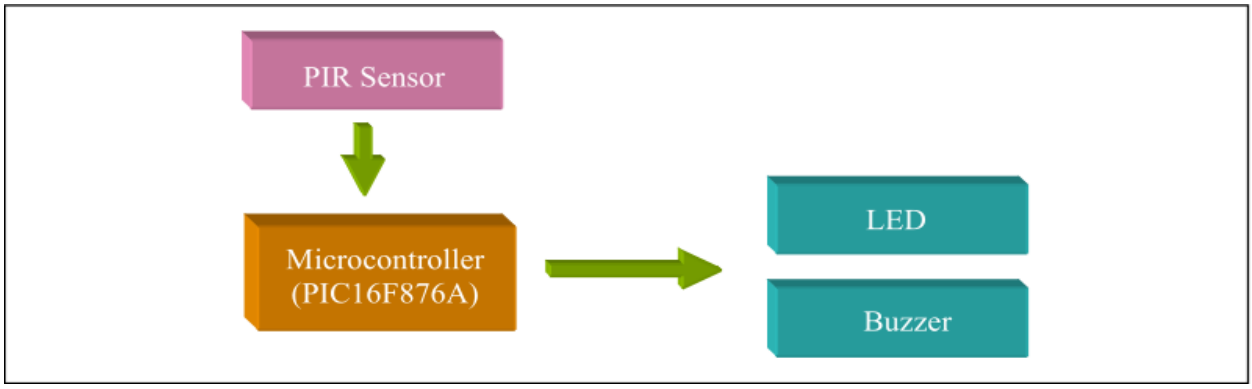

Figure 4 Block diagram for PIR sensor

Sending Data Using RF Module

This project will use two PIC16F876A to control RF Module (Transmitter and Receiver). The transmitter will send data (in Hexadecimal) and the receiver will receive the data and display the data on 7-segment display. There are 2 separate circuit boards with a microcontroller (PIC16F876A) each. One board is for transmitter while another for receiver. Hexadecimal number from 0 to F (which display on 7-segment) can be chosen for transmitting. The receiver will receive the sent data and display the number.

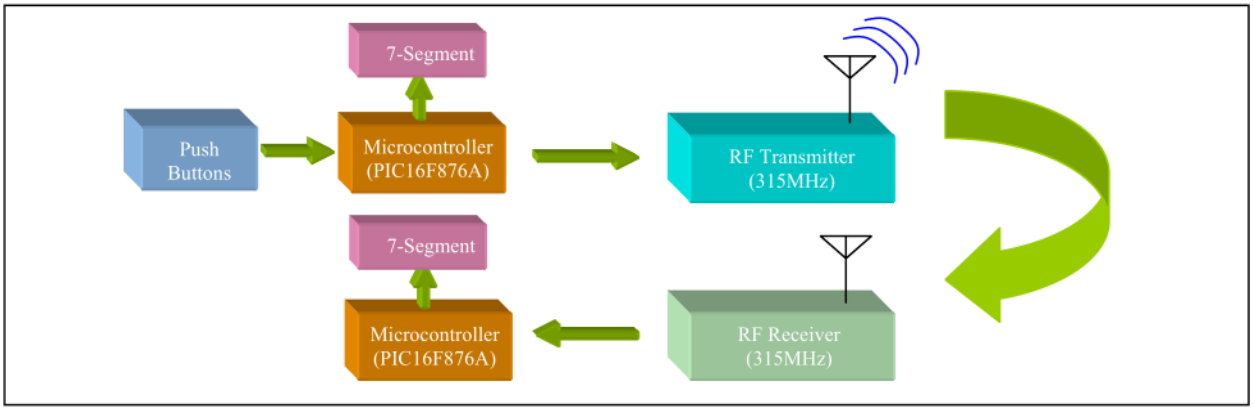

Figure 5 Block diagram for RF Module

	PRESENT	ABSENT
WATER	**0**	**1**
SMOKE	**1**	**0**
MOTION	**1**	**0**

Figure 6 The logical truth table

CONCLUSION

In a nutshell, the research was to apply the concept of waves as a whole and to innovate a prototype combining all three sensors. The programmer software, which was the CCS C Compiler and also the PIC Kit 2 v2.61 was helpful as this language are fairly easy to programme. This prototype can be further developed with speaker, HD Camera and even integrating many sensors. When speaker are used, the transmission of waves becomes easier and the alert of danger can be understood efficiently in a sensible ways. There are plethora of questions that can be answered and must be answered. One of the most significant ones that should be put into account is How can we use waves with longer wavelength to enable faster transmission of signals to the phone? All in all, this project was a ground breaking success, where briefly again three sensors, smoke detector, PIR sensor and water sensor could detect the presence of this danger at home and most importantly dial the owner to alert him/her in order to take subsequent actions to save the lives of the people.

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ROBOTICS INGENUITY: A STEP TO A BETTER TOMORROW

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ABSTRACT

Robotics is everywhere .Yet there is still a vast room for improvement, especially robotics ingenuity. Our society is still facing a lot of problems, for example, environmental pollution, resource shortage, inconveniences faced by the handicapped (OKU) in life, problems in human relationships and handling of life endangering tasks. Therefore, the aim of this project is to maximize the use of robotics technology in various sectors, by creating innovative prototypes for research and development purposes, leading to marketable products for a better tomorrow. By using LEGO, TETRIX Robotics System and National Instrument LABVIEW Programming Software, three robots were built to accommodate three real world problems: SMART RECYCLE BIN to sort paper, glass and aluminium cans automatically; SMART WHEEL CHAIR, built with unique features to provide comfort and convenience to the handicapped; KONNEC-S, a humanoid robot, which can connect two human parties by mimicking human actions via a KINECT sensor, a touch screen panel and internet. It can help working parents to take care of the family from a remote distance or replace humans in handling dangerous tasks. With further R&D, these robots will lead mankind to a better tomorrow.

KEYWORDS: robotics technology; robots; recycle bin; wheelchair; LEGO.

INTRODUCTION

Robotics is everywhere, from a large scale industrial production line, the outer space Mars exploration "Curiosity" to the house hold i-Robot robotics vacuum cleaner, our world is full of robots. We cannot live without a robot or robotics technology. This is due to fact that there is robotics engineering behind almost everything we are using daily. Industrial revolution has brought a huge change to human society and living. Obviously, robotics technology has brought in the second revolution to the industries.

Yet, human world is still facing a lot of difficulties and challenges. Robotics engineering should be used in a proper and correct way to help human for a better living and solving real world problems. Ingenuity, is always a very essential element in robotics design and innovation. We have to use the knowledge that we possess to create a totally new robot that does not exist before.

METHODOLOGY

The hardware used in these project are the Lego MINDSTORM NXT Robotics Set (Diagram 1) and the TETRIX Robotics System (Diagram 2). The Lego MINDSTORM NXT Robotics Set is consists of a programmable main controller brain which has a total of 4 input and 3 output ports, servo motors plus four types of sensors. They are touch sensor, sound sensor, light sensor and the ultrasonic sensor (see

Diagram 3). The TETRIX Robotics System, made of aircraft grade aluminium, can be used together with the Lego MINDSTORM Robotics Set to create bigger robots. The software used are Lego NXT-G and National Instruments LABVIEW For Education.

Diagram 1 Lego MINDSTORM NXT Robotics Set System

Diagram 2 TETRIX Robotics System

SMART RECYCLE BIN

The Smart Recycle Bin is a single bin which is able to sort 3 types of recyclable materials - glass, paper, and aluminium automatically. The robot is designed to discriminate the materials one by one based on their physical characteristics. First of all, mass. The mass of glass is generally greater than that of aluminium and paper. When a glass made object is placed on the first platform, the touch sensor below will detect the pressure exerted on it, and a robotic arm will channel it into the corresponding brown bin. If a paper or aluminium made object is placed, the touch sensor will not be pressed, so the object is swept into the second platform by a robotic arm. The second platform consists of a metal surface with a sound sensor located beneath it. When an aluminium object falls on to the platform, a loud sound will be produced and a robotic arm will channel the object into its corresponding orange bin. If the object is a paper, least sound will be produced due to its soft surface. It will then be channeled into its corresponding blue bin. Thus, by using a simple method and mechanism, the Smart Recycle Bin is able to sort the three types of rubbish automatically.

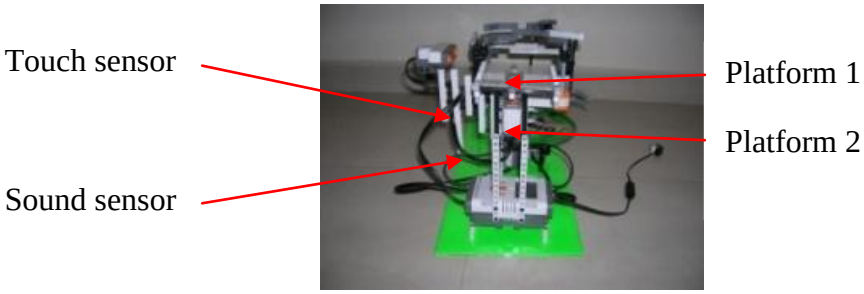

Diagram 3 Sorter in the recycle bin

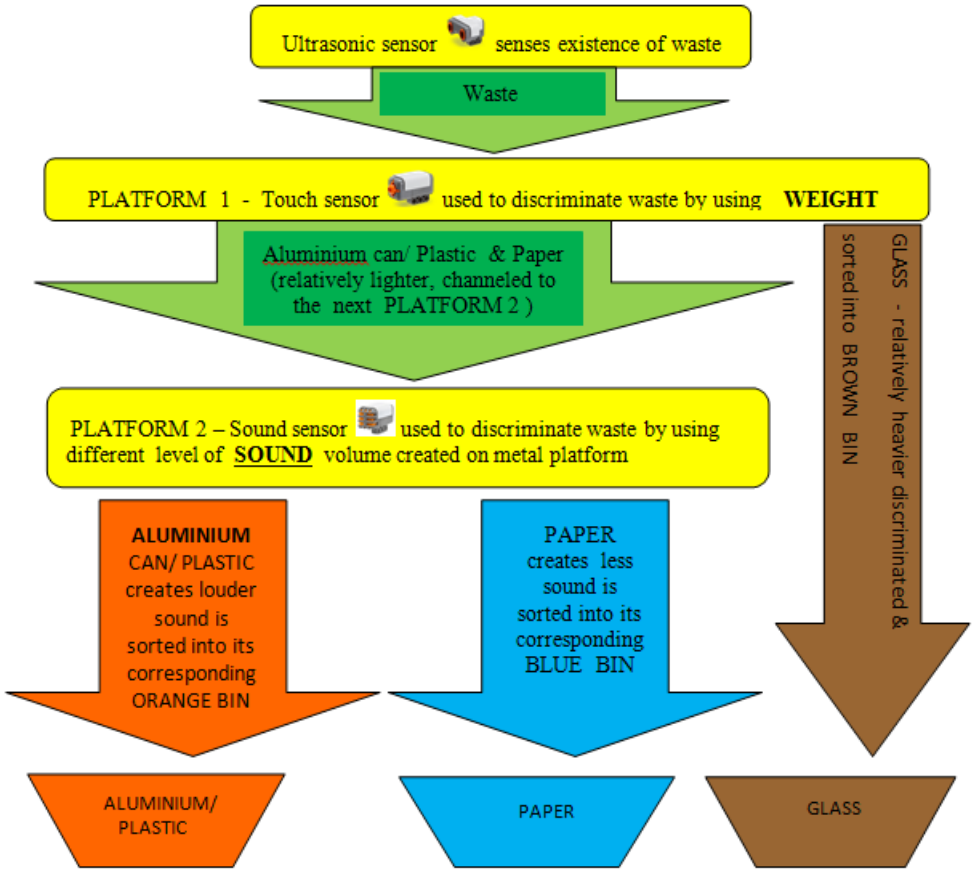

Diagram 4 MECHANISM OF THE SMART RECYCLE BIN

SMART WHEELCHAIR

Smart Wheelchair is created based on surveys and questionnaires conducted at the Eden Handicapped Centre and Kompleks Masyarakat Penyayang Pulau Pinang. The aim of the surveys is to find out what problems actually faced by the handicapped and what features they actually wished to have in a wheelchair. Besides, professionals like doctors, pharmacists and healthcare wholesalers were consulted for advice.

Diagram 5 Visiting handicapped centers

Diagram 6 Consulting professionals

Based on the surveys, about 90% of the wheelchair users face mobility problem, like the inability in climbing up stairs, difficulties when moving on sand or grass. All of the wheelchair users face big problems when using the toilet. They are also facing difficulty in transferring from the wheelchair to other places, like onto a bed or vehicles.

The wheelchair is made with a seat which can be slidden out for easy transferring and using of toilet. The back rest contains a massager to improve the user's blood circulation and to ease backaches after long hours sitting. The wheelchair can be converted into a bed to provide better rest place. The wheelchair is equipped with 4 ultrasonic sensors, one on each side, and an alarm for safety purposes. It is also equipped with powerful crawler tracks to allow it to move on sandy or grassy terrain, and even climb up or down stairs. The wheelchair is remote controllable to make it very user friendly. In a normal electrical wheelchair, the controller is located on the arm rest. But when lying down or sliding out, the handicapped will not be able to reach the controls. Therefore, a mobile remote control to control the wheelchair is very essential.

KONNEC-S

The KONNEC-S, a humanoid robot as tall as a human is capable of mimicking human actions. The body is mainly made of TETRIX parts, to create a solid framework to support the whole body. The Microsoft X Box KINECT sensor, which is used for gaming purposes to sense human body gestures, is used to detect the user's body gesture. The National Instruments LABVIEW Programming Software is used to interpret and analyse the readings obtained from the KINECT sensor, then send out corresponding instructions to operate the robot. To control the KONNEC-S from a long distance, a tablet computer which can operate LABVIEW is used as the face of the KONNEC-S, so that it can receive the instructions to control the

KONNEC-S, and also to display the user's face by using video call apps like Skype. A working mother, who is not at home, can use the KONNEC-S which is placed at home to do chores or take care of family members like children or elders, replacing her from her work place, by copying her actions through internet transmission.

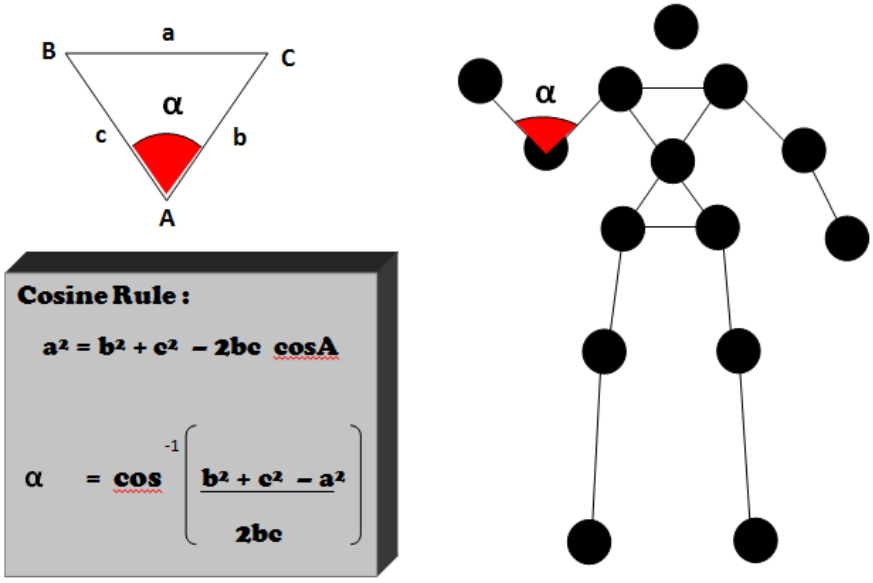

Diagram 7 KINECT skeleton and formula used to find arm angle

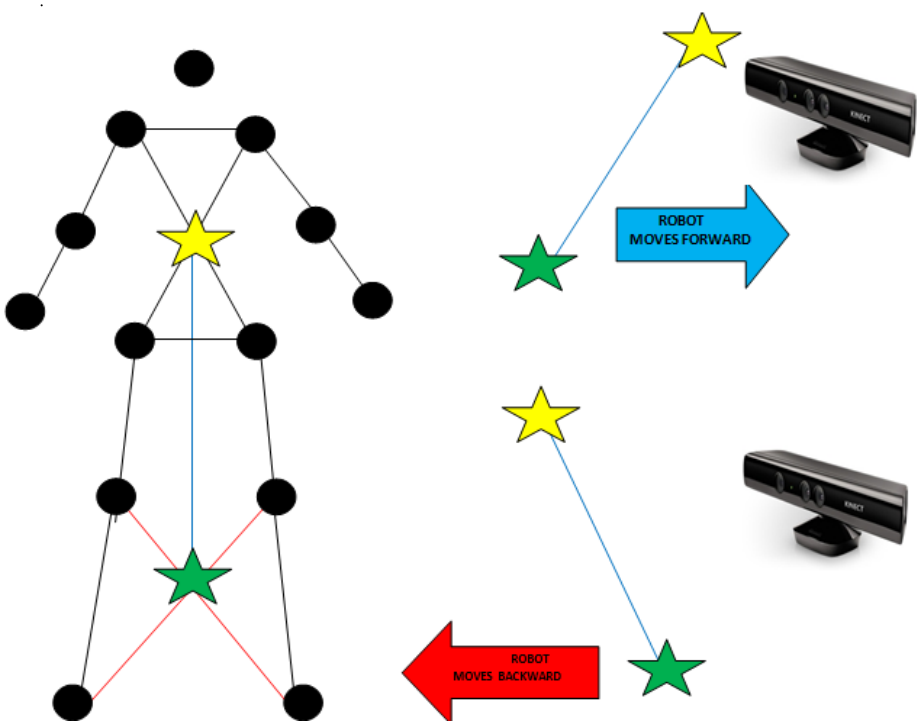

Diagram 8 KINECT effect of leg

KONNEC-S can also perform autonomous functions, without human control. KONNEC-S can sense sudden changes in the environment by using sensors like the temperature and sound sensors. When a sudden rise in temperatures or high amplitude sound is sensed, the emergency escape mode will be activated. The lights on the KONNEC-S will start blinking and high pitch alarms will alert the family members. Once everybody has gathered, just press a button. With the help of a compass sensor, the robot will take a pre-programmed route, leading everyone to escape from the area.

Other than as a social robot, the KONNEC-S can also be used in many other sectors, basically by mimicking actions. For example, a surgeon from abroad can conduct a diagnosis check on local patients through the KONNEC-S. KONNEC-S can also substitute humans in endangering tasks, like during earthquakes, radioactive leaks and so on. The KONNEC-S's torso is actually designed to be hollow, so that it can be equipped with different equipments to suit in different situations.

OUTCOME

SMART RECYCLE BIN

Diagram 9 SMART RECYCLE BIN

Just throw in any recycle-able waste, paper, glass, plastic/ aluminium can, the SMART RECYCLE BIN will sort it AUTOMATICALLY into the corresponding bins. That is, brown bin for glass, blue bin for paper and orange bin for plastic/ aluminium can.

Diagram 10 Waste sorted accordingly into the corresponding bins

Diagram 11 The sorting machines inside the bin

SMART WHEEL CHAIR

Diagram 12 Seat slides out for easy transferring

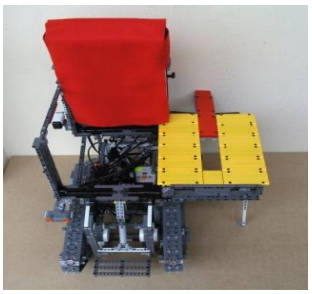

Diagram13 Seat centre part pushed out to ease toilet use

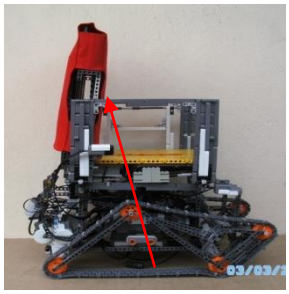

Diagram 14: Compass sensor allows preset direction for smart movement & ultra sonic sensor to avoid obstacles

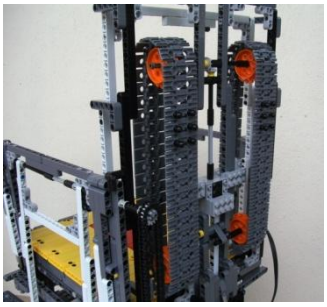

Diagram 15 Back rest massager

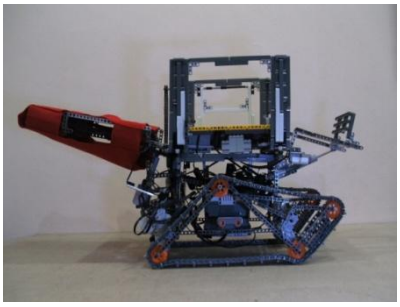

Diagram16 Convertible to bed

Diagram 17 Climbing up stairs

SMART WHEEL CHAIR is built with the above features to provide comfort, convenience and safety to handicapped.

1. Control – a remote control is used.
2. Convenience – transferring seat (with slide out opening – over toilet bowl)
3. Comfort – convertible to bed plus back rest massager.
4. Mobility – crawler track enable movement on grass, sand, rocks and stair climbing.
5. Smart – give alarming signal when obstacle is sensed.

3. KONNEC-S

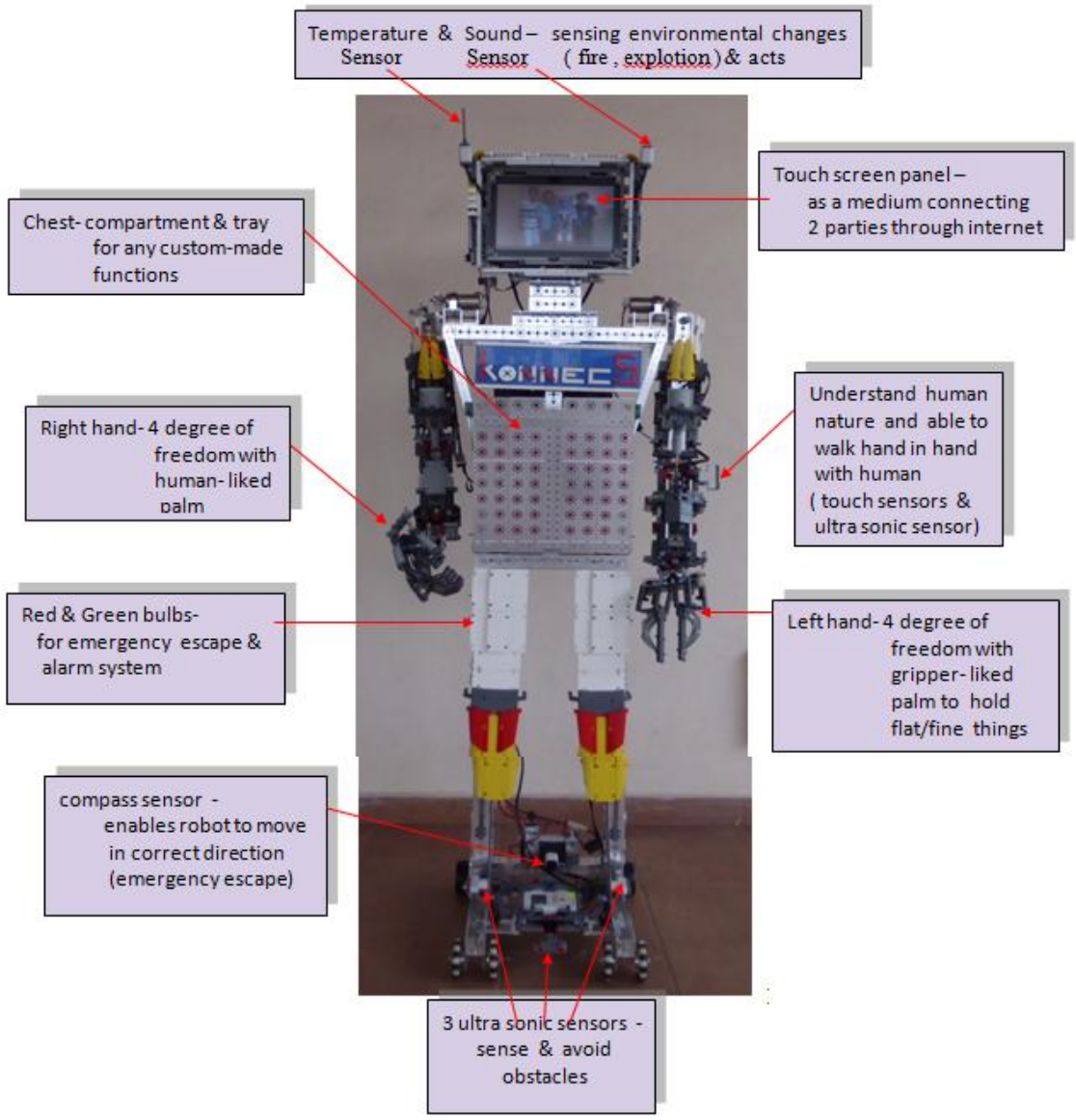

Diagram 18 KONNEC-S

CONCLUSION

All the three robots introduced here are unique. They are having different functions to allow them to play roles in solving real world problems. They are all just prototypes. But as Albert Einstein said, "imagination is more important than knowledge", these prototypes which are made from basic materials like plastic Lego parts, have the potential to be ultimately developed into marketable products through further research and development for mankind better tomorrow.

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THE EFFECT OF COW'S MILK AND GOAT'S MILK ON BLOOD LIPID PROFILE IN NORMAL RATS

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ABSTRACT

Milk is very important to maintain a good health as it provides a lot of nutrients needed for our body. In this paper, the objective of the experiment was to evaluate the effect of goat's milk and cow's milk on the blood lipid profile of normal rats. Eighteen Sprague Dawley male rats were divided into three groups of 6 rats per group and they were treated for eight weeks. One group of rats was treated with rat pallets that were soaked with goat's milk overnight and the other group was treated with rat pallets that were soaked with cow's milk overnight every day. On the other hand, a group of rats was fed with normal rat pallets only as a control group. The results at 8 weeks of treatment showed that there was an increase in all of the group weight with the group fed with goat's milk being the heaviest. However, there is no significant difference ($p \leq 0.05$) in the Low Density Lipoprotein Cholesterol (LDL-C), High Lipoprotein Cholesterol (HDL-C) and Triglycerides. The Total Cholesterol level for all the three groups was also showing no significant difference ($p \leq 0.05$). For the blood lipid profile of all three groups, every testing aspect of it was within the optimum range of the standard numerical value given.These results could be due to the fact that goat's milk and cow's milk is almost similar in terms of nutritional composition and other external factors that should be improved if this experiment is to be repeated.

KEYWORDS: Goat's milk; Cow's milk; Blood lipid profile; High Density Level Cholesterol (HDL-C); Low Density Level Cholesterol (LDL-C)

INTRODUCTION

Milk has been an integral part of our daily lives as humans, ever since we are born. However, as adult humans, we no longer drink our mother's milk but instead we consume commercialized milk. This milk may come from various mammals such as cows, goats and buffaloes. Cow milk is the most popularly commercialized milk but goat milk is also starting to gain attention due to the belief that its nutritional values are better than cow milk. Hence, the aim of this study was to investigate whether cow milk or goat milk has better effect on preventing Coronary Artery Disease (CAD) through the analysis of blood lipid profile of normal rats.

Milk is a white liquid that can only be produced by female mammals for the feeding and nourishing of their young. Although milk is essentially the primary source of nutrition for young mammals, human adults also need milk. This is because milk is considered to have high nutritional values as it is rich in energy, proteins, vitamins and minerals that are needed by humans for a healthy body (Asmah et al. 2001).

For humans, the milk that we consume is produced by cattle such as cows and goats. Since ages ago, wide commercialization of cow milk and goat milk has been going on.

Goat's milk**:** There has been a numerous debate on which milk of the two species is the best milk in terms of nutritional values. There are a few theories that scientists have came up with. It is believed that goats' milk contain a slightly less amount of lactose compared to cows' milk which is approximately 4.4g per 100g versus 4.5g per 100g in cows' milk (William et al. 2003)and (McBeanet al. 1998). A research done also showed that goat milk contains more iron compared to cow milk which makes goat's milk more suitable in combating anaemia (Park et al. 1986). In fact, goat milk has been proven to contain more minerals than cow's milk in fighting the demineralization of bones (Diaz-Castro et al. 2011).

Goats' milk is also believed to provide a wholesome source of protein (both whey and casein protein). Scientific experiments have proved that a 250ml serving can provide 7g of protein which is important for the human body growth (Pribila et al. 2000).

Cow's milk: The milk produced from cows is the most popular milk on Earth because of its nutritional values and also because of its reasonable price. Even though some researchers have been claiming the superiority of goat milk over cow milk, this does not mean that cow milk totally lacks nutrition. Cow milk is a good source of protein and a range of other essential vitamins and minerals. Calcium that is needed for our bones mostly comes from the cow's milk that we consume.

LIPID PROFILE

Blood lipid profile is a series of blood test to check the amount of lipids such as cholesterol and triglycerides in the body. Hence, the data obtained can then be used to detect certain genetic diseases and also cardiovascular diseases. Generally, blood lipids are utilised as a key intermediate in atherogenesis(Gofman et al. 1950).

This study aims to show that goat's milk is indeed better in terms of its lipid content compared to all the benefits that other scientists have proven the goat's milk to have. Therefore, the objective of this research was to study the effect of goat's milk and cow's milk on blood lipid profile of normal rats after 8 weeks of treatment.

MATERIALS AND METHODS

Instruments**:**A reflotron was used to measure the blood lipid profile. A centrifuge is used to separate the plasma from the whole blood at room temperature for 10 minutes with speed of 3000 r.p.m.

Experimental diets: The goat milk consists of vitamin A (2074.0 mg/l), Riboflavin (1.84 mg/l), Ash (0.8%) – calcium and phosphorus provided by ISNAR FOOD & TRADING and cow milk (Goodday) was obtained commercially. The test diet was prepared by mixing Goat's milk and Cow's milk separately with normal commercial rat pellet. The test diet was prepared by adding 150ml of Goat's milk and Cow's

milk to 120g of rat pellet. The diets were then left overnight at room temperature to absorb the milk before the feeding trial was conducted.

Animals: Eighteen Sprague Dawley male rats approximately 80 days old were obtained from the animal house of the Faculty of Science and Technology, UniversitiKebangsaan Malaysia. The rats were randomly divided into three groups of six rats per group where the rats in the first cage (Control Group) were fed with normal commercial rat pellet. Rats in the second cage (Cow Group) were given a mixed of Cow milk with normal commercial pellet and those in the last cage (Goat Group) were fed a mix of Goat milk with normal rat pellet for 8 weeks everyday. At the end of the duration of this feeding treatment, the rats were not fed for 18 hours. They were anesthetized using chloroform and their blood samples were collected from post vena cavaand were transferred into EDTA tubes immediately.

Experimental condition: Control (Cl) group, Cow (C) group. Goat (G) group: Rats were maintained under standard laboratory conditions and fed with respective diet until the completion of the experiment.

Lipid analysis of the blood**:** Total Cholesterol (TC) and Triglyceride (TG) were measured by strips with reflotron-machine using 32 μL^{-1} whole blood. High Density Lipoprotein Cholesterol (HDL-C) was determined by strips (ROCHE, Germany) with reflotron-machine using 32 μL^{-1}plasma blood. Plasma blood was prepared using a centrifuge for 10 minutes at room temperature with speed 3000 r.p.m to recover plasma and remove red blood cells. Low Density Lipoprotein (LDL-C) was calculated using the Friedwald equation from TC, HDL-C and TG values as follows:

$$LDL = TC - HDL - \frac{Triglyceride}{5}$$

All analyses were completed within 24 hoursof sample collection. Cholesterol and triglyceride guidelines are shown in Table 1 below.

Table 1 Cholesterol and triglyceride guidelines

Total Cholesterol Level	Total Cholesterol Category
<200 mg/dL	Desirable
200-239 mg/dL	Borderline high
≥240 mg/dL	High blood cholesterol.A ➢ Person with this level has more than twice the risk of heart disease as someone whose cholesterol is below 200mg/ dL
LDL Cholesterol Level	**LDL Cholesterol Category**
<100 mg/dL	Optimal
100-129 mg/dL	Near optimal
130-159 mg/dL	Borderline high
160-189 mg/dL	High

≥190 mg/dL	Very high
HDL Cholesterol Level	HDL Cholesterol Category
<40 mg/dLA	major risk factor for heart disease
40-59 mg/dL	The higher HDL level, the better
≥60 mg/dL and above	Considered protective against heart disease

Triglyceride Level	Triglyceride Category
<150 mg/dL	Optimal
150-199 mg/dL	Borderline high
≥200 mg/dL	High

*LDL indicates low-density lipoprotein; HDL, high-density lipoprotein

Statistical analysis: Results were expressed as mean values ± SEM (n=6). Means of six samples were compared by analysis of variance (ANOVA). Significant differences between means were determined by Turkey's least significant difference ($p \leq 0.05$). The software used was MINITAB® 16.

RESULTS

Total cholesterol

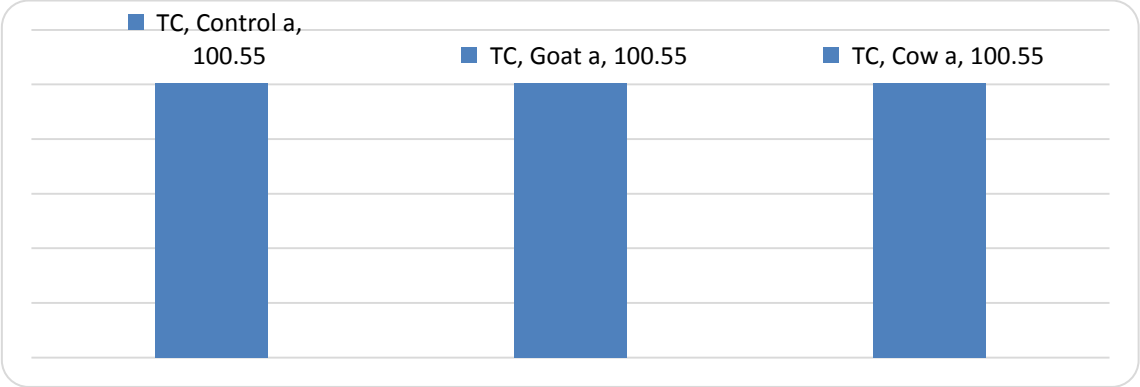

Figure 1 Total cholesterol (mg/dl) in rats fed with cow milk and goat milk for 2 months. Bars are mean ± SEM (n=6). Alphabets under histogram indicated significant difference ($p \leq 0.05$).

Figure 1 shows the results of TC level in blood samples of rats that were treated with goat milk and cow milk. The results show that the total cholesterol values were within the normal range (< 200 mg/dl) after two months of treatment. However, the total cholesterol level in blood sample has no significant difference ($P \geq 0.05$) between control group and groups fed with goat milk and cow milk.

Triglycerides

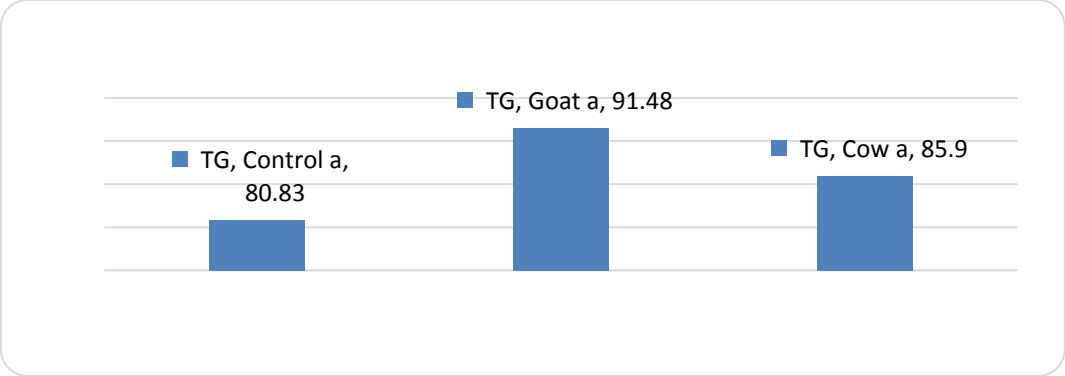

Figure 2 Triglycerides (mg/dl) in rats fed with goat milk and cow milk for 2 months. Bars are mean ± SEM (n=6). Alphabets under histogram indicated significant difference ($p \leq 0.05$).

Figure 2 shows the results of TG in goat milk and cow milk of treatment. After 2 months of treatment the results show that this group had triglyceride values that were within the normal range (<150 mg/dl). TG level in blood sample was the highest in blood sample of rats fed with goat milk and slightly higher in blood sample of rats fed with cow milk than the control group. There was no significant difference ($P \geq 0.05$) between rat in control group and rat treated with goat milk or cow milk.

High Density Lipoprotein Cholesterol

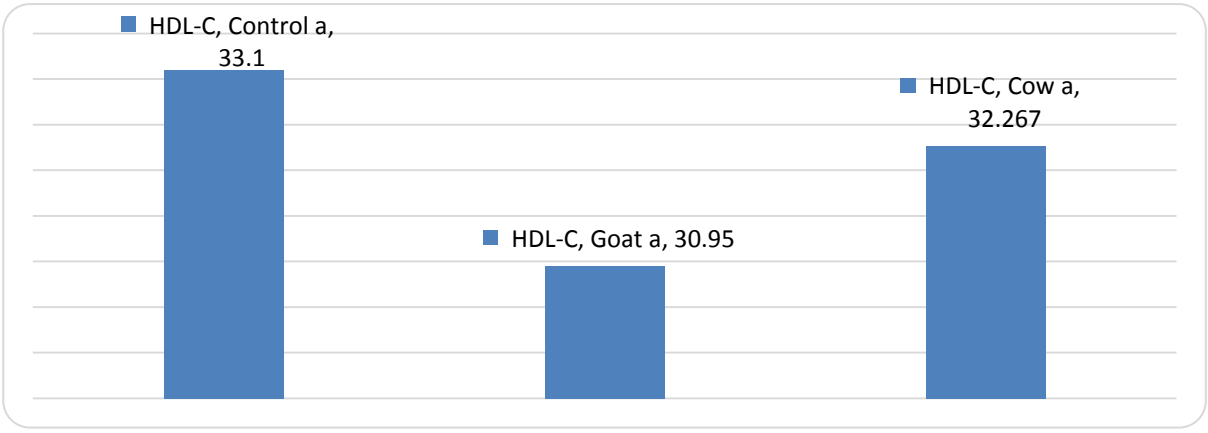

Figure 3 High density lipoprotein cholesterol (mg/dl) in rats fed with cow milk and goat milk for 2 months. Bars are mean ± SEM (n=6). Alphabets under histogram indicated significant difference ($p \leq 0.05$).

Figure 3 shows the results of HDL-C level in blood samples of rats that were treated with goat milk and cow milk. After two months of treatment the results show that HDL-C level in blood sample was the highest in control group followed by cow milk group and goat milk group. However, there was no significant difference of HDL-C between the three groups.

Low Density Lipoprotein Cholesterol

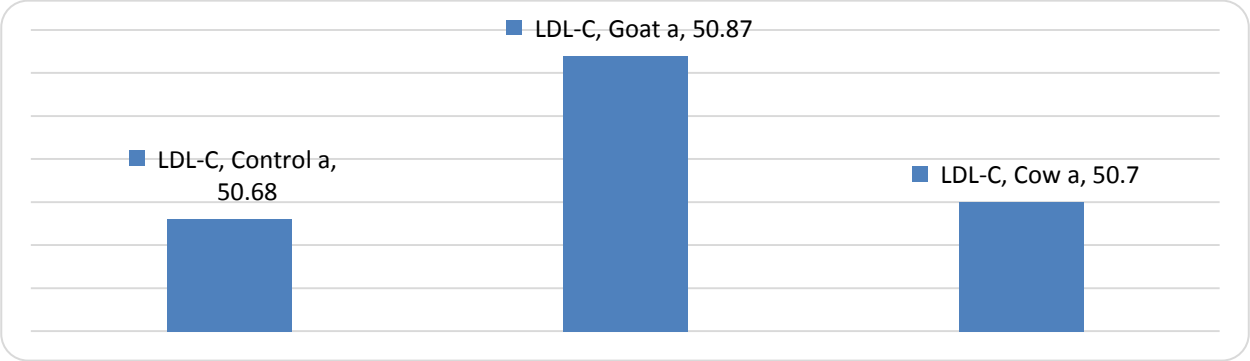

Figure 4 Low density lipoprotein cholesterol (mg/dl) in rats fed with cow milk and goat milk for 2 months. Bars are mean ± SEM (n=6). Alphabets under histogram indicated significant difference ($p \leq 0.05$)

Figure 4 shows the results of LDL-C in goat milk and cow milk of treatment. After 2 months of treatment the results shows that blood samples of goat milk group has the highest LDL-C level compared to cow milk group followed by the least LDL-C in the control group. There was no significant differencebetween rat in control group and rat treated with goat milk or cow milk.

DISCUSSION

Figure 2 showed the total High Density Lipoprotein Cholesterol (HDL-C) between control group and groups fed with goat milk and cow milk. The goat-fed milk has the highest value of HDL-C compared to control and cow-fed milk group. This result showed that goat's milk is good because HDL-C or 'good cholesterol' helps toremove excess cholesterol from the blood stream and carries it to the liver for removal. The high level of HDL-C may also protect someone from cardiovascular diseases such as atherosclerosis and Coronary Artery Diseases (CAD).

While HDL-C is'good cholesterol', LDL-C is the 'bad cholesterol'. People are encouraged to lower the level of Low Density Lipoprotein (LDL-C) as well as Triglycerides to prevent from the fatty deposit build up in their arteries. Lipid profile checking would help in measuring the level of specific lipids (mostly cholesterol and triglycerides) in the blood.

CONCLUSION

There was no significant difference in the results obtained between the rats in the control group and the rats fed with goat milk and cow milk after two whole month of treatment of this experiment. The results of the TG, TC, HDL-C and LDL-C obtained for both goat milk and cow milk in the end of this project are all within the normal range which will less likely to lead to any fat-related diseases. As the difference of TG, TC, HDL-C and LDL-C were all nearly the same while still being in the normal range for the control

group, goat milk group and the cow milk group, therefore, this study shows that there is not much difference whether a person consumes goat milk, cow milk or does not consume any milk at all.

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THE DESIGN OF A TROPICAL DWELLING WITH THERMAL COMFORT CHARACTERISTICS: A MUSOLLA FOR PERMATAPINTAR, BY THE NUSANTARA BUILDING GROUP (NUBIG).

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ABSTRACT

The thermal comfort musolla was important to give a conducive environment for the Muslim to do the prayer. A design of a tropical dwelling with the thermal comfort characteristicswas made for this project which is musolla for PERMATApintar. The purpose of this design to accommodate for Muslim PERMATApintarian to do the prayer at one sitting. The design is based on the principal of thermal comfort and sustainable use of energy. A few criteria were apply on the design which were Islamic culture, the design material, the design to maintain the daily temperature (26 to 27 degree Celsius), use of indigenous materials and user requirement. In order to complete this project, we have to identify the characteristics of thermal comfort dwelling and apply it on the design. The balsa wood were used as the basic material for the musolla model.The findings showed, that the design must on a platform, has double facade concept and high rate of ventilation.Based on the findings a model of musolla was built with the scale 1:75 from the actual size. The implications of this project was a musolla could be built with thermal comfort characteristics which offer the Muslim to do their prayer with comfortable environment.

KEYWORD: Thermal; comfort; musolla PERMATApintar; temperature; indigenous materials; ventilation

INTRODUCTION

Thermal comfort is the condition of mind that expresses satisfaction with the thermal environment and is assessed by subjective evaluation (ANSI/ASHRAE Standard 55[1]). Maintaining this standard of thermal comfort for occupants of buildings or other enclosures is one of the important goals of HVAC (heating, ventilation, and air conditioning) design engineers.(1)

There are six primary factors that directly affect thermal comfort, and they can be grouped in two categories: personal factors - because they are characteristics of the occupants - and environmental factors - which are conditions of the thermal environment. The former are metabolic rate and clothing level, the latter are air temperature, radiant temperature, air speed and humidity. Even if all these factors may vary with time, standards usually refer to a steady state to study thermal comfort, just allowing limited temperature variations.

Tropical dwelling is a building which is made of the local indigenous materials such as wood. This concept is introduced to ensure that the traditional concept will not extinct as long in the modern concept.

There are a few problems faced by the PERMATApintarMuslim students especially when they do their prayer. This is due to the size of the existing musolla which is quitesmall and can only accommodate the male students at once and the condition of the musolla is not comfortable at a certain time because it was very hot. It willaffect the concentration towards the prayer.

A design of a tropical dwelling with the thermal comfort characteristics was made for this project which is musolla for PERMATApintar. There are many element of thermal comfort characteristics and tropical dwelling introduced in the design. This concept use to overcome the problems and to maintain the daily temperature (26-27 degree Celsius) without using a lot of energy.

The main purpose of this project is to accommodate for Muslim PERMATApintarian to do the prayer at one sitting, to sustain the tradition of Malay, to study the thermal comfort characteristics and to ensure Muslim students will be comfortable doing their prayer.

METHODOLOGY

A study was made to identify the characteristics of thermal comfort. internet search was used to identify those characteristics. After listing out all of the characteristics, a sketch of a musolla was made based on all the characteristics and most important was the design will achieve the purpose of the project like in Figure 1.1. A measurement of the actual size musolla had been taken before the dimensional process to be done. This measurement taken at the suggestion site in Figure 1.2 which was located in between instructors' building and male hostel. This site had be chosen because it had a big space and very strategic to build the musolla. Then, a dimensional process been made into the sketch. From the dimensional, the ratio of the model been made for the musolla was determined and the ratio was 1:75. After finished up the sketching, the actual design was redesign using the AUTOCAD software. Shown in Figure 1.3 and Figure 1.4. In order to build a model of the musolla, which useswood as the basic material, balsa wood was used as it also easy to shape. A list of the materials and apparatus needed to buy for the model. All of the materials and apparatus were bought at the stationery shop around Kajang. A process of making the model was held until it finished and the some decorative been made around the model to make it at the real site.

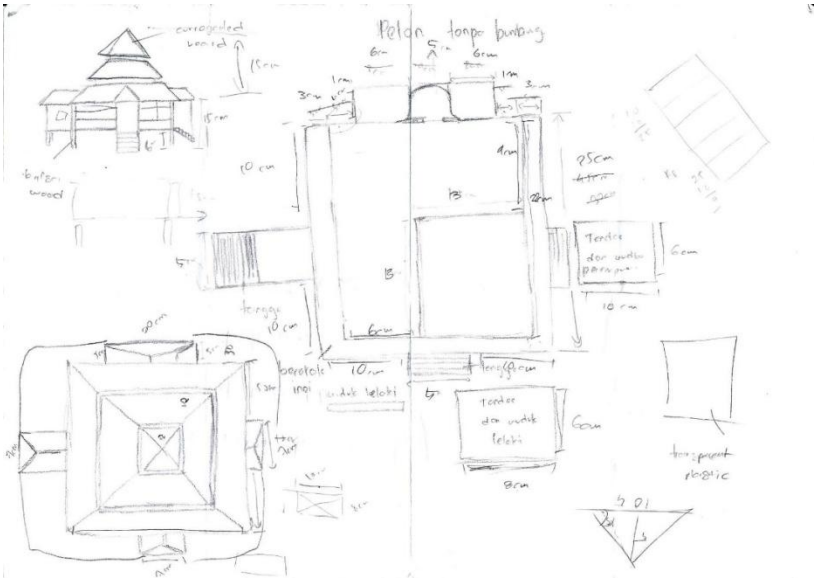

Figure 1.1 Sketch of the design with the early concept

Figure 1.2 Site for the musolla

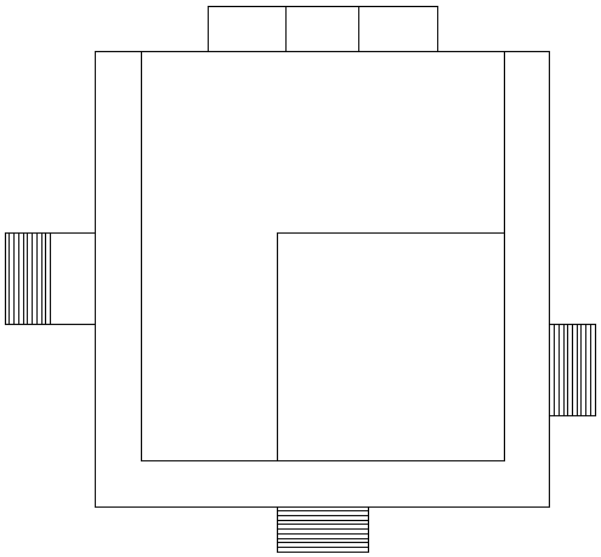

Figure 1.3 Plan view of the musolla using the AUTOCAD software

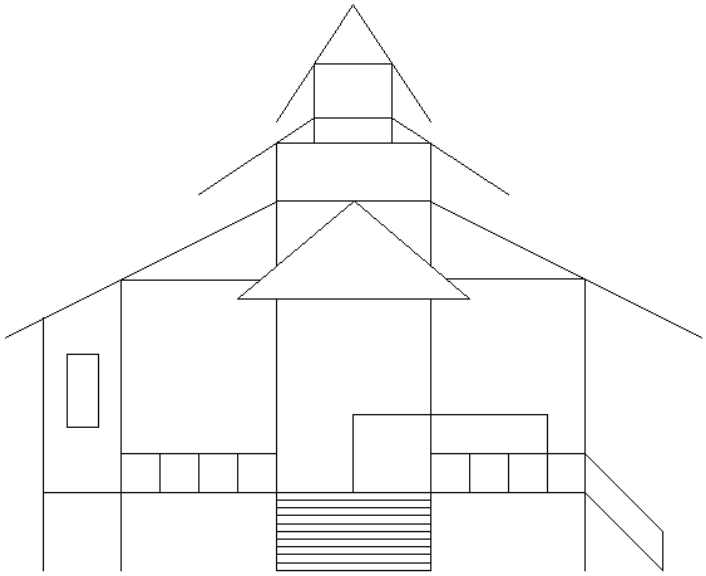

Figure 1.4 Side view of the musolla using AUTOCAD software

RESULT AND DISCUSSION

There were many characteristics of the thermal comfort which were the building must be high, on a platform, use double façade concept and the materials use. The musolla must be high to allow the high rate of movement of air into the musolla. The musollamust also be on a platform which we called it as *berpanggung*in Malay. Double façade concept was introduced to the design that allow sunlight to enter the building but reflect the heat away from it. This concept will ensure the temperature in the building remain low during the day. Then, to fulfill the objective which want to sustain the tradition of Malay, Resak wood was identified as the basic materials of the building as it is cheaper than Jati wood but have the same characteristics with Jati wood. As usual, Malay traditional houses have a veranda called *berarakinai*around their houses and this concept is also introduced to the design of the musolla.

Besides, some other elements which were the Islamic culture and sustainable uses of energywere used in the design. The interior design, a divider was made to separate the male and femaleattendees as it is a requirement in Islam. For the roof of the musolla, there were three layers of roof. It also helps the efficiency of the ventilation. When air from the surrounding enter the building, the warm air which is lighter than cool air will rise up and go out through the spaces between each layer of roof. In the design, there was no ceiling at all to allow the movement of the warm air go out from the building. Lastly, a model of the musolla with the scale of 1:75 was made to represent the actual design of the building. Figure 1.5 shows the model after the finishing touches.

Figure 1.5 The model of the musolla with scale of 1:75

The thermal comfort characteristics must have by all of the buildings in the world because it will helps in conserve the energy. Most of the building nowadays need a lot of air conditioners to keep a comfortable temperature in the building. Consequently, this will use a lot of electrical energy and at the same time the chemical use for the air-conditioner will cause the thinning of the ozone layer.

The purpose of this project was to study the thermal comfort characteristics, to sustain the tradition of Malay and to ensure that Muslims feel comfortable doing the prayer. This project was also intended to overcome the problems faced by the muslim students of the PERMATApintar.

CONCLUSION

There are many characteristics of thermal comfort that can be introduced in designing an eco-friendly building. The tradition of Malay also gives some good impact to the building towards the maintaining of the temperature.

By using all of the thermal comfort characteristics in the design of the musolla the comfortable temperature of 26-27 degree Celcius can be assured withoutrequiring too much energy. Furthermore, this will reduce the need for air-conditioning systems, and the harmful chemicals they require.

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A GOAL PROGRAMMING APPROACH TO MAXIMIZE THE PROFIT GAINED BY COOP PERMATAPINTAR NATIONAL GIFTED CENTRE

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ABSTRACT

This research which portrays a preemptive goal programming model is built with utility functions for multi-objective profit maximization by determining the total number of products needed to be bought in cooperation of Pusat PERMATApintar Negara. Survey is conducted among students there in order to know the demand for each type of product. Some products are in high demand but not all demands can be met due to certain limitations. A set of data has been used to test the effectiveness and efficiency of the proposed model. The LINDO 6.1 optimizer solver indicated that the coop has to review its profit target in line with its policy on the funding and demand of each product. Results of the model specify that all objectives have been achieved. The flexibility of model can be done by adjusting the goal priorities with respect to the importance of each objective.

KEYWORDS: Goal programming; Cooperation Profit; Utility Function

INTRODUCTION

PERMATApintar National Gifted Centre is the only centre of excellence in Malaysia, to be responsible for identifying gifted and talented students from all around the nation and provide them with the opportunity to develop their potentials and talents. Coop ofPERMATApintar National Gifted Centre is built for the students of the national gifted centre not only to buy goods without the need of going outside to preclude the assets of this nation from being exposed to the dangers out there, but also to let those who are involved in the coop to have a chance to practice the technique of managing a small business. Successful businessmen must have the knowledge to maximize their profit with the minimum amount of funding. Thus, we are here to help them in realizing their dream by building a mathematical model which will assist them to achieve this objective.

Goal programming is one of the techniques that can be used in such situation for solving multi criteria decision making and multi objectives decision making problems by finding a set of satisfying solutions. LINDO 6.1 is used as the optimizer solver. The products of this coop under consideration are stationery, credit topups, toiletries, food and beverages, mild medication, hygiene kits and snacks. Demands exceed supply but coop has to make sure that only the demands that are profitable should be fulfilled.

LITERATURE REVIEW

Many researches have been done by using goal programming. Goal programming has been used for various objectives such as to determine the required resources to achieve a desired set of objectives, determine the degree of attainment of the goals with the available resources and provide the best satisfying solution under a varying amount of resources and priorities of the goals.

Goal programming with utility functions to overcome the funding allocation problem in purchasing reading materials, has been successfully applied to the university library. For example, goal programming is used to maximize the number of reading materials of a research university, University Kebangsaan Malaysia known as Perpustakaan Tun Sri Lanang. This program was conducted by Dr. Nasruddin Hassan and Lim Lih Loon. The utility value approach will help libraries make better decisions in optimizing funding allocation in order to maximize utility with limited resources such as this library funding allocation problem.

Furthermore, a goal programming model is built attempting to deal with the nutrient management problem. For instance, another goal programming conducted by Dr.Nasruddin Hassan, SuhailaSafiai, NurHayati Mohammad Raduan and ZurainiAyop is used to minimize theoverachievement of total cost of fertilizer combinations. The methodology for optimum fertilizer combinations presented in that paper is found to be useful for agricultural planners who can advise farmers on fertilizer nutrient combinations. It is shown that along with maintenance of soil fertility, the cost of fertilizer combination for any agriculture product can be reduced.

In addition, a research on food product distribution of small and medium enterprises was also conducted using goal programming by Dr. Nasruddin Hassan and Zuraini Ayop. In this case, goal programming is used to optimize the customers' demands of a Small and Medium Enterprise (SME) company which produce frozenfoods. A pre-emptive goal programming model is formulated with three objectives. These objectives are maximizing thetotal distribution of five products of frozen foods to three different locations, maximizing total profits andminimizing the total manufacturing costs. They used Lindo 6.1 as an optimizer solver to achieve their objectives. The second and third objectives were fully achieved; however the first objective was not fully achieved.

In short, we manage to achieve our objectives by building a mathematical model after referring to previous researches done by our mentor, Dr. Nasruddin Hassan.

METHODOLOGY

We conducted this researchby distributing survey formsto know the demand for 7 different types of product that are being sold in thecoop of PERMATApintar National Gifted Centre. We distributedquestionnaires to 125 Form 5 students of PERMATApintar National Gifted Centre. The questionnaires consist of seven columns, with each column represents the types of productthat thecoop is selling. Students were then asked to grade the types of product according to the tendency of them buying those products from thecoop of PERMATApintar National Gifted Centre.

Before that, we obtained the necessary information such as the buying and selling prices for each and every product from the coop. Then, using Microsoft Excel, we calculated the average buying and selling prices for each type of product in order to get the profit gained.

We started building our mathematical model by figuring out an objective function, which is needed to be achieved in order to maximize the profit of the coop. After that, we constructed some constraints that the data needs to follow in order to get the optimal result. We also wrote the constraints in equation form so that it can be interpreted by the Lindo optimizer solver. The constraints were then rearranged into simplified form before it is coded.

Subsequently, the equations obtained wereused to run in LINDO, one of the software which is capable of doing goal programming to achieve our objectives when we type in our constraints. This solver is used because of its capability to solve equations with lots of variables that cannot be easily solved by human's mind.

While trying to write a code to run the mathematical model, we faced abundance of difficulties. The processes of finding the integer solutions for the buying of the products, exemplifyit. After doing some readings, we found the method to do it.

After working for quite some times, we finally got our result with integer solutions. The solutions are then tabulated for a clearly view to the audience. With abet of this clear perspective, lucid explanations can be easily provided for a better understanding to others, who are interested to review our work in the future. Mathematical model built is shown as below:

Max:

$$\sum_{i=1}^{m} \mathrm{n_i\, x_i} = \mathrm{P}$$

$$x_i = s_i - b_i$$

Constraints:

$$\sum_{i=1}^{m} n_i b_i \leq RM\ 4\,000$$

$$n_i \leq w_i \times \sum_{i=1}^{m} n_i \times 120\%$$

$$n_i \geq w_i \times \sum_{i=1}^{m} n_i \times 90\%$$

Where:
n= Number of items bought
x= Average profit of items
s= Average selling price of items

b= Average buying price of items
P = Total profit
i= Item types
w= Weightage of each items

RESULTS AND DISCUSSION

After carrying out the research, we found out that the maximum profit of the coop that can be obtained given that the capital is RM 4000, is RM 888.46. This profit can be obtained when the number of products sold is as below:

Table 1 Results obtained before getting integer solution

Type of Products	Number sold
Stationery	290.458344
Credit Top-ups	202.119370
Toiletries	190.840790
Food and Beverages	389.737732
Mild Medication	263.763702
Hygiene Kits	184.395889
Snacks	467.852356

Since the number of products sold cannot be in decimal form, we need to get optimal profit with integer solution.

Table 2 Results obtained after getting integer solution

Type of Products	Number sold	Profit gained (RM)
Stationery	291	218.25
Credit Top-ups	202	30.3
Toiletries	191	150.89
Food and Beverages	390	102.57
Mild Medication	263	75.85
Hygiene Kits	185	158.1
Snacks	465	888.06

The maximum profit that can be obtained when using this method is RM 888.06, which is slightly less than the original profit.The capital used is RM 3999.80, where RM0.20 is left.

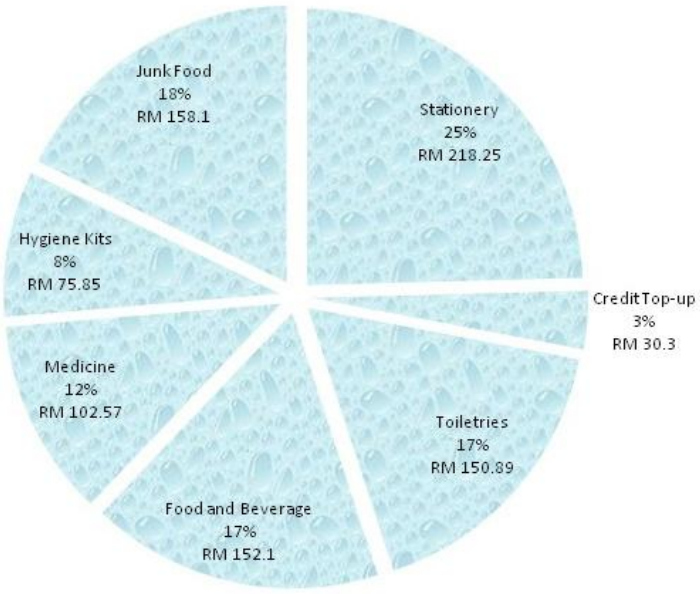

Diagram 1 Percentage of each type of products should be sold

This pie chart clearly illustrates that stationery is the most profitable product, while the credit top-ups is the least profitable product among others.

CONCLUSION

Goal programming with utility functions to compute the number of type of products should be bought, has been successfully applied to a coop. The utility value approach will help the share holders make wiser decisions in order to earn more profit.

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Nasruddin Hassan* and Lim Lih Loon : Goal Programming with Utility Function for Funding Allocation of a University Library.

QUALITY CONTROL OF *ORTHOSIPHONSTAMINEUS* USING ATTENUATED TOTAL REFLECTANCE-FOURIER TRANSFORM INFRARED SPECTROPHOTOMETRY AND CHEMOMETRICS

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ABSTRACT

The use of the herb Orthosiphonstamineus, or more well known as MisaiKucing had been practiced since the olden times to treat diabetes and lower blood pressure. Nowadays, the herb has been manufactured into commercial products. However, the quality regulation specifications set by the Ministry of Health is very loose. The products are only tested for microbial activity, heavy metal contamination and disintegration test for tablets and capsules. This research aims to use chemical means to determine quality control specifications as well as setting a baseline for traditional medicine screening. In this research, infrared spectrophotometry, specifically one dimensional-attenuated total reflectance-Fourier transform infrared spectrophotometry (1D-ATR-FTIR) is used to pinpoint the chemical fingerprint of the herb and relevant products. This will show the method of preparation and chemical fingerprint of the product. The herb is ground and extracted using water (H_2O) and freeze dried into a powder. The ground herb and freeze dried powder are then scanned with an ATR-FTIR spectrophotometer. The data is then analyzed using Unscrambler X 10.0.1. In conclusion, this method enabled total knowledge of the compound and its constituents. Also it indirectly shows the method of preparation of herbs in the factory. This ensures that the customers get the most out of their herbal products as well as being safe from inappropriate herbal preparations.

INTRODUCTION

Medicinal herbs have been used for thousands of years as a natural source of healing powers. Malaysia, being one of the world's twelve mega biodiversity-rich countries, had been a good source of medicinal herbs. In rural areas, people still rely a lot on them, since it is said to have less harmful side effects known to human aside from being cheaper than modern pharmaceuticals.

Orthosiphonstamineus or much known as MisaiKucing is a medical herb used as an antioxidant (Siddig Ibrahim Abdelwahabet al., 2011) and has antihyperglycemic properties (Mohamed, E.A.H. et al. **2011**). It is usually prepared as an infusion with water.

The testing of herbs can be challenging without proper equipment. The use of Attenuated Total Reflectance-Fourier Transform Infrared Spectrophotometry makes the process a bit easier by providing a chemical fingerprint that is unique to all compounds.

LITERATURE REVIEW

- Differentiation of Asian Ginseng, American Ginseng and Notoginseng by Fourier Transform Infrared Spectroscopy Combined With Two-Dimensional Correlation Infrared Spectroscopy (Guang-hua Lu et al. 2008)

- Use of FTIR and pattern recognition to determine geographical origins of Chinese medical herbs (S.H. Liu; X.G. Zhang; Q. Zhou; S.Q. Sun, Beijing, China, Jun 2005)

EXPERIMENTAL

Samples

The raw materials used in the study originated from a same plant obtained in Kangar, Perlis. The commercial products are obtained from a local herbal products store in Kuala Lumpur.

Apparatus

Each sample was scanned between 4000 and 650 cm^{-1} with 16 scans and 4 cm^{-1} resolution using an Attenuated Total Reflectance-Fourier transform infrared (ATR-FTIR) spectrometer (PerkinElmer).

Water Extracted Samples

The samples are refluxed with water and the extracts are freeze-dried to obtain a solid.

ATR-FTIR

Each sample was analyzed using an ATR-FTIR spectrophotometer. Air background spectrum was recorded before any analysis. A small amount of the sample was placed just enough to cover a small hole on the ATR cell of the universal ATR (UATR). One dimensional ATR-FTIR (1D-ATR-FTIR) spectra of all samples were collected in the range of 4000 to 650 cm^{-1} with a resolution of 4 cm^{-1} for 16 scans. All scans were averaged for each sample spectrum. Experiments are repeated twice.

RESULTS AND DISCUSSION

Based on Beer's Law, the absorption of light at a given wavelength depends onto the absorptivity of the constituents in the specimen. Thus, any variation in the spectral caused by spectrometer and sampling error should be eliminated prior to data analysis. Therefore in this study, we used two chemometric pre-processing step which are baseline correction and normalization. By auto-correcting the spectrum baseline, we removed baseline effects introduced by the spectrometer such as detector drift, changing environmental condition like temperature, spectrometer purge and sampling accessories (Tranter, R.L. 2000). Table 1 shows the typical infrared absorption frequencies of chemical functional groups.

Analysis of 1D-ATR-FTIR spectra

Figure 1.1 shows the spectra obtained using raw plant material and dry products. As expected, the graph shows a complex overlap of absorption spectra.

Not much difference is observed from the two raw material samples, since they only differ by preparation method. The same applies to the products.

Figure 1.2 shows the spectra of the water extraction. The main difference from the spectra is the intensity of the peaks. The sun dried plant has a lower dipole change as observed by the lower absorbance than the shade dried plant. This shows that the plant is damaged by the heat of the sun. Comparing with the products, it is seen that product B has a similar spectra to the sun dried sample. Therefore, it can be said that in the process of preparation, the product is a little damaged by the heat applied during the manufacturing process.

CONCLUSIONS

From this study, we can see that commercial products can be differentiated from the method of preparation. The use of 1D-ATR-FTIR is a reliable way to differentiate the method of preparation of products.

Table 1 Typical infrared absorption frequencies of chemical functional groups [14]

Frequency Range (cm-1)	Assignment of functional groups
3400-3200	O-H stretching (H-bonded, alcohols and phenols)
3000-2850	C-H stretching (CH_3, CH_2 and CH, alkanes)
1725-1705	C=O stretching (ketones)
1680-1600	C=C stretching (alkenes)
1600 and 1475	C=C stretching (aromatic rings)
1450-1375	C-H bending (CH_3 and CH_2 deformation, alkanes)
1430-1330	O-H bending (alcohols and phenols)
1300-1000	C-O stretching (alcohols and phenols)
900-650	C-H out-of-plane bending (aromatic rings)
850-780	C-H out-of-plane bending (alkenes)
770-650	O-H out-of-plane bending (alcohols and phenols)

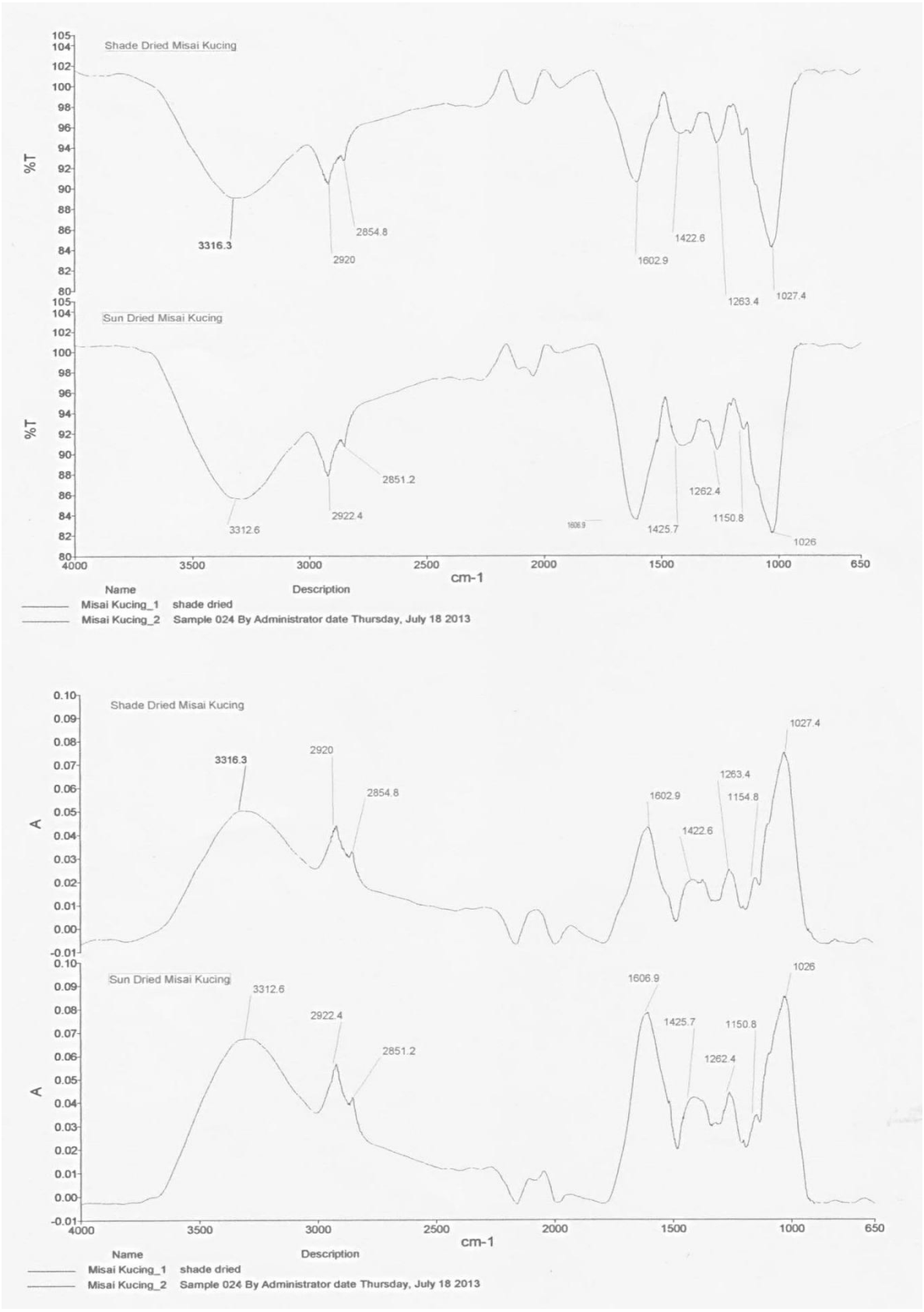


Figure 1.1 Transmittance and Absorbance Spectra of Raw Materials (Plant)

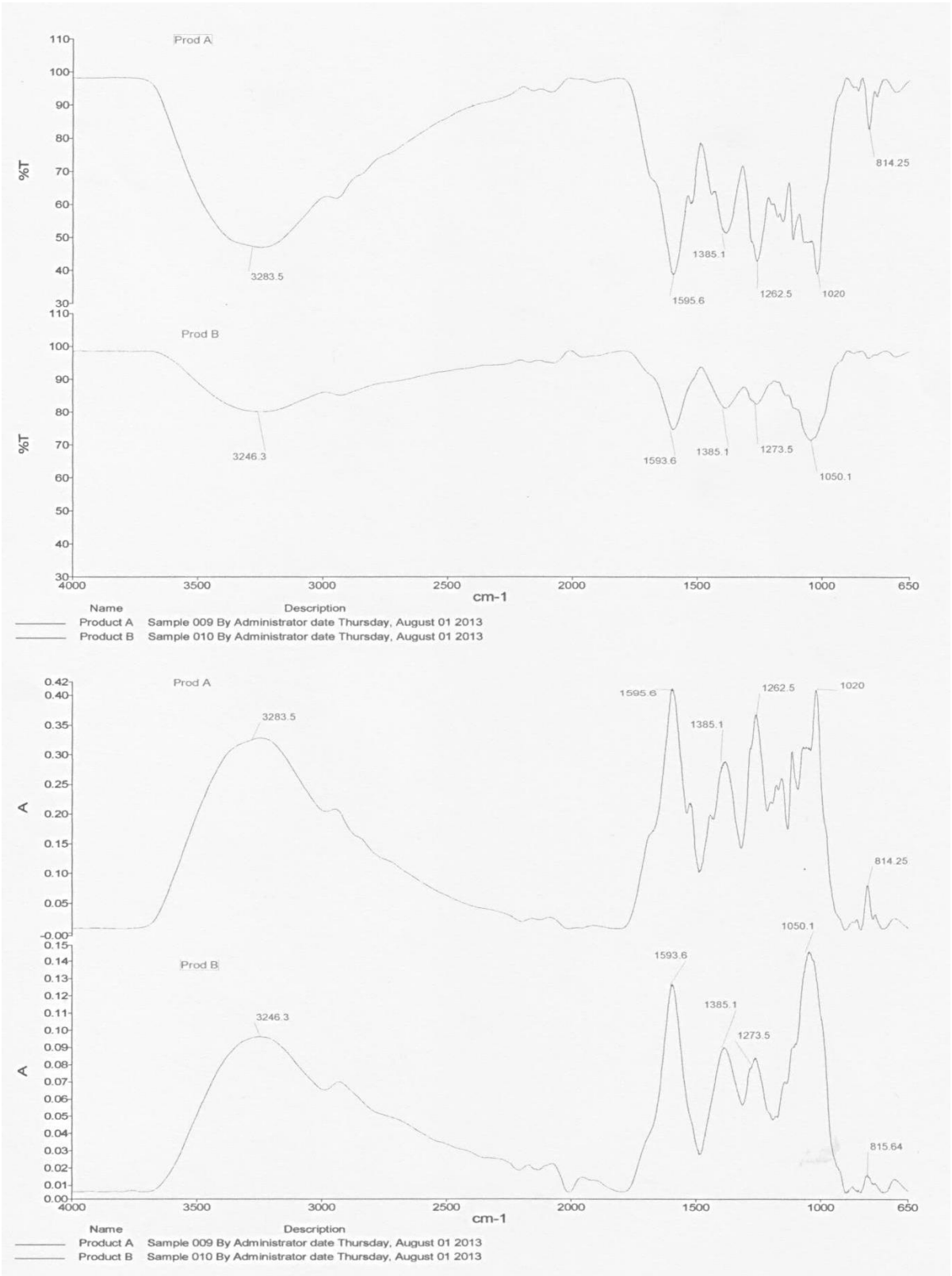
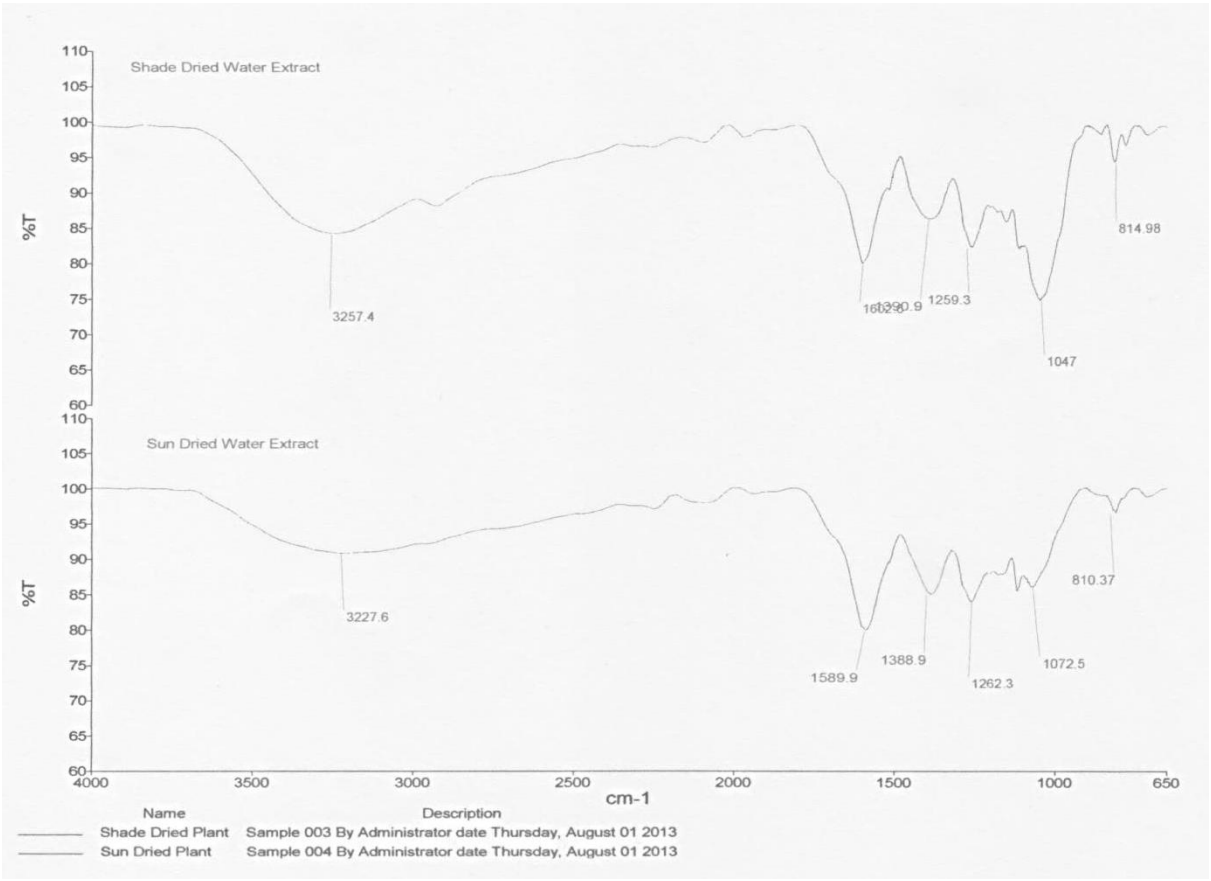


Figure 1.2 Transmittance and Absorbance Spectra of Raw Materials (Commercial Products)



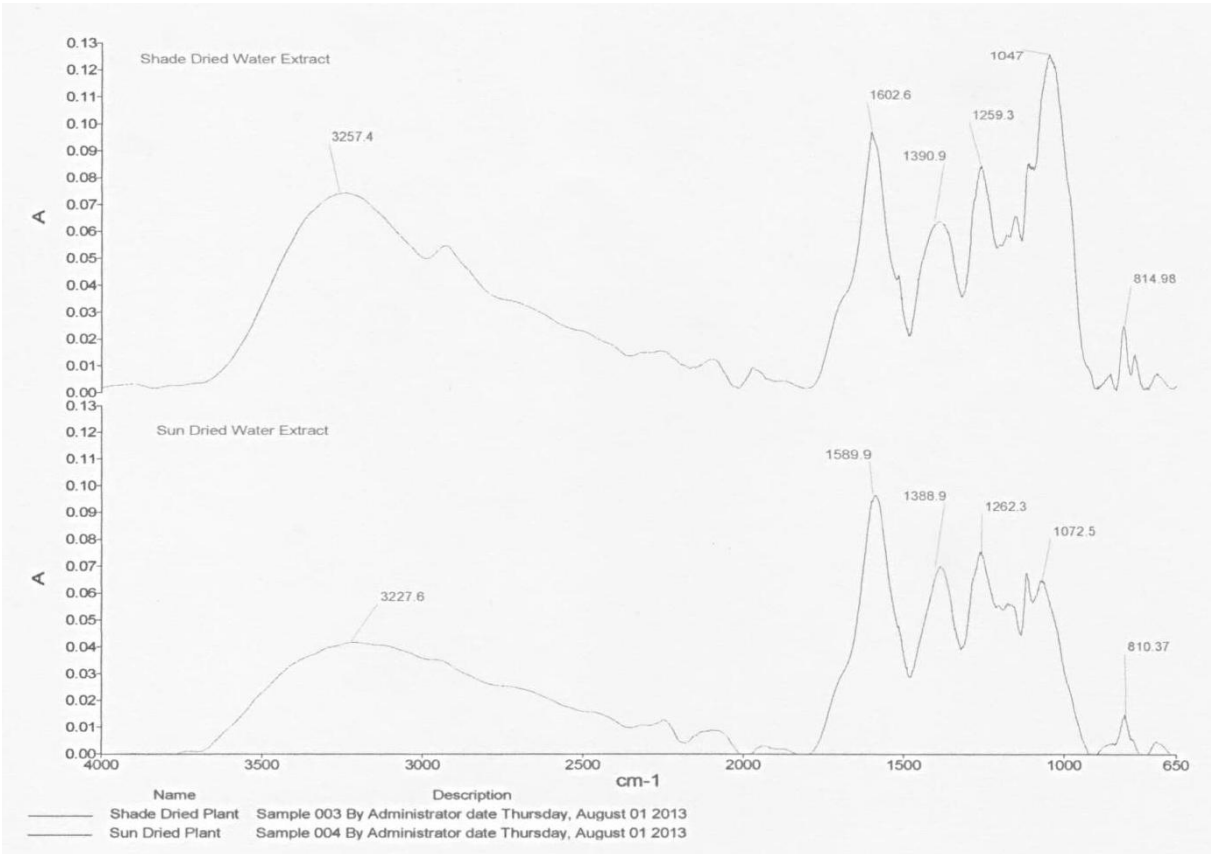


Figure 1.3 Water Extracts of Plant

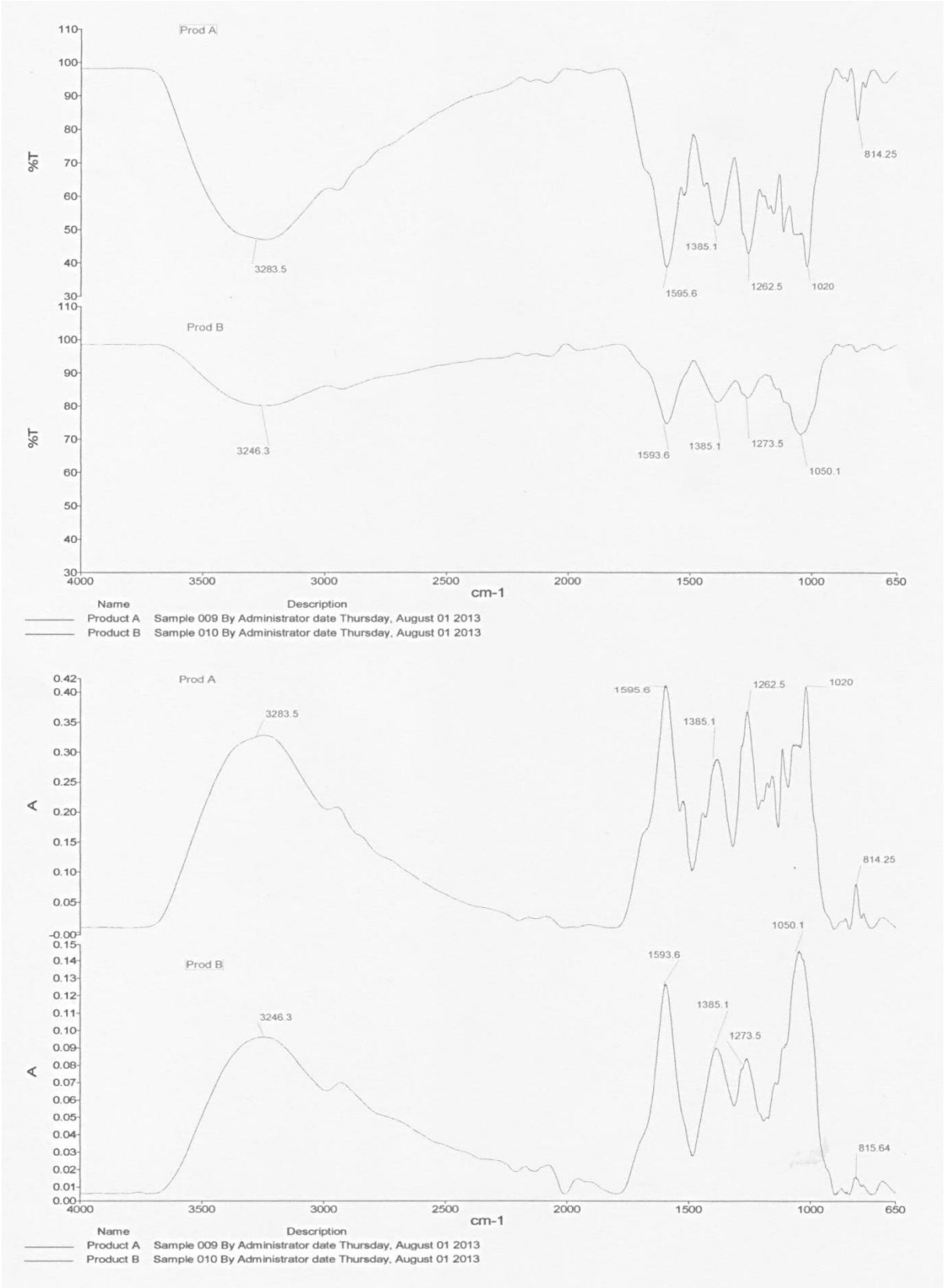


Figure 1.4 Water Extracts of Commercial Product

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FACTORS AFFECTING THE CAPTURE OF SOLAR ENERGY

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ABSTRACT

This paper discusses the factors affecting the capture of solar energy, particularly in relation to dye sensitized solar cells (DSSC), third generation solar cells which rely on organic dyes to capture sunlight. The aim of this research is to identify the ideal combination of organic dyes and solvents to produce the ideal low cost sensitizer for DSSCs while investigating the properties of the sensitizers such as absorption. Natural materials such as flowers and leaves of different species were immersed and boiled in water as well as various organic solvents such as hexane (C_6H_{14}), acetone (C_3H_6O), ethanol (C_2H_5OH) and chloroform ($CHCl_3$). The dyes of these natural materials were extracted and tested using an ATI UNICAM UV-Vis spectrometer to identify the potential of the different natural plants in producing efficient sensitizers and also to determine the optimum extraction method for each dye. The results showed that the red leaf extract of the *Mesua ferrea* produces the most efficient dye species when dissolved in water. Furthermore, extracts dissolved in water produce better sensitisers compared to extracts dissolved in other solvents. These results can then be used by other researchers to advance the study of DSSCs. This paper discusses in detail the process and results of the experiments.

KEYWORDS: Dye sensitised solar cells (DSSC); organic solvents; sensitizers

INTRODUCTION

Solar energy

Solar power is renewable, eco-friendly and cheap, it was predicted that solar cells will have a production cost of less than $0.10/kWh by 2020. Thus, people invented solar cells to harness solar energy. Inventors started out with the bulky silicon-based solar cells and then the thin-film solar cells respectively. In the year of 1991, Brian O'Regan and Micheal Grätzel came up with dye-sensitized solar cells, or DSSCs, that used dyes instead of semiconductors to provide electrons.

DSSC technology is the key of publicizing solar cells. They can be constructed easily and rapidly using cheap materials such as plant materials. Beside, DSSCs can be engineered to operate on flexible sheets due to its mechanically robust nature. In addition, they also have aesthetic value as they can come in different colours. Even though DSSCs only managed to reach up to 15% energy efficiency so far, their production cost are cheap and the time consumed are short.

How DSSCs work

DSSCs consist of three primary layers: a transparent anode on top, a thin layer of dye and titanium dioxide in the middle, and a counter electrode at the bottom. The dye is thinly deposited on the titanium dioxide, as such to create a highly porous structure with a large surface area. DSSCs generate electric current when light particles, i.e. photons excite the dye particles and cause them to release

electrons. Given that the solar cell is exposed to light with enough energy (i.e. high enough frequency), the solar cell will be able to produce a steady stream of electrons.

The literature review revealed that DSSCs were focused on verying the type of plant materials in producing efficient dye to capture solar energy (Sofyan, et al. 2013; Kim, H-J., et al. 2013; Zhou, H. t al. 2011). Hence this paper is aim to investigate the potential of sensitizers by varying the solvent and also method of extraction instead.

METHODOLOGY

Preparation of Extracts

There were 10 types of plant parts used in the research, three from the *Mesua Ferra* species, namely, green, red and brown leaves, two from the *Bougainvillea Glabra* species which consisting of pink and purple petals, two from the *Ixora Chinensis* species consisting of red and yellow petals, red leaves from the *Excoecaria Cochinchinensis* species, leaves from the *Bambusa* sp and finally, leaves from the *Cordyline Terminalis* species.

Each freshly plucked plant part (1 gram) was measured with an electronic balance and inserted into a test tube. Five of the test tubes containing the plant part are prepared and filled with 40 ml water, hexane, ethanol, acetone and chloroform, respectively. The test tube is inserted into a water bath and heated up until it almost reaches the boiling point of particular solvent. After that, the test tubes are removed from the water bath and allowed to cool. After allowing it to cool down a little, the test tubes are inserted back into the water bath and continue to be heated. The test tubes are stirred throughout the process for 15 minutes. The resulting solution is then collected in a test tube. The test tube is then wrapped in aluminium foil while the mouth of the test tube is covered with a layer of parafilm first, before topping it with aluminium foil to prevent the solutions from pollution or evaporation.

UV – Visible Spectroscopy

The collected solution is inserted into plastic cuvettes which are then inserted into an ATI UNICAM UV4 spectrometer and the data is analysed using Vision-Scan software. The absorbance spectra were obtained by scanning between 200 nm and 800 nm in the analysis.

RESULTS AND DISCUSSION

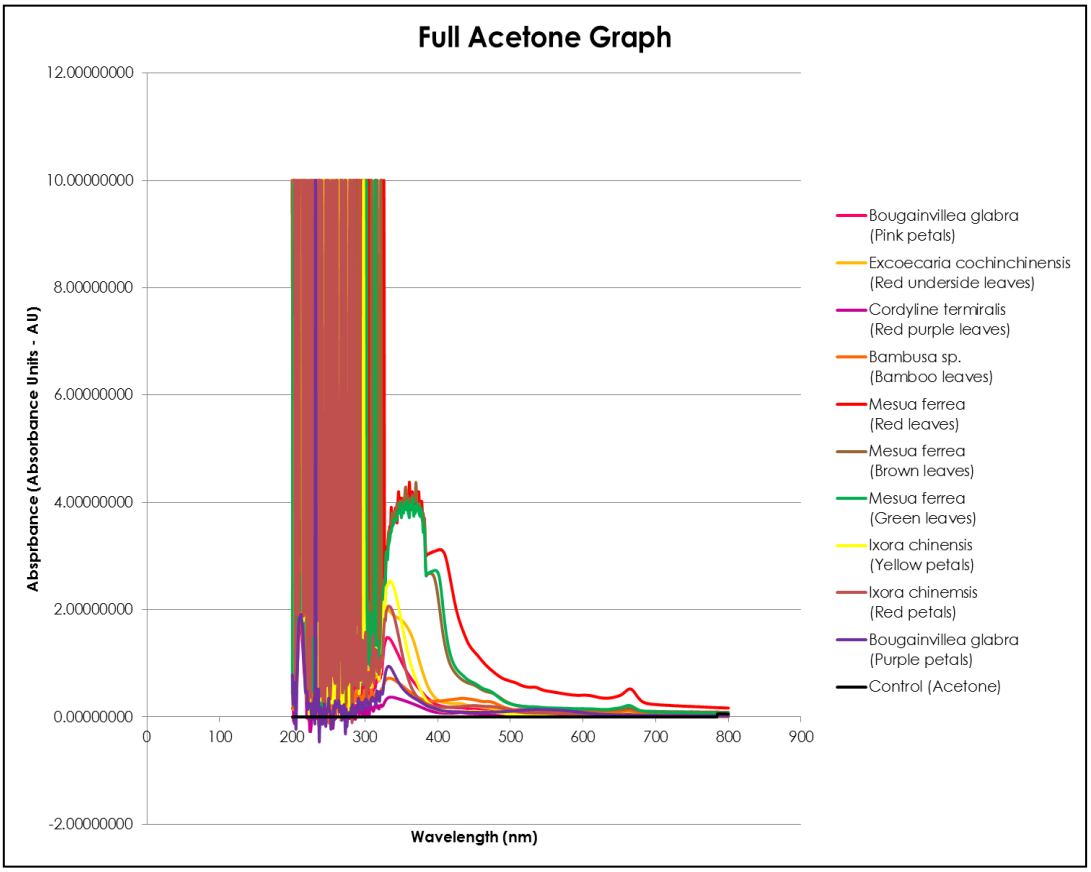

Diagram 1 Full Acetone Graph

Diagram 1 shows the absorbance of different acetone solutions of different extracts with respect to wavelength. There is plenty of noise for data corresponding to wavelengths less than 328 nm as shown in the diagram. The noise is the disturbance or interference that occurs in the experiment. For the purpose of this research, we have chosen to eliminate all data below 400 nm and all data above 700 nm for two reasons. Firstly, we would like to eliminate the noise usually found in data below 400 nm and secondly, we are interested in the absorbancy of light of wavelengths between 400 nm and 700 nm as this light can be seen by the naked eye.

The y-axis is represented by the absorbance, or the amount of light absorbed by the solution. An absorbance of 1 means that the solution absorbs 99.9 percent of light received while an absorbance of 2 shows that the solution absorbs 99.99 percent of the light received. Absorbance is a logarithmic scale. On the x-axis is the wavelength of the light emitted during the testing, which ranges from 200 nm to 800 nm. The lines on the graph show the performance of each solution in absorbing light. The legend for the lines can be found by the side of the graph, which are labelled with species name followed by a general simpler description in brackets.

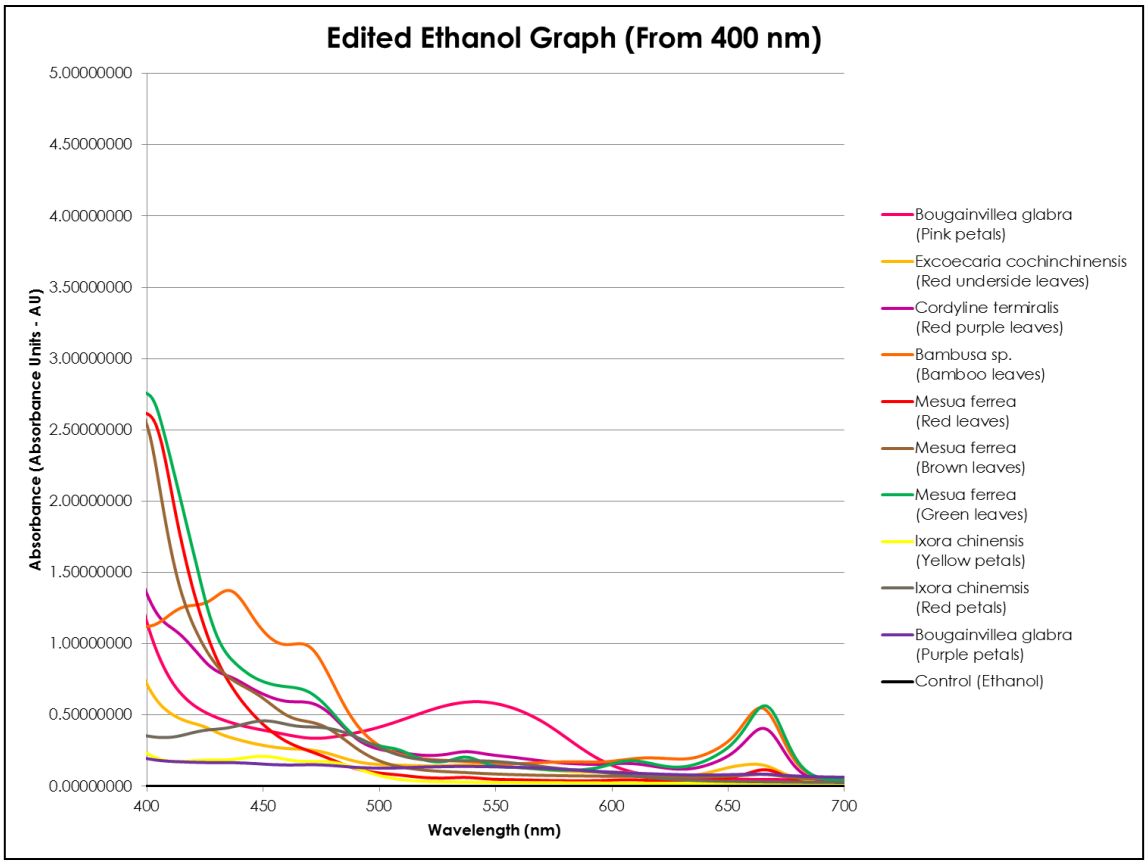

Diagram 2 Edited Ethanol Graph

Diagram 2 shows the results obtained between 400 nm and 700 nm. Unlike the previous graph, the current graph shows the absorbancy of the ethanol solutions obtained during the experiment. As observed from the graph, there are peaks in the graph showing where certain solutions show relatively high absorbancy for a particular range of wavelength.

The area under the curve is calculated between wavelengths of 400 nm and 700 nm in order to evaluate the results obtained. The top 20 species have been compiled in the table 1 by absorbance area. In the table observed, water – based solutions dominate the first 9 spots of the table. It is clearly seen that water can dissolve dyes most suitable for light capture. Furthermore, it should also be noted that the species dissolved in hexane do not show much potential for the visible light spectrum, they show greater potential in the ultraviolet light spectrum, showing interesting peaks in that region. However, in light of the results produced by hexane – based solutions, further research should be conducted as some energy can be harnessed from the ultraviolet light spectrum. Diagram 3 reveals the graph for hexane solutions.

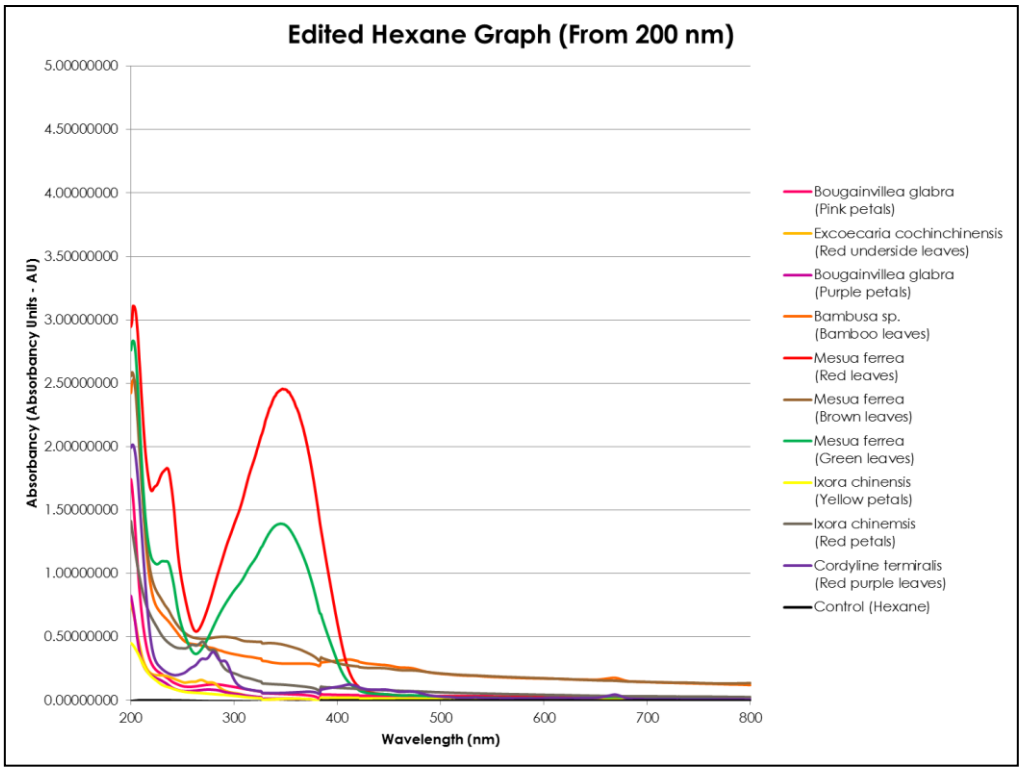

Diagram 3 Edited Hexane Graph

There is no clustering of any species within the table. However, it should be noted that the plant parts from the *Mesua ferrea* species dominate the top three spots in the table. It only occurs for water but not for other solvents, and hence, it is possible that the *Mesua ferrea* species produces a pigment only soluble in water which is highly effective in absorbing light.

Table 1 Top 20 Species – Solvent Combinations

Solvent	Species	Absorbance Area
Water	*Mesua ferrea* (Red leaves)	662.01998400
Water	*Mesua ferrea* (Brown leaves)	591.42572200
Water	*Mesua ferrea* (Green leaves)	546.14262900
Water	*Excoecaria cochinchinensis* (Red underside leaves)	517.38959250
Water	*Bougainvillea glabra* (Pink petals)	460.24204650
Water	*Bambusa* sp. (Bamboo leaves)	395.95190000
Water	*Cordyline termiralis* (Red purple leaves)	359.12808250
Water	*Bougainvillea glabra* (Purple petals)	344.51081700
Water	*Ixora chinensis* (Yellow petals)	258.40083600
Acetone	*Mesua ferrea* (Red leaves)	239.46850150
Water	*Ixora chinemsis* (Red petals)	195.62330300
Ethanol	*Bambusa* sp. (Bamboo leaves)	142.71795850
Ethanol	*Mesua ferrea* (Green leaves)	141.59842150
Chloroform	*Cordyline termiralis* (Red purple leaves)	122.04623500
Acetone	*Mesua ferrea* (Green leaves)	114.38146850
Chloroform	*Mesua ferrea* (Brown leaves)	112.32411950

Ethanol	*Cordyline termiralis* (Red purple leaves)	108.18501450
Acetone	*Mesua ferrea* (Brown leaves)	101.06212300
Ethanol	*Bougainvillea glabra* (Pink petals)	99.76807750
Ethanol	*Mesua ferrea* (Brown leaves)	95.02838650

CONCLUSION

The research was carried out by using absorbancy of the solution with a spectrophotometer. In nutshell, water is the best solvent for extracting dyes, water – based solutions has the highest absorbance. On the other hand, the colour of the plant part does not affect the results. While there is no clustering of any species, it should be noted that plant parts from the species *Mesua ferrea* dominates the top of the table when dissolved in water.

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BODY IMAGE DISSATISFACTION AMONG MALAYSIAN GIFTED STUDENTS

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ABSTRACT

Adolescents frequently experience dissatisfaction with their body image due to discrepancies between their ideal and actual body size leading to eating disorder, psychosocial problems and obesity. The objective is to assess the prevalence of body image dissatisfaction among Malaysian gifted students and to determine its correlation with disordered eating, Body Mass Index (BMI) and its effects on psychosocial factors. A cross-sectional study was conducted on 227 Malaysian gifted students based at PERMATApintar® National Gifted Center. Respondents were assessed through Body Shape Questionnaire (BSQ), Eating Attitudes Test (EAT-26) © and Depression Anxiety Stress Scale-21(DASS-21).Data on social demographic, BMI, family characteristics and academic performance were also obtained and analysed. Body Image Dissatisfaction (BID) was present in 37.5% of the respondents with significantly higher prevalence in females. It was noted to be positively associated with disordered eating and significantly correlated with higher BMI. Anxiety, stress and depression were found to be significantly correlated with BID. There was no significant association between BID when compared with family characteristics, race and academic performance. Body image dissatisfaction is high among Malaysian gifted students and found to be associated with disordered eating and other psychological problems. Preventive strategies to promote healthy body image perception are important to curb disordered eating and its related psychological and physical complications.

KEYWORDS: Body image dissatisfaction; Disordered eating; Malaysian gifted students; BMI; Psychosocial factor

INTRODUCTION

Dissatisfaction with one's body image is often seen as a form of eating disorder. This has been demonstrated by the high prevalence of eating disorders among groups in which there is an increased emphasis on maintaining a thin, "ideal" body example in ballet dancers and models (Garner & Garfunkel 1980) as well as athletes (Sundgot-Borgen 1993). In this study we focused on adolescents, who had been extensively studied in this area as many eating disorders appear to start soon after puberty and persist throughout secondary school years. This appears to be a universal issue, and there have been numerous cross-cultural studies.

The difference between the desires for a shape change in men, as opposed to weight loss through dieting in women, may be a function of the different male and female ideals. The male ideal is a V-shaped figure with an emphasis placed on large biceps, chest, and shoulders; whereas the female ideal is to be extremely thin, with the emphasis placed on slim hips, bottom, and thighs. Men's desire

for weight gain would fit with the desire to achieve the male ideal V-shaped figure and to gain additional muscle.

Women are also generally more dissatisfied with their physical appearance than men (Cooper & Fairburn 1983; Furnham & Calnan 1998). The most marked difference in body-image perceptions between the sexes is dissatisfaction with weight and, to a lesser extent, with shape, particularly the hips (Berscheid, Walster, &Bohrnstedt 1973). Franco et al. (1988), and Miller, Coffman, and Linke (1980) have shown that many men are dissatisfied with their weight and shape, although somewhat less so than women; yet some researchers have indicated that men are as dissatisfied as women with their body shape and weight (Drewnowski & Yee 1987; Silberstein et al. 1988).

Body image dissatisfaction (BID) in both genders has been linked with many adverse psychological consequences, including eating disorder, depression, anxiety, poor self-esteem and the diminished quality of life (Cash et al.2004). Shape and body weight is one of the main contributors to the body image dissatisfaction. Person with abnormal body weight and height will be more prone to experience body image dissatisfaction. However this is not always true as it also depends on the individual themselves. Psychological, social and cultural context; all these contribute to the development of an individual's body image.

This study is targeted among the adolescents as it is during this crucial period, with the rapid growth and change associated with puberty, body image represents a major proportion of global self-esteem (Newman et al. 2006). Some unhealthy conduct of adolescents such as smoking are even used with the intention to reduce appetite. Unfortunately, this bad habit represents an overall increased risk to physical health (Stice& Shaw 2003). Body image is perceived far more important that body mass and body image plays a stronger role in psychological well-being and behavioral consequences for adolescents. Most of the studies showed that many adolescents of normal weight or low weight compared themselves to societal ideals of body size and shape and thus these adolescents experienced body image dissatisfaction.

Previous studies from various countries such as Australia (McCabe &Ricciardelli 2004), Korea (Kim & Yoon 2000), Malaysia (Pon et al. 2004), Taiwan (Wong & Huang 1999) and Latin America (Mc Arthur et al. 2005), have all reported that a substantial proportion of girls in their samples who were of normal weight thought that they were overweight, and expressed the urge to lose weight. The aim of this study is to assess the prevalence of body image dissatisfaction among Malaysian gifted students and to determine its correlation with disordered eating, Body Mass Index (BMI) and its effect on psychosocial factors.

METHODOLOGY

Participants

This cross-sectional study was conducted among gifted student population in Malaysia, aged between 16 to 18 years who were based at PERMATApintar®, UKM. Out of 266 students at the center, 227 students agreed to participate and provided complete data on the variables of interest in the study.

Materials

The respondents were assessed through Body Shape Questionnaire (BSQ), Eating Attitudes Test (EAT-26) © and Depression Anxiety Stress Scale-21(DASS-21).

Demographic Information

Participants were asked to provide their gender, ethnicity, total parents' income, Cumulative Grade Performance Average (CGPA) and parents' marital status.

INSTRUMENTS

In this study, three different sets of questionnaires were used; the Body Shape Questionnaire (BSQ), the Eating Attitudes Test (EAT-26), and the Depression Anxiety Stress Scale-21(DASS-21). All these three questionnaires were pre-tested, pre-validated, self-administered questionnaires with detailed attributes as follows:

Body Shape Questionnaire (BSQ)-The BSQ is a self-report measure of the body shape preoccupation typical of bulimia nervosa and anorexia nervosa. There are a total of 34 questions on an individual's feeling about his/her appearance over 4 weeks. Psychometric evaluations of the widely used 34-item version, have confirmed its unifactorial structure, retest reliability, internal consistency, construct validity, discriminant validity, concurrent validity, and its sensitivity to detect treatment related changes. The Cronbach's alpha value of 0.88 indicates its high reliability (MPook et al. 2008).

Eating Attitudes Test (EAT-26)-Eating Attitude Test-26 (EAT-26) is a validated self-administered questionnaire widely used to measure eating disorders. It comprises of 26 questions for which, scoring is done on a 6-point scale from always tonever. Total sum of Eat-26scores range from zero to 78 (Memon et al. 2012)the test score reliability can be estimated using a widely used method, which is the measure of internal consistency. For EAT-26 the mean estimate of internal consistency was 0.86. But for its subscales, the mean estimate of internal consistency ranged from 0.56 to 0.80 (Pearson 2006) A score at or above 20 means that the person is highly concerned about dieting, body weight and problematic eating behaviours. Thus, it is strongly suggested that the person with such scores should seek clinical attention. EAT-26 also contains behavioural part, which recognizes any eating disorder symptoms and recent significant weight loss.

Depression Anxiety Stress Scale-21(DASS-21)-The tool is designed to measure the severity of depression, stress and anxiety. The questionnaire comprises of 21 self-report questions. Based on study done by Ramli M et al. (2007) on 263 subjects whom were chosen by random sampling, the reliabilities of Bahasa Malaysia version of the DASS-21 is good with overall Cronbach's alpha value of 0.904. For each scale such as depression, anxiety and stress, the Cronbach's value is 0.84, 0.74 and 0.79 respectively. Besides it also has good validity by having most items score from 0.39 to 0.73 in factor loading values (more than 0.4, is considered good). And lastly the correlation between depression, anxiety and stress scale is between 0.54 and 0.68.

Body Mass Index (BMI)-BMI (kg/m^2) was calculated using self-reported weight and height. Participants were asked to report their weight in kilograms (kg). Previous research has confirmed that self-reported weight and height are reliable and valid measures of actual weight and height (Field et al.

2001; Paradis et al. 2008). Furthermore, similar studies have also relied upon this method of measuring BMI (Mellor et al. 2008; Bardone-Cone et al. 2008).

Statistical Analyses

Data analysis was carried out using IBM SPSS (Statistical Package for the Social Sciences) software version 21.0. Chi-square test was used to test the association of Body Image Dissatisfaction with demographic data, disordered eating and BMI. Pearson's correlation was used to evaluate correlation between body image dissatisfaction with other psychosocial factors. The significant level was set at $p< 0.05$.

RESULTS

Out of this 227 participants whom completed the questionnaires, 107 (47.14 %) were males and 120 (52.86 %) were females. In terms of ethnicity, Malays ranked highest 176 (77.53 %) followed by Chinese with 27 (11.89 %), Indians with 10 (4.41%) and 14 were from "Others" (6.17 %). The study found that 37.4 % (n=85) of the respondents had Body Image Dissatisfaction (Table 1). BID is noted to be significantly higher among female respondents compared to male respondents (61 % vs. 39 %, $p<0.05$). There was no significant association between BID against ethnicity, parents' marital status, total family income as well as academic performance (Table 2). 16.4% of those with BID were noted to have disordered eating habits, compared to only 2.1 % among those with normal BSQ score ($p<0.01$)(Table3).

Table 1 Prevalence of Body Image Dissatisfaction

		Count n=227 (%)
BSQ Level	Normal	142 (62.6%)
	Abnormal	85 (37.44%)

Table 2 Body Image Dissatisfaction and Socio-demographic Data

		BSQ Level		p-value
		Normal n=142 (%)	Abnormal n=85 (%)	
Ethnicity	Malay	108 (76.0)	68 (80.0)	
	Chinese	18 (12.8)	9 (10.6)	p>0.05
	Indian	8 (5.6)	2 (2.3)	
	Others	8 (5.6)	6 (7.1)	
Gender	Male	74 (52.1)	33 (38.8)	p<0.05*
	Female	68 (47.9)	52 (61.2)	
Parent's Income	<1000	14 (9.9)	14 (16.5)	
	1000-5000	69 (48.6)	31 (36.5)	p>0.05
	>5000	59 (41.5)	40 (47.0)	

CGPA	<2	1 (0.7)	2 (2.3)	
	2-3	39 (27.5)	22 (25.9)	p>0.05
	>3	102 (71.8)	61 (71.8)	
Parents' Marital Status	Married	132 (93.0)	81 (95.3)	p>0.05
	Divorced	10 (7.0)	4 (4.7)	

Table 3 Body Image Dissatisfaction and Disordered Eating

		EAT26 Level		Total	p-value
		Normal (%)	Abnormal (%)		
BSQ Level	Normal	139 (97.9)	3 (2.1)	142	p<0.01*
	Abnormal	71 (83.5)	14 (16.5)	85	
Total		210 (92.5)	17 (7.5)	227	

Body Image Dissatisfaction and Psychosocial Factors

Psychosocial factors in our study referred to depression, anxiety and stress. For the depression score, 51.76% (n=44) of the respondents with abnormal BSQ were shown to have abnormal depression level (Table 4).94.12% (n=80) students who had BID among these gifted students population seemed to also have anxiety (Table 5). Our study also revealed that 50.59% (n=43) of students with BID were also concurrently stressed (Table 6). All of these three psychosocial factors; depression (r=0.242, p<0.01), anxiety (r=0.351, p<0.01) and stress (r=0.348, p<0.01) showed a significant positive correlation when tested against BID.

Table 4 Body Image Dissatisfaction and Depression

		Depression Level		Total	p-value
		Normal (%)	Abnormal (%)		
BSQ Level	Normal	103 (72.54)	39 (27.46)	142	p<0.01*
	Abnormal	41 (48.24)	44 (51.76)	85	
Total		144 (63.44)	83 (36.56)	227	

Table 5 Body Image Dissatisfaction and Anxiety

		Anxiety Level		Total	p-value
		Normal (%)	Abnormal (%)		
BSQ Level	Normal	37 (26.06)	105 (73.94)	142	p<0.01*
	Abnormal	5 (5.88)	80 (94.12)	85	
Total		42 (18.5)	185 (81.5)	227	

Table 6 Body Image Dissatisfaction and Stress

		Stress Level		Total	p-value
		Normal (%)	Abnormal (%)		
BSQ Level	Normal	112 (78.87)	30 (21.13)	142	p<0.01
	Abnormal	42 (49.41)	43 (50.59)	85	*
Total		154 (67.84)	73 (32.16)	227	

Body Image Dissatisfaction and Body Mass Index (BMI)

From the study, we also found significant positive association between BID and BMI (p<0.01) (Table 7). 2 (5.26%) out of 38 underweight respondents were found to have BID while 59 (39.33%) from 150 normal BMI respondents were found to have BID. As for the overweight category, 20 (57.14%) out of 35 respondents had BID problem. Lastly, all (n=4) of obese respondents were found to have BID.

Table 7 Body Image Dissatisfaction and BMI

		BMI Level				Total	p-value
		Underweight (%)	Normal (%)	Overweight (%)	Obese (%)		
BSQ Level	Normal	36 (25.35)	91 (64.08)	15 (10.56)	0 (0)	142	p<0.01*
	Abnormal	2 (2.35)	59 (69.41)	20 (23.53)	4 (4.71)	85	
Total		38 (16.74)	150 (66.08)	35 (15.42)	4 (1.76)	227	

DISCUSSION

This present research aimed to explore the Body Image Dissatisfaction among Malaysian gifted students and its relation with the socio-demographic data, eating disorders, psychosocial factors and body mass index (BMI).In our study, we found that age, ethnicity, parents' income, parents' marital status and academic performance did not have any correlation with BID.

Our study showed that female respondents seemed to have greater BID problems compared to male respondents with 61.18% (n=52) of female respondents had BID, compared to 38.82% (n=33) of male respondents. This finding was consistent with past research, which quoted that over 80% of females and only about 40% of males reported a high level of incongruency and dissatisfaction with their body image (Paxton et al. 1991; Rierda et al. 1989; Wertheim et al. 1992). However, this particular finding from our research was inconsistent with a previous research conducted locally among Malaysian adolescents, whereby the researchers found that there were no differences between boys and girls with regards to body dissatisfaction (Mellor et al. 2010).

Our study also compared the levels of body image dissatisfaction and the disordered eating among Malaysian gifted students' population. From the results, we found that over 16.47% (n=14) of the respondents had concurrent BID and disordered eating. A few previous researches also supported

our findings in which there was an association between body dissatisfaction and disordered eating (Hepp& Milos 2002; Silverstein et al. 1990; Vocks et al. 2009; Winston et al. 2004).

In studying the relationship between BID and the psychosocial factors, we discovered that psychosocial factors, anxiety, depression and stress were shown to be positively related to BID. This finding was further supported by other previous researches (Kostanski&Gullone 1998).Not only did we find positive relation between BID and psychosocial factors, it was also revealed that these three aspects of psychosocial factors are highly correlated with BID among Malaysian gifted students.

Our research also discovered that there was a relation between body mass index and BID among these gifted students. Kostanski et al. (1998) also showed that body mass index was found to be significantly related with body image dissatisfaction in their study. Higher BMI was associated with greater body dissatisfaction as well as the perception of being physically unhealthy (Newman et al. 2006). Our findings were also supported by a previous study which concluded that within the at-risk group, adolescents with body dissatisfaction had higher BMI, consumed fewer calories, were more influenced by socio-cultural factors and had more emotional issues than those who were satisfied with their body (Babio et al. 2008).

As alarming as it was to discover that our gifted students' population was highly dissatisfied with their body image, preventive and curative measures should be promptly taken into action to curb this disastrous phenomena. These gifted students should be approached tactfully via campaigns and programmes to inculcate self-love and to boost their self-esteem. Their skewed body image perception should be addressed by professionals and the distorted mental images corrected. Mass media could play a pivotal role in disseminating healthy body image perception and not indoctrinating the minds of adolescents with the wrong perceptions of ideal body image to be thin, skinny females and broad chested males. Multilevel involvement of governmental bodies as well as non-governmental organizations (NGOs) with a shared purpose to combat BID would prove to be beneficial in addressing this worrying BID phenomenon among Malaysian adolescents.

It is important to consider the limitations of present study when interpreting these findings. In this study, only the participants from the PERMATApintar® National Gifted Center were selected, so it may not be representative of the whole gifted students' population in Malaysia. In future studies, we hope to conduct multi-centered cross-sectional study involving a larger scale respondent such as students from boarding schools as well as normal daily school students. By widening our population sample across different types of schools as well as various levels of students' intelligence, it is hoped that the results would yield a better finding in terms of BID and its correlation with socio-demographic data, eating disorder, psychosocial factors and BMI among Malaysian students irrespective of school types and intelligence. Another aspect of our study which may be improved is the participants' weight and height self-reporting. Given additional time and added resources, direct anthropometric measurements of height and weight of the respondents could be carried out and BMI could be more reliably calculated based on this direct measurement of each respondent. This approach is predicted to help improve the accuracy of the finding as previous studies (e.g. Engstrom et al. 2003; Spencer et al. 2002) showed that findings based on self-reported height and weight may be biased as these adults tend to overestimate their height and underestimate their weight, thus compromising on reports reliability.

CONCLUSION

Body image dissatisfaction was found high among Malaysian gifted students and it was found to be associated with disordered eating and other psychological problems. Preventive strategies to promote healthy body image perception are important to curb disordered eating and its related psychological and physical complications.

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THE SOCIAL, EMOTIONAL, AND ACADEMIC ADJUSTMENT OF PERMATAPINTAR™ HIGH SCHOOL PROGRAMME

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ABSTRACT

Emotional, Social and Academic is the main component of adjustment for a student to get along well in the high school. This research reports three main objectives which are the correlation between emotional, social and academic adjustment, the predictive value of academic adjustment through their social and emotional adjustment and lastly the significant difference of adjustment between male and female. The research was conducted by distributing Student Adaptation towards College Questionnaire (SACQ) (Baker &Siryk 1989). The questionnaire was distributed among the first year students of PERMATApintar. Participants included 91 of the students, 44 of them are boys and 47 girls. This questionnaire consists of 25 items to which students respond using a 5-point scale by applying the strongly agree and strongly disagree. The data was analysed using descriptive statistics (mean) using SPSS software (version 21). The finding showed that there is a major correlation between social, emotional and academic adjustment. Then, the student's academic adjustment can be predicted from their social and emotional adjustment. Lastly, there was a significant difference between boys and girls in emotional adjustment except for the academic and social adjustment. The finding of this study will help to plan a better program for boys and girls because they need different way of program to help them fit wellto the adjustment. In order to develop a gifted student, all the adjustment must be well-balanced.

KEYWORD: social adjustment; emotional adjustment; academic adjustment; gifted student.

INTRODUCTION

PERMATApintar™ is the first Gifted and Talented Centre in Malaysia. It is one of its kind and still new in a developing country like Malaysia. Established in 2011, PERMATApintar™ National Gifted Centre has grown as a conducive place for gifted students. In order to develop virtuous gifted students, they must have a well-balanced social, emotional, and academic adjustment. A gifted student should have a balanced adjustment in all of the elements. Findings of this study will help to improve the students to adjust themselves and also improve the quality of surrounding to adapt to the needs of the students in PERMATApintar™. The research findings will help to plan the suitable programmes for the students. This helps in achieving the vision in developing students with high IQ and EQ. In addition the students come from different types of background, and also take time to adjust to the new situation. This will help them to feel comfortable and able to get along with the programme.

LITERATURE REVIEW

Many researches have been conductedabout adjustment especially on the relation between social, emotional and academic adjustment, and the first year students. Colangelo, Assouline, &Gross (2004),

highlighted that academic accelerants may bring bad effect to the social-emotional adjustment of gifted student.

Other research findings showed that the predictive value of academic adjustment can be linked to the students' social and emotional adjustment (Salovey & Sluyter 1997). Parker et al.(2004) found that various Emotional Intelligence(EI) dimensions were predictors of academic success. Moon(2002, 2004) also stated that social-emotional development problem may lead to adjustment difficulties among gifted students. The social, emotional and academic adjustments are mutually related to each other. Students who are well-adjusted to college life have a lower score on neuroticism, a higher score on extraversion and a higher score on perceived social support than those students who are poorly adjusted.

METHODOLOGY

Design

The research was conducted by using quantitative approaches where Student Adaptation to College Questionnaire (SACQ) by Baker and Siryk (1984) was used. The research was conducted by distributing the slightly modified questionnaires to measure the adjustment towardshigh school. The questionnaire is rated with 5-point scale by using the rate from strongly disagree to strongly agree. The sum of scores for the items (the full scale score) provides an index of overall adjustment.

Participants

The questionnaires were distributed only for the level 1 PERMATApintar™ High School Programme since they were new to the environment. There was no exclusion criteria fixed in this study since they have the same thing in common where they are new to the surrounding and just start to adapt to the situation. From 125 of the total numbers of students in level 1, 91 of them took part in the study. 44 of them were male and 47 of them were female.

Procedure

Permission to conduct this study was requested from the Director of Pusat PERMATApintar Negara™. The questionnaires were distributed to the participants in a one questionnaire answering session. Each of the respondents was given 30 minutes time to complete the questionnaire.

Data Analysis

The data were analysed by using the Statistical Packages for Social Science (SPSS) version 21. The data were analysed through correlation, linear regression and independence sample T test.

Table 1 Linear regression analysis

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.036	2	.518	4.094	.020[b]
	Residual	11.138	88	.127		
	Total	12.174	90			
a. Dependent Variable: Academic						
b. Predictors: (Constant), Emotional, Social						

RESULTS AND DISCUSSION

From the research, the results were shown in the table below.

Table 2 Correlation analysis

		Social	Academic	Emotional
Social	Pearson Correlation	1	.209*	.022
	Sig. (2-tailed)		.047	.839
	N	91	91	91
Academic	Pearson Correlation	.209*	1	.209*
	Sig. (2-tailed)	.047		.047
	N	91	91	91
Emotional	Pearson Correlation	.022	.209*	1
	Sig. (2-tailed)	.839	.047	
	N	91	91	91

*. Correlation is significant at the 0.05 level (2-tailed).

Table 1 shows the correlation analysis for all adjustments. Totally, the whole results shows that all the correlation is ($p < 0.5$). It can be concluded that all of the adjustment are related.

Table 3 Linear regression analysis

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.292[a]	.085	.064	.35576
a. Predictors: (Constant), Emotional, Social				

Through the linear regression analysis, it shows that the result is ($p < 0.05$). By using academic adjustment as the dependence variable and the emotional and social adjustment as the independence variable, it shows that both social and emotional adjustment can predict the value of academic adjustment.

Table 4 Group statistics

Elements	Gender	N	Mean	Std. Deviation	Std. Error Mean
Social	Male	44	3.5065	.52508	.07916
	Female	47	3.5258	.52709	.07688
Academic	Male	44	3.1894	.30928	.04663
	Female	47	3.3239	.40781	.05948
Emotional	Male	44	3.1237	.44199	.06663
	Female	47	3.3924	.41629	.06072

From the final analysis, independent sample T Test shows that academic and social adjustment result is ($p > 0.05$) .This shows that there are no significant difference between male and female. But the result is slightly different in emotional adjustment which is ($p < 0.05$).

The association between academic adjustment and these emotional and social competencies is not surprising, given the type of issues involved in the transition to high school. First-year students are confronted with a variety of new personal and interpersonal challenges. Along with the need to make new relationships (especially if the student attends a school or college outside of their hometown), they must also modify existing relationships with parents and friends (e.g. learn to be more independent). They also need to learn study habits for a relatively new academic environment (one that typically involves more independence than was experienced in high school).

Based on the findings, it shows that there is a correlation between the social, emotional and academic adjustments as the statistical analysis presents a value below than 0.5. Pearson product-moment correlation coefficient shows that social, emotional and academic adjustments are associated with each other and mutually related. Thus they can indicate a predictive relationship that can be exploited hypothetically.

Table 5 Independent sample T test analysis

Var	F Value	Sig	T Value	df	Sig. (2-tailed)
Social	.003	.957	-.175	89	.861
Academic	3.934	.050	-1.763	89	.081
Emotional	.010	.921	-2.986	89	.004

The predictive value of academic adjustment of the first year students in PERMATApintar™ Educational Programme can be seen through the social and emotional adjustment. Szulecka, Springett, and de Pauw (1987) have suggested that the major causes of attrition in first-year students are emotional rather than academic factors. Furthermore, Leafgran (1989) has suggested that students who are emotionally and socially healthy have a greater chance to succeed in the college. However, little research has addressed the relationship of high school student's emotional and social well-being to academic success. Well here it means that the student's academic adjustment can be predicted based on the observation of their social and emotional adjustments to the college. A well-adjusted student should have a balanced adjustment for the three components.

There is a significant difference between the way of adjustments for a male student and a female student in PERMATApintar™ Educational Programme from the emotional adjustment component. The value of significant difference revealed ($p < 0.005$) for emotional adjustment and ($p > 0.005$) for social and academic adjustment. This shows that male and female students have a kind of same way in adjusted themselves for social and academic but not in emotional. We can assume that the emotional adjustment of the male student is better than the female students. Thus, further study is needed to confirm the validity and causes.

In a longitudinal study examining the transition from high school to university, Parker et al. (2004) also found that various emotional intelligence dimensions were predictors of academic success. Hence, this significant different of emotional adjustment should be put in attention as it might affect the academic success of the student.

By examined the adjustments of students in PERMATApintar™ Educational Programme, improvisation can be carried out in specific ways in order to make the students fit in the new community according to their own level of adjustments.

CONCLUSION

From this research, it is prove that social, emotional and academic adjustment is related to each other. In order to develop a well-adjusted gifted student, all of the adjustment must be develop equally. It is also found that social and emotional adjustment can predict the academic adjustment of a student. To have well academic adjustment, they must have pay attention to their social and emotional adjustment because it's affluence their academic adjustment. Lastly, definitely boys and girls are not same in their way of adjustment in emotional. The reasons are not specified but maybe can be think logically. But they have no major significant in their social and academic adjustment.

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THE EFFECTS OF STATIC AND DYNAMIC STRETCHING ON EXPLOSIVE POWER, AGILITY, FLEXIBILITY AND SPRINT

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ABSTRACT

Stretching is an important component in sport activities. Most people think stretching improves their performances and prevent injuries even though studies have shown otherwise. Thus, the aim of this study was to investigate the effects of static and dynamic stretching on explosive power, agility, flexibility and sprint. Twenty one adolescent boys and girls volunteered and were clustered as active based on Rapid Assessment on Physical Activity (RAPA) test. The subjects went 3 alternate testing days for the three types of stretching, and the muscles group being stretched included plantar flexor, hip extensors, hamstrings, hip flexors and quadriceps femoris. A set of 20 seconds stretch were done on each muscle group for static and dynamic stretching; no stretching were performed on no stretching test day. A 5-minutes warm-up was done before every stretching procedure started. For explosive power (jump and reach) and T agility test, dynamic stretching shows a significant higher means but it impairs sprinting ability. On the other hand, static stretching improves flexibility performances on sit and reach test. For sprinting ability, stretching decrease the sprint performances. Therefore, it can be concluded that dynamic stretching is beneficial for jumping and agility as predicted and static stretching is suitable for flexibility. Sprinting is at its best when muscles are warm-up but not necessarily stretch. This contradiction however results for sprinting to warrant further investigation.

KEYWORDS: static and dynamic stretching; agility; flexibility; jump and reach; sprint.

INTRODUCTION

Normally, one will warm-up with some calisthenics activities before starting any physical activities. Those warm-up who followed by stretching is believe to prevent injuries and enhance performance. However, studies shows otherwise, depending on the type of warm-up and stretching performed. Generally, sports activities required a good agility, enough explosive power, a high flexibility and a fast sprint. Those skills could lead to a victory in a game if it is performed with full passion, not forgetting the stretching prior to the activities. They are two types of stretching procedure that commonly known and use in warm-up routine, namely static and dynamic. Static stretching is the process where stretching and holding the muscles for a while before releasing it back. This action results in lengthening the muscles while stretching. Some studies agree that static stretching could improve flexibility performances (Bacarau, Paradisis & Morton 2009). Dynamic on the other hand, is a type of stretching with a low intensity movement which prepares the muscles to every types of possible movement as dynamic stretching increase the range of motion. Many studies recommend dynamic stretching as the best stretching procedure for all types of activities (Sim, Mcmillan & Yamaguchi 2009). However, the priority of warm-up should not be replaced by stretching.

There are many types of sports performances that vary in every game. Most of the games need a good explosive power, agility, flexibility and sprinting ability. The appropriate warm-up and stretching routine prior to these performances needed to produces the best results.

METHODOLOGY

Design

This research is an experimental research. Permission was obtained from the Sports Centre as the study was held at the stadium of National University of Malaysia. Participants were informed of the tests and procedures. The tests were held on three alternate days, but at the same time. The Rapid Assessment of Physical Activity test was done to classify the students according to their level of activeness. Only the active students were taken to become the participants of the study.

For performance test, four types of testing were done to test for explosive power, agility, flexibility and sprint. For explosive power, the jump and reach test was done while T Drill for agility test. The sit and reach box was used to test for flexibility and 20 meter for sprinting.

Participants

This study involved 21 PERMATApintar students as sample. There were 18 males (age, 16 ± 1 year; height, 164 ± 5 cm; weight, 57 ± 8 kg) and 3 females (age, 17 years; height, 158 ± 6 cm; weight, 47 ± 3 kg). The participants were the active students based on the Rapid Assessment Physical Activity test. The participants were free from lower limb injuries (i.e., ankle or knee injuries). The participants were familiarized with all the static and dynamic stretching methods as well as the performance tests on a dry run session. No participant were injured during this study was conducted.

Procedure

The volunteers among the students for the study completed the RAPA survey test. From the results, the active students were clustered to become the participants for the study. The first session was the familiarization session during the dry run session and the participants signed an informed consent document. The participants received instruction about the stretching and the tests procedure. For all testing days, all the participants were asked to do a self-paced 5-min jog as a general warm-up for all testing day. On the first day, was the controlled day with no stretching procedure was done. After the participants completed the warm-up, they were asked to sit still for 10 minutes. They performed the four tests right after that. There was also 1 minute rest between tests. On the next test days, the participants performed their warm-up procedure and rest for a minute. They performed the static stretching procedure on the second day and dynamic stretching on the third day. They stretched their plantar flexors, hip extensors, hamstrings, hip flexors and quadriceps femoris. For static stretching, the participants stretched the target muscles for 20 seconds, with 5 seconds rest between each muscle. Dynamic stretching on the other hand, 2 seconds for each muscle with 10 times repetition.

Performance Tests

Jump and Reach

The participants were asked to reach out their hand straight. Their middle finger was coloured to mark the point. They jump as high as possible and mark the highest point they could reach. The jump was cancelled if the participants make more than one arm swing and knee flex less than 90^{o}. The measurement was taken by subtracting the highest point jump to the original high of the participants. The measurement indicated the explosive power for jumping that the participants could perform.

T Agility Test

The T Drill agility test was selected as measurement tool because the dynamic nature of athletic events. These athletic events involve elements of speed, change in direction and varying types of movement. The T agility test was carried out as followed: the participant stands at cone A and sprints 10 m to cone B and touches the cone with right hand. Then, the participants shuffle 5 m to cone C and touches the cone with left hand, then shuffling back to the right to cone D, touching the cone with their right hand. After shuffling back to cone B and touches with their left hand, the participants back-peddled to cone A, and the time was stopped. The time was started when the participants make their first move. A diagram of T agility test is shown in Figure 1.

Sit and Reach

The equipment used in sit and reach test is the sit and reach box to test their flexibility. The participants were asked to take off their shoe before performing the test. They were seated on the floor with knees fully extended and ankles flexes against the box, flat. The participants leaned forward slowly as far as possible toward a graduated ruler held on the box, without bending the knees and holding the greatest stretch for 2 seconds. Their hand should be overlap.

Sprint

The participants performed a 20 m straight sprint for sprint test. The time was started when the participants make the first move out for sprint.

DATA ANALYSIS

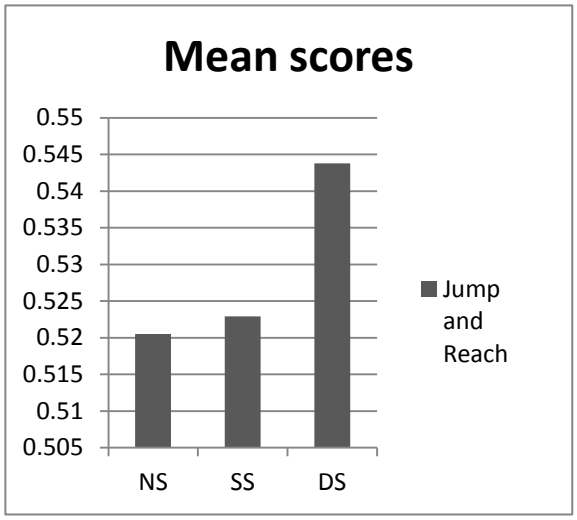
Data analysis on finding the means for the scores was done by IBM SPSS 20 and Microsoft Excel 2010.

RESULTS

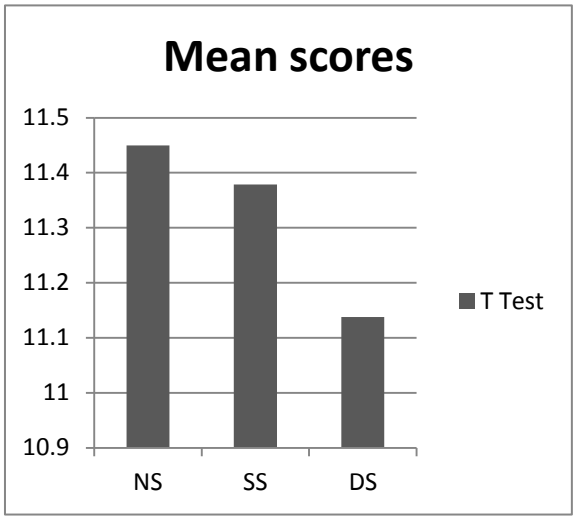
The results were taken from the means of the scores to compare the highest scores among the two type of stretching with the controlled. A summary of the results is shown in table and graph. For jump and reach and T agility test, dynamic stretching shows the highest mean scores and the fastest time taken compared to static and no stretch (DS = 0.5438). Static stretching shows the highest mean for flexibility (SS=36.1810), while sprinting is at its best when muscles are not stretch (NS=3.0448) where it shows the fastest time taken compared to stretching.

Table 1 : Means Scores

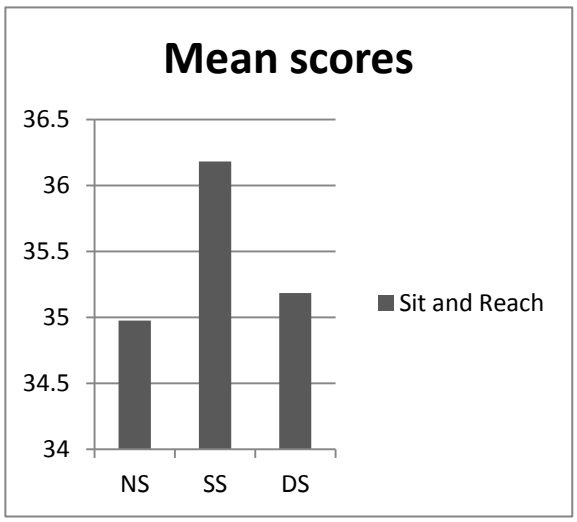
Tests	No Stretching	Static Stretching	Dynamic Stretching
Jump and Reach	0.5205	0.5229	0.5438
T Test	11.4495	11.379	11.1381
Sit and Reach	34.9762	36.181	35.1857
Sprint	3.0448	3.1562	3.1605

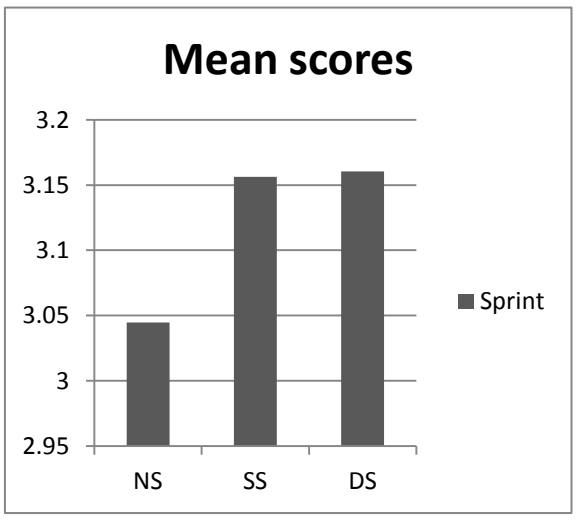


Graph 1 Mean scores for Jump and Reach tests



Graph 2 Mean scores for T Agility Test





The graphs show the mean scores for the performances tests by different types of stretching. Referring to graph 1, dynamic stretching has the highest mean scores compared to static and no stretching. For graph 2, T agility test works the best when dynamic stretching is applied. It records the fastest time taken to complete the tests compared to static and no stretching. Graph 3 shows the results for sit and reach. Static stretching shows the highest mean scores which is the furthest reach the participants could perform than dynamic and no stretching. The results for sprint test is showed in

Graph 4 where no stretching records the fastest time taken to complete the 20 meter sprint compared to static and dynamic stretching.

DISCUSSION

Explosive power, agility, flexibility and sprint are common movement to be used in many sporting activities. For the best results in games, players need to have speed and ability to against body weight. It needs a lot training and appropriate warm-up to prepare for the activities. Because of the risks of injury, exercise professional and coach should prepare the right warm-up and stretching procedure. The purpose of this study is to compare the effects of static and dynamic stretching on explosive power, agility, flexibility and sprint. In previous study it has been recommended to use dynamic stretching as the primary method of stretching together with warm-up prior to activities. (Little & William 2006).

Jump and Reach

The results for jump and reach revealed that static stretching slightly reduces jump performances compared to dynamic stretching which support previous studies (Hough, Ross & Howatson 2003). Some studies, on the other hand, reported no changes on jumping performances (Koch, Bryant, Stone, Sanborn, Proulx, Hruby, Shannonhouse, Boros, & Stone 2004) which may be due to different stretching procedure. Apart from lower body parts, upper body also plays an important role for making a jump. The variety of the results may due to the different stretching procedure. The age and types of sample could also be the cause.

T Agility Test

Warm-up and dynamic stretching prior to agility test produces the fastest time taken, as recommended by (Nelson, Driscoll, Landin, Young & Schexnayder 2004). Static stretching is shown to have negative effects on agility performances, which agrees (Unick, Scott, Cheeseman & Feeney 2005) who found static stretching diluted the effectiveness of general warm-up. During agility movement, muscles experiences stretch-shortening cycle where the series elastic component lengthens, and stores elastic energy. The stored elastic energy is to be used during concentric phase where it springs back to its original position. When performing static stretching, the series elastic component is already lengthened, which may hinder preactivation, reducing the ability to store energy, make it less agile (Shorten 1987).

Sit and Reach

As for flexibility, static stretching showed better results than dynamic stretching. Studies agree with this result (Bacarau, Monteiro, Ugrinowitsch, Tricoli, Cabral, & Aoki 2009). The greater increases in flexibility following static stretching maybe because of increased tendon elasticity and a decreased muscles viscosity, which produces a decreased passive joint torque (Keitaro Kubo, Hiroaki Kanehisa, Yasuo Kawakami, & Tetsuo Fukunaga 2000).

Sprint

Previous studies had shown that dynamic stretching is the best for sprinting. (Fletcher 2007; Kistler, 2012; Amiri 2010; Winchester 2008) However, this study revealed the opposite results when stretching do not improve performances. The time taken for sprint on the control day is faster than with stretching. This contradiction may due to several factors such as the age of the sample, the time taker, etc.

Confounding Variables

The difference results from this studies compared to others may be due to several variables that leads to this situation such as first, the participants were not trained athletes-the participants for this study is the students of PERMATApintar National gifted Centre age 15 to 17 years old. They were active as an adolescent but not as an trained athlete. Their muscles and body metabolisms are still developing. The selection of participants should be precise. Secondly, the invigilators were different during taking the reading for the test for the tests. The invigilators should be the same person and know how to read the reading correctly. Third, every test should be done three times and takes the average reading as the score.

CONCLUSION

Generally, the efficacy of stretching depends on the types of activities. Dynamic stretching is best for explosive movement and agility, while static stretching produces a better result for flexibility. Even though sprinting is at its best when the muscles are not stretch, it is a question how does it happen. This could be attributed to the warm-up procedure that being done before the stretching procedure started. It is clear that warm-up prior to activities is much important than stretching alone.

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APPENDIX A

STRETCHING PROCEDURE

TABLE 1. The procedures for static stretching of target muscles.

Plantar flexors The experimenter dorsiflexed the ankle joint of the subject while the subject remained in the supine position with knee fully extended.	
Hip extensors The experimenter flexed the hip joint of the subject while the subject remained in the supine position with knee fully flexed.	
Hamstrings The experimenter flexed the hip joint of the subject while the subject remained in the supine position with knee fully extended.	
Hip flexors The experimentor lifted up the knee of the subject while the subject remained in the prone position with knee lightly flexed so that the hip joint was extended.	
Quadriceps femoris The experimentor fully flexed the knee joint of the subject in the prone position until the subject's heel touched his buttock, and then the knee was lifted up so that the hip joint was extended.	

Table 2. The procedures for dynamic stretching of target muscles.

Plantar flexors First, the subject raised one foot from the floor and fully extended the knee. Then, the subject contracted his dorsiflexors intentionally and dorsiflexed his ankle joint so that his toe was pointing upward.	
Hip extensors The subject contracted hip flexors intentionally with knee flexed and flexed his hip joint so that his thigh came up to his chest.	
Hamstrings The subject contracted the hip flexors intentionally with knee extended and flexed his hip joint so that his leg was swung up to the anterior aspect of his body.	
Hip flexors First, the subject raised a foot from the floor and lightly flexed his hip joint with the knee lightly flexed. The subject then contracted his hip extensors intentionally and extended his hip and knee joints so that his leg was extended to the posterior aspect of his body.	
Quadriceps femoris The subject contracted his hamstrings intentionally and flexed his knee joint so that his heel touched his buttock.	

THE TRANSFER OF IDIOMS FROM ENGLISH TO MALAY: THE CASE OF LOST IN TRANSLATION

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ABSTRACT

Having mastered many languages at any one time does not necessarily mean that a person has an ability to easily translate from one language to another. Due to this incapability, most people resort to direct translation, which in a way can demolish the real meaning of any respective language. This research aims to train students to be able to think in both English and Malay, and to ensure that they do not direct translate between these two languages. To carry out this research, questionnaires were distributed to 50 Level II students in PERMATApintar™ National Gifted Centre. Each set of the questionnaire consists of 20 English idioms. The students were required to give the meanings and also the equivalent Malay idioms stated in the questionnaires. The results in this study showed that 67.6% of the students understood the meanings of the English idioms but only 61.2% of them were able to deliver equilibrate translation. By analysing the questionnaires, it determines the capability of the students to think in both English and Malay and perform translation precisely. Students are supposed to be able to train themselves not to translate literally while thinking in both languages.

KEYWORDS: idioms; literal; translation; demolish; language

INTRODUCTION

Knowing how to speak many languages is not the same thing as knowing how to translate. Translation is a special skill that professionals work hard to develop. Literal translation or directed translation is the rendering of text from one language to another rather than conveying the sense of the original. When considered a bad practice of conveying word by word translation on non-technical type, literal translation has the meaning of mistranslating idioms. For example, in the concept of translating an analytic language to a synthetic language, it renders even the grammar unintelligible.

A literal translation may communicate the wrong meaning. Anyone relying on a translation has to be aware of this most common pitfall among translators. But how does one avoid the dangers of literal translations and overcome the problem of losing crucial messages in translation? The answer lies in the range of multifaceted skills a professional translator has. Having expert knowledge of a language is only just the foundation of a translator's job; translation is really about the ability to communicate meaning in spite of differences that may exist between languages. Ideally, language skills are complemented by other essential skills involving a target language: cultural or historical awareness of the community of speakers, mastery of the language's grammatical and linguistic rules, knowing how to use and where to find reference material, literacy in online research and last but not

least, courage to use creativity in language. After all, languages are alive and incessantly evolving, just as its speakers.

LITERATURE REVIEW

When China opened the doors of trade and tourism to the world community, it is trying to help foreign visitors, including businessmen and tourists in facilitating their visit to the country.Among the approaches taken to look friendlier to foreign visitors, is to provide signboards in English as well as in Chinese. However, English used in the signboardsseems funny and sometimes embarrassing.

Collections of some funny signboards were posted on the website of China, *Offbeat China*. In some cases, the incident took place because of the translation of the Chinese characters in making the signboards. Thus, *Offbeat China* proposes translators to be involved in the provision of signage.

This is because the error could embarrass China into the world's major economic powers. Even so, most of the visitors reported feeling comforted by the signboards. They assume the signboards are funny and entertaining.

METHODOLOGY

Reading Newspaper Article

While I was reading a newspaper article regarding the cast of lost in translation of signboards in China (refer to page 5, *Pancawarna*, *BeritaHarian*, dated 26th May 2013), I got the idea on how to conduct this research. Though it was funny at first, but I learned that it is not easy to translate from one language to another. I pursued my research in studying on the transfer of idioms from English to Malay: the case of lost in translation.

Searching Equivalent English and Malay Idioms

I sat down with my co-supervisor who is also my English instructor, Afifah Mohamad Radzi, to find idioms both in English and Malay which have the same meanings. We took hours and hours in searching and translating those idioms. We used the books entitled ‘English Idioms & How to Use them’ by Steven Bratman and ‘*Peribahasa WATAFA (WajibTahudanFaham)*’ by ZanariahAbdol.

Distributing Questionnaires

Questionnaires were distributed to 50 Level II students in PERMATApintar™ National Gifted Centre. Each set of the questionnaire consists of 20 English idioms. The students were required to give the meanings and also equivalent Malay idioms based on the English idioms stated in the questionnaires.

RESULTS

Table 1 The Percentage of the Ability of Understanding and Translating Idioms according to Gender

Male		Female	
Ability of giving correct meanings of English idioms	Ability of delivering equilibrate Malay idioms	Ability of giving correct meanings of English idioms	Ability of delivering equilibrate Malay idioms
31.8%	26.2%	35.8%	35%

Table 2 The Ranking of Difficulties in Understanding and Translating Idioms from English to Malay

Ranking of difficulties	English idioms	Ability of giving correct meanings of English idioms	Ability of delivering equilibrate Malay idioms	Ability of understanding and capability of translating idioms	Malay idioms
Easy	united we stand, divided we fall	76%	88%	88.76%	Bersatu teguh, bercerai roboh
	killing two birds with one stone	62%	62%	62.62%	Sambil menyelam minum air
	out of the frying pan into the fire	46%	52%	52.46%	Terlepas dari mulut buaya, masuk ke dalam mulut harimau
					Sudah jatuh ditimpa tangga
	a snake in the grass	48%	50%	50.48%	Api dalam sekam
					Duri dalam daging
					Gunting dalam lipatan
					Musuh dalam selimut
Moderate	blood is thicker than water	50%	48%	48.50%	air dicincang tidak akan putus
	there's no smoke without fire	50%	46%	46.50%	Jikalau tiada angin, masakan pokok bergoyang
	the pen is mightier than the sword	36%	36%	36.36%	kata-kata lebih tajam daripada pedang

	don't let the cat out of the bag	42%	34%	34.42%	Biar pecah di perut, jangan pecah di mulut
	a penny saved is a penny earned	34%	32%	32.34%	sikit-sikit lama-lama jadi bukit
	to sell like hot cakes	42%	28%	28.42%	Seperti pisang goring panas
	walls have ears	40%	24%	24.40%	Cakap siang pandang-pandang, cakap malamd engar-dengar
	a chip of the old block	20%	24%	24.20%	Bapa borek, anak rintik
					Bagaimana acuan, begitulah kuihnya
					Kemana tumpahnya kuah kalau tidak kenasi
Difficult	a bird in the hand is worth two in the bush	26%	16%	16.26%	yang dikejar tak dapat, yang dikendong berciciran
	it takes two to tango	14%	16%	16.14%	Bertepuk sebelah tangan tidak akan berbunyi
	to cast pearls before swine	14%	14%	14.14%	Bagai sikudung mendapat cincin
					Seperti kera mendapat bunga
	through thick and thin	36%	12%	12.36%	Bukit sama didaki, lurah sama dituruni
					Berat sama dipikul, ringan sama dijinjing
	wet behind the ears	12%	12%	12.12%	Setahun jagung
					Darah baru setampuk pinang
	a windfall	8%	10%	10.08%	durian runtuh
	between the devil and the deep blue sea	14%	8%	8.14%	Ditelan mati emak, diluah mati bapa

	to steal someone's thunder	8%	0%	0.08%	Lembu punya susu, sapi dapat nama

DISCUSSION

The results in this study showed that 67.6% of the students understood the meanings of the English idioms but only 61.2% of them were able to deliver equilibrate translation. By analysing the questionnaires, it determines the capability of the students to think in both English and Malay and translate them precisely. Students are supposed to be able to train themselves not to translate literally while thinking in both languages.

The ranking of difficulties in understanding and translating idioms from English to Malay. The study showed that among the easier idioms to be translated were united we stand, divided we fall, killing two birds with one stone, out of the frying pan into the fire and a snake in the grass. Meanwhile, the moderate difficulty levels of idioms translations were blood is thicker than water, there's no smoke without fire, the pen is mightier than the sword, don't let the cat out of the bag, a penny saved is a penny earned, to sell like hot cakes, walls have ears and a chip of the old block. Finally the most difficult idioms to be translated were a bird in the hand is worth two in the bush, it takes two to tango, to cast pearls before swine, through thick and thin, wet behind the ears, windfall, between the devil and the deep blue sea and to steal someone's thunder.

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SIESTA OR MIDDAY NAPPING: EFFECTS ON STUDENTS' THINKING SKILLS

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ABSTRACT

This research focuses on the siesta or in other words, midday napping. The main objective of this research was to prove the miscellaneous benefits of siesta, which was believed to increase students' thinking skills especially in Mathematics. This research involved 35 students to prove whether siesta or midday napping does improve their thinking skill or not. Four different tests were administered on each of the students. We also want to prove one of the Sunnahs of our beloved Prophet Muhammad. Sunnah is defined as the honorable and beneficial things which the Prophet practices in his daily routines. In our research, we tested the effects of taking a short nap before the afternoon prayers, Zuhur, which is before 2 p.m. Hence, the students were required to take a nap before Zuhur for around 15-20 minutes, before participating in sports later in the evening and doing mathematics exercises at night. The time taken for them to answer the questions given for each section were recorded to observe their thinking skills. Data gathered are presented in table and graphical forms.

INTRODUCTION

A siesta is a short nap taken in the early afternoon, often after the midday meal. Older, pre-teenage children are usually capable of napping, but others acquire the ability to nap as teenagers as well. The timing of sleep in humans depends on the balance between homeostatic sleep propensity, which is the need for sleep as a function of the amount of time elapsed since the last adequate sleep episode, and circadian rhythms which determine the ideal timing of a correctly structured and restorative sleep episode. The homeostatic pressure to sleep starts to grow upon wakening. The circadian signal for wakefulness starts building in the (late) afternoon. As Harvard professor of sleep medicine Czeisler notes, "The circadian system is set up in a beautiful way to override the homeostatic drive for sleep."

Thus, in many people, there is a dip when the drive for sleep has been building up for hours and the drive for wakefulness has not yet started. This is, again quoting Czeisler, "a great time for a nap." The drive for wakefulness intensifies through the evening, making it difficult to sleep 2–3 hours before one's usual bedtime when the wake maintenance zone ends. In some individuals, "postprandial dip", a brief drop in blood glucose levels caused by the body's normal insulin response to a heavy meal, may produce drowsiness after the meal that can encourage a nap. However, the appearance of the dip is primarily circadian as it occurs also in the absence of the meal.

Previous research has shown that short daytime naps or siesta improve vigilance and cognitive functions, and are beneficial for memory consolidation. In particular, a nap as short as 10 minutes can improve alertness and performance for 2.5-4 hours. A recent study assessed the health effects of napping in 23,681 healthy Greek adults for an average of about six years. After controlling for potential confounders, the researchers concluded that those who napped at least three times weekly for about half an hour had 37% lower coronary mortality than those who did not nap.

Oston who has written many books writes, “If it was in my control I would close schools, factories etc. and make everyone rest at this time as if this is observed then we would have less ill patients and people would be saved from many illnesses.” The psychologist suggests that sleeping at this time (siesta) refreshes the body, strengthening it and it is saved from many physical and mental illnesses.

Our aim is to improve the knowledge of people on how good or bad napping is to them. Not all people in the world know about the effect of taking a short napduring daylight. Our activity on daylight affect the quality of work in the night. Napping has been found to be both physiologically and psychologically beneficial. Napping or siesta for 20 minutes can help refresh the mind, improve overall alertness, boost mood and increase productivity. The benefitsof siesta may help students achieve good results.Students should be given allocated time to take a nap in the daylight. The Ministry of Education and schools should consider this as a way to produce a better and more quality students. This way may lead to the successful nation in the future.

PROBLEM STATEMENT

In today’s conversation about midday naps, there are a lot of misconceptions about the effectiveness of midday naps or siesta. Some say that midday naps can be disruptive, which is that it might interrupt their bedtime and give adverse impact on the next day. Majority of the students are confused whether napping can contribute to their future or not. Hence, they take a nap in daylight with intention to replace the sleep that they have lost due to study and assignments that they do late in the night.

OBJECTIVES OF RESEARCH

The objectives of our research are to:

1. Discover the pros and cons of napping especially towards high school students based on our research.
2. Find out whether activities during the day affect students’ performance at night.
3. Prove that the Hadith promoting taking short napduring the dayis .
4. Find out the most suitable time for students or even workers to take short nap.

SIGNIFICANCE OF RESEARCH

The significance of this research will be to:

1. Reveal the right time for students or workers to take a nap.
2. Students can find a better way to study and improve their result.
3. People can actually understand how their brain works.

LITERATURE REVIEW

Napping or siesta is a short nap taken in the early afternoon. Siesta is considered a tradition in Spain, and through Spanish influence, of many Hispanic American countries and in the Philippines. Siesta is also common in Italy and it is called *riposo* where museums, churches and shops close during siesta

so that proprietors can go home for a long lunch and perhaps a snooze. *Einhard's Life of Charlemagne* recounts the emperor's summertime siesta: "In summer, after his midday meal, he would eat some fruit and take another drink; then he would remove his shoes and undress completely, just as he did at night, and rest for two or three hours."

Nap-related misconceptions need clarification. Research suggests that both objective and subjective measurements indicate that some mid-day naps are effective recuperative strategies. Before one can understand the benefits of a nap, one must understand the benefits of sleep as a whole. Interruptions can produce some negative effects if the sleep is in the wrong stage of the cycle (Kubo et al., 2010; Miyasita, Fukuda, &Inugami, 1989), but the sleep can still be somewhat helpful even if of poor quality of duration (Signal, Gander, Anderson, Brash, 2009).

Past research that has been done about naps

Naps have been found to be helpful in a number of studies: one study showed that naps were more effective than caffeine (Horne, Anderson, Platten, 2008); another shows that a midday nap after sleep deprivation can improve alertness, remedy sleepiness and increase white blood cell count (Faraut et al., 2011); another study show that a frequently-napping infant has better long-term memory (Hupbach, Gomez, Bootzin, Nadel, 2009); a study of 100 adults aged 60 to 89 showed that two daily naps were healthier than just one (Dautovich, McCrae, Rowe, 2008). The duration of sleep is important to consider when napping. A division can be made between short naps and longer ones. Our research is important as it actually showed whether napping can improve students' performance or not.

Short naps and long naps

Short naps do not allow one to enter deep sleep simply by nature of their duration, but they can still be restful and effective. A study tested naps of five minutes, 10 minutes, 20 minutes, and 30 minutes. The study also tested a no-nap control. It was found that 10-minute naps were the most effective, though all but the five-minute nap were recuperative (Brooks & Lack, 2006). Another study also found 10-minute naps to be beneficial, and found that naps of 30 and 90 seconds were ineffective (Tietzel& Lack, 2002). Both studies suggest that some beneficial biological process occurs in the first 10 minutes of sleep, and though neither is sure about what that process is, both suggest that even short naps can be useful.

METHODOLOGY

Subjects of the study

The subjects of this study comprised PERMATApintar students whose age raged between 15 and 17 years. They voluntarily wished to participate in this study. This study observed a few students from different classesand ranksin this school. Every student was given two opportunities totake short nap and two time to do not sleep during daylight. Each time will be held on different days. The schedule is based on below:

DAY	ACTIVITY
1	Sleep and do some activities in the evening
2	Sleep and do nothing in the evening
3	Do not sleep and do some activities in the evening
4	Do not sleep and do nothing in the evening

Our observation was conducted in four days.

MATERIALS

After conducting the observation, every night, for four days, the students were given a set of Mental Mathematics test to be answered. The question paper consisted of Section A, Section B, Section C and Section D. Section A consists of 8 questions, Section B consists of 7 questions, Section C consists of 10 questions and lastly Section D consists of 5 questions. They were required to answer all the questions in each section one at a time with time intervals between each sections. For each of the section, it was important for all respondents to answer all of the questions as fast as they could. They weregiven an answer sheet to mark the answer.

PROCEDURES

The study was a 3 week study beginning in July 2013. The data collection will be scaffold depending on the data. The test that was given to the student to measure how napping affect their performances at night. Test data were collected immediately after the test was completed.

ANALYSIS

The data collected in our study will be analyzed depending on the type of data collection based on the test given.

RESULTS

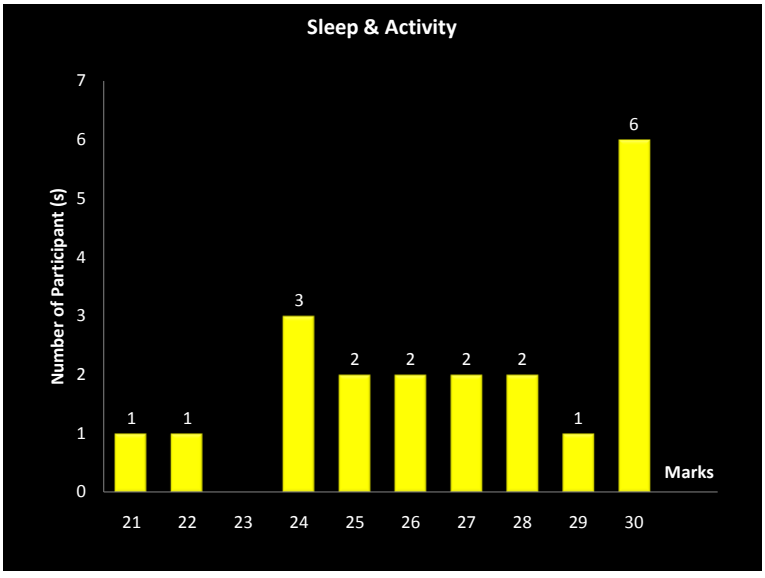

Figure 1.0 Number of subjects involved in the study versus marks obtained in the math test

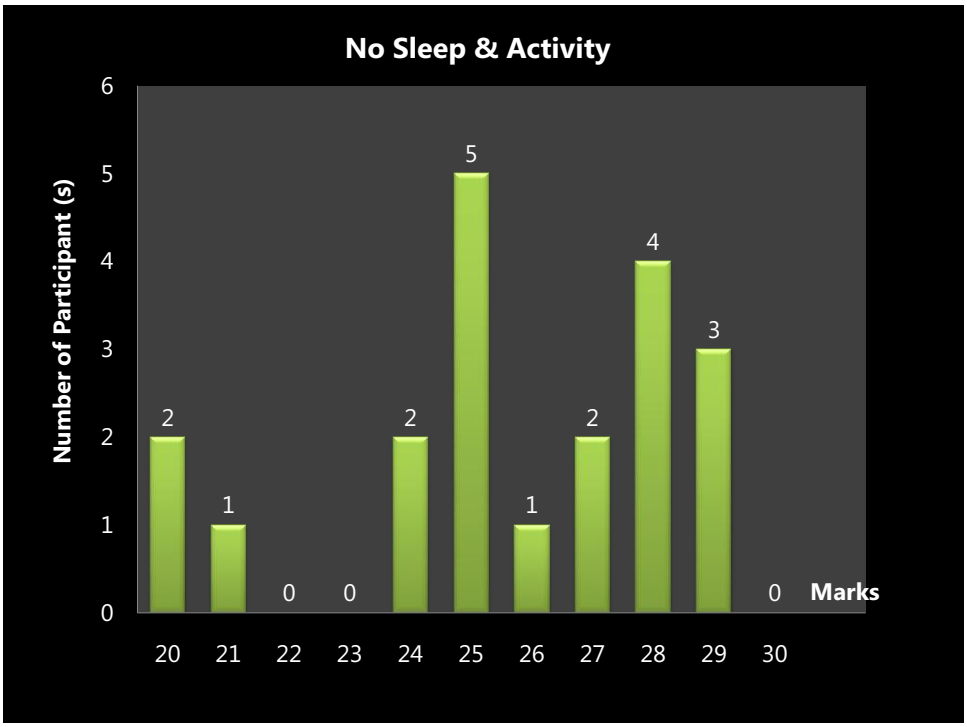

Figure 1.2: Number of participant versus mark

The overall result is like below:

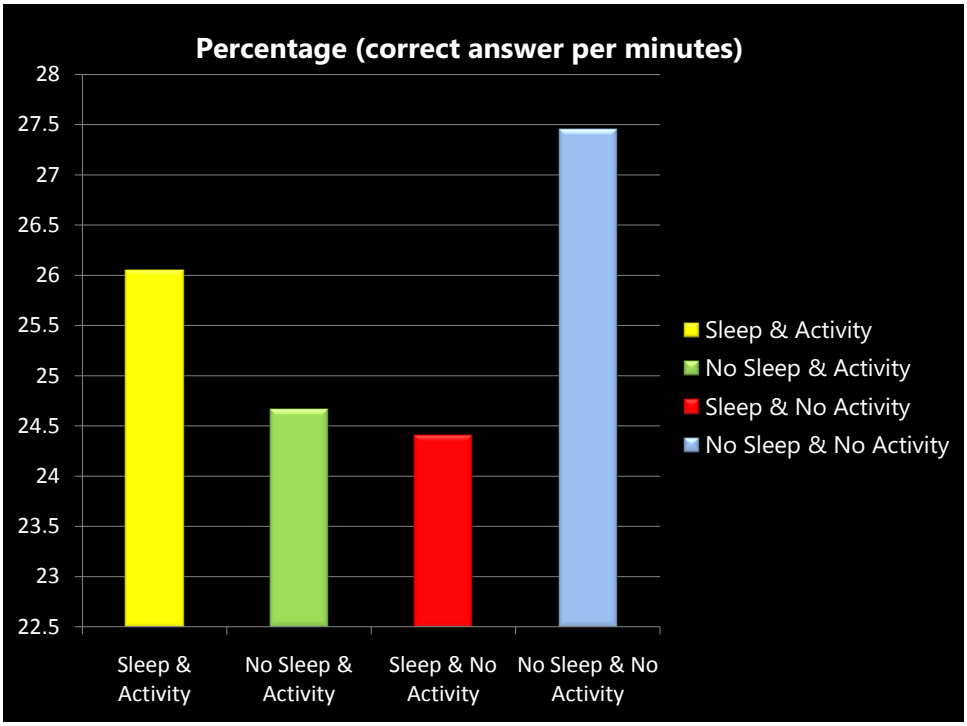

Figure 1.3Percentage against activities

DISCUSSION

Based on the findings of this research, it is found that PERMATApintar students performed better if they do not take short nap and are not involve in any activity during the day. The findings also indicate that the combination of taking short nap and no activity does not contribute to PERMATApintar students performance in the tests. However, the result for this research might be affected by the confounding factor such as the respondents' lifestyle, metabolic rate, stamina and cooperation. Since our respondents were human being, the researchers could not control them for the sake of our research. They were the ones who need to be honest with themselves. Besides, our respondents' consisted of students from various lifestyle and races. Thus, it might be hard for them to adapt to something new immediately. For example, they might already have the habit of sleeping in the evening, and due to our research, they hadto adjust their habit, then it could have affected our results. It can be concluded that the result of this research might be invalid and thus it is suggestedthat future research be carried out in a controlled and uncontrolled environment.

RESULTS

As results, we found that No Sleep and No Activity is much more better for the students of PERMATApintar National Gifted Centre. By the same time it is also actually depend on his or her daily activity.

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FERTILITY AWARENESS AND ATTITUDES TOWARDS PARENTHOOD AMONG MALE AND FEMALE COMMUNITY IN PERMATApintar™ NATIONAL GIFTED CENTRE

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ABSTRACT

Fertility awareness and attitude towards parenthood is very important among the young people because this stage of age is a very sensitive age for their psychological well being and for their future generation. The aim of this study is to investigate gifted community's intentions and attitudes to future parenthood and their awareness regarding male and female fertility. The data was collected by distributing surveys to a randomly selected sample of 100 female and 100 male community of PERMATApintar™ National Gifted Centre. The data was analysed using SPSS software programme by calculating the percentage value. The findings showed that women and men have largely positive attitudes towards parenthood and they want to have children. Women, in comparison to men, were significantly more concerned about problems related to work and children. Both women and men had overly optimistic perceptions of women's chances of becoming pregnant. About half of women intended to have children after age 25 years and were sufficiently aware of the age-related decline of female fecundity in the late 30s. The conclusion was that youngsters need to be awared about fertility and attitudes towards parenthood as it will affect the rate of childbirth in Malaysia. This is because low fertility awareness will increases the risk of involuntary infertility, which is alarming in view of the great importance they put on parenthood.

KEYWORDS: attitudes; fertility; parenthood; gifted student; pregnant

INTRODUCTION

Nowadays, postponing childbirth is becoming increasingly common, especially among groups with higher education qualifications. It is relatively unknown to what extent women and men are aware of the age-related decline in female fertility. Postponing of childbirth until an age at which female reproductive capacity is lower entails risks of involuntary childlessness. Thus, a research was conducted to educate people and to introduce the fertility awareness as well as the attitudes towards parenthood among students and staffs in PERMATApintar™ National Gifted Centre. Besides, this research is conducted to the population needed to achieve an optimum population for Malaysia in the year of 2020 which the mission is to achieve 70 million of people approaching the year 2020. Fertility awareness refers to a set of practices used to determine the fertile and infertile phases of a woman's menstrual cycle. Fertility awareness methods may be used to avoid pregnancy, to achieve pregnant, or as a way to monitor gynaecology health. Methods of identifying infertile days have been known since antiquity, but scientific knowledge gained during the past century has increased the number and variety of methods. In Malaysia, the postponement of childbearing reflects contemporary social norms of delaying marriage, pursing educational goals and securing economic stability prior to attempting conception. Although university students are more likely to delay childbearing, it is

unclear to what extent they are aware of age-related fertility decline. The current study is the first of its kind to assess fertility awareness and parenting attitudes of PERMATApintar Student and Staff. Previous research has suggested that poor fertility-awareness may be a contributing cause of infertility among women seeking fertility assistance at assisted reproductive technology clinics. The actual practices and attitudes towards fertility-awareness in this particular group of women are unknown.

LITERATURE REVIEW

Fertility awareness-based methods have both advantages and disadvantages. Most methods entail no or minimal cost, no drugs or physical devices are required, and medical personnel are not required. No medical contraindications exist. On the other hand, signs and symptoms of the fertile phase may be subtle (Hughes 1988; IPPF 1995). There is a lack of studies concerning women's and men's awareness of fertility issues. In a database search, only two relevant studies were found (Blake, 1997) demonstrated that few women attending a fertility unit had an adequate understanding of when the fertile window occurred in their menstrual cycle (Adashi, 2000). When women and men plan for a pregnancy they include a number of factors in their decision-making process (Morin, 2003). Results indicate that women perceive the age interval 25–34 years suitable for childbearing, and that women (or couples) postpone the birth of their first child until they feel prepared socially and financially to assume the responsibilities of parenting (Rasch, 2001). It has been shown that women with higher education embark on parenthood later in life (Heck, 1997; Statistics Sweden, 2002; Roensen, 2004). The trend of postponing childbirth is becoming increasingly common in Malaysia, especially in groups with higher education. Postponing of childbirth until an age at which female reproductive capacity is lower entails risks of involuntary childlessness. It is at present relatively unknown to what extent young women and men are aware of the probability for women to become pregnant at different ages, and whether fertility awareness is related to timing of childbirth. In addition, men's and women's attitudes towards parenthood are a relatively unexplored territory in Malaysia and abroad.

METHODOLOGY

Participants and Procedure

Demographic data of participants are shown in Table I. Participant age was quite differ significantly from the mean age of the target population. 94.9% of participants were students and the other were staffs and instructors. Eight participants had had children or were currently experiencing a pregnancy (with their partner). There were significant differences between female and male participants regarding demographic variables.

Table 1 Background of respondents

	Male (n = 78)		Female (n = 97)	
	%	n	%	n
Status				
Unmarried	98.7	77	92.8	90
Married	1.3	1	7.2	7
Age				
15 - 17 years	87.2	68	74.2	72

18 - 20 years	10.3	8	18.6	18
21 years & above	2.6	2	7.2	7
Occupation				
Student	97.4	76	92.8	90
Instructor	0	0	6.2	6
Other	2.6	2	1	1
Race				
Malay	84.6	66	86.6	84
Chinese	6.4	5	9.3	9
Indian	5.1	4	3.1	3
Other	3.8	3	1	1
Religion				
Muslim	88.5	69	87.6	85
Other	11.5	9	12.4	12
Reproduction				
Have children	1.3	1	3.1	3
Current pregnancy	0	0	1	1

Instruments

In this research, the collection of the data was distributing the questionnaires to 200 respondents. In these questionnaires, there have 52 items which consist of:

Demographic data (Seven items)

Participants were requested to state their age, race, status, gender, occupation, religion and personal experience of pregnancy (only for those who had married).

Intention to have children (Four items)

The first item was 'Do you plan to have children?' (Yes/No). A positive response was followed by three questions with an open response format: 'How many children do you want?', 'At what age would you like to/did you have your first child?', 'At what age would you like to have your last child?'

Importance of having children (1 items)

'How important is it for you to have children?' Responses were given on a visual analogue scale (VAS) scale with extreme values Unimportant (0) and Extremely important (100).

Conditions of importance for the decision to become a parent (13 items)

Participants were requested to assess the importance of specific circumstances for their decision to have a child (see Table III). The response alternatives were Very Important, Important, Not Sure, Unimportant and Strongly Unimportant.

Women's and men's opinion on the impact of parenthood (16 items)

Respondents were required to assess to what extent they agreed with itmes specifying possible (or experienced) impacts of parenthood (see Table IV). The response alternatives were Strongly Agree, Agree, Not Sure, Disagree and Strongly Disagree.

Awareness of fertility issue (4 items)

Participants were requested to answer questions regarding women's fertility at different ages, couples' chances of achieving a pregnancy, and questions regarding infertility (see Table VI). In the questionnaire, it was emphasized that this was not a test of knowledge and respondents were requested to state what they believed. An open response format was used.

Behavioral intention in case of infertility (7 items)

In response to the question 'What would you do if you and your partner could not get pregnant?' participants were requested to assess the likelihood of their undergoing IVF, adopting, or choosing not to have children. Responses were given on a VAS scale with extreme values Entirely unlikely (0) and Highly likely (100).

After distributing the questionnaires, 15 minutes were given to them to answer the questionnaires. Then, the questionnaires were collected and analysed using SPSS software. Before that, 25 of the questionnaires (2.5%) were eliminated because of errors. Eg: The respondents did not answer the questions completely. Comparisons of data by the female and male groups were performed with a number of statistical tests Comparisons of data by the female and male groups were performed with a number of statistical tests. These items were analysed and presented in the form of percentage.

RESULTS AND DISCUSSION

Almost all participants in stated that they wanted to have children someday (Table II), and 56.6% from them (male = 56.4%, female = 56.7%) preferred three to five children, which confirm the notion of the five-child family for Malaysia to achieve 70 million nations on 2125 based on Malaysia's *'Dasar Kependudukan Negara'*. Female's (61.9%) and male's (70.5%) preferred mean ages for becoming a parent are in line with the mean ages of first-time parents in Malaysia whish between ages 25 and 29 years. More than half of the women (51.5%) wanted to have their last child between ages 35 and 40 years, an age period during which female fecundity decreases markedly. Besides of similar personal intentions for childbirth, both male and female regarded having children as being significantly important. They were more likely to adopt a child in the case of infertility indicates that both regarded parenthood a more essential part of life (Table VI).

Table 2 Intentions of having children among women and men

	Male (n=78)		Female (n=97)	
	%	n	%	n
Want to have children				
Yes	94.9	74	95.9	93
No	5.1	4	4.1	4
Desired number of children				
0	1.3	1	4.1	4
1 - 2 children	24.4	19	24.7	24
3 - 5 children	56.4	44	56.7	55
6 children & above	17.9	14	14.4	14
Desired age at first child				
18 - 22 years	3.8	3	4.1	4
23 - 24 years	15.44	12	29.9	29
25 - 29 years	70.5	55	61.9	60
30 - 34 years	9	7	4.1	4
35 - 39 years	1.3	1	0	0
Desired age at last child				
25 - 29 years	7.7	6	7.2	7
30 - 34 years	15.4	12	28.9	28
35 - 40 years	44.9	35	51.5	50
41 - 44 years	21.8	17	11.3	11
45 - 50 years	10.3	8	1	1
Importance of having children				
Very important	73.1	57	59.8	58
Important	21.8	17	33	32

Participants viewed living in a stable relationship, sharing responsibility with a partner and having children before they were too old as the most important circumstances for their decision to become a parent (Table III). The finding that half of female (68%) and half of male (53.8%) regarded 'having children before one is too old' an important issue indicates that women are aware of the 'biological clock'. The finding that female put more emphasis on the importance of having access to childcare (76.3%) and a job that can be combined with having children (78.3%), indicates that women are more concerned about the practical issues concerned with combining work and parenthood. A majority of participants stated that becoming a parent would entail personal development, giving and receiving more love and another view on what is important (Table IV). Women, to a greater degree than men, also presumed that parenthood would lead to new interests in life. They associated becoming a parent with positive consequences, both were optimistic regarding the effect of parenthood on their status in the labour market and on the amount of time available for work and career. Participants overall were sufficiently aware of the age-related decline in fecundity (Table V).

Table 3 Important circumstances for women's and men's decision to have children

	Male (n = 78)		Female (n = 97)	
	%	n	%	n
Live in a stable relationship				
Very important	71.8	56	71.8	72
Important	19.2	15	19.2	16
TOTAL	91	71	91	88
Have a partner with whom I can share the responsibility				
Very important	69.2	54	77.3	75
Important	16.7	13	14.4	14
TOTAL	85.9	67	91.7	89
Feel sufficiently mature				
Very important	48.7	38	38.1	37
Important	38.5	30	48.5	47
TOTAL	87.2	68	86.5	84
Have a good economy				
Very important	57.7	45	58.5	57
Important	28.2	22	32	31
TOTAL	85.9	67	90.8	88
Have completed my studies				
Very important	44.9	35	41.2	40
Important	35.9	28	35.1	34
TOTAL	80.8	63	76.3	74
Work can be combined with having children				
Very important	41	32	34	33
Important	48.7	38	44.3	43
TOTAL	89.7	70	78.3	76
Have access to child care				
Very important	29.5	23	41.2	40

Important	42.3	33	35.1	34
TOTAL	71.8	56	76.3	74
Have a home that is sufficiently large				
Very important	38.5	30	32	31
Important	37.2	29	39.2	38
TOTAL	75.7	59	71.2	69
Have a permanent position				
Very important	52.6	41	42.3	41
Important	26.9	21	40.2	39
TOTAL	79.5	62	82.5	80
Want to have children before I am to old				
Very important	53.8	42	68	66
Important	37.2	29	24.7	24
TOTAL	91	71	92.7	90
Have time to travel and do other thing that maybe difficult to do with children				
Very important	21.8	17	25.8	25
Important	29.5	23	28.9	28
TOTAL	51.3	40	54.7	53
Have advance in my profession				
Very important	33.3	26	28.9	28
Important	43.6	34	38.9	37
TOTAL	76.9	60	67	65
Friends had children or are expecting children				
Very important	19.2	15	17.5	17
Important	32.1	25	23.7	23
TOTAL	51.3	40	41.2	40

The present results indicate a direct relation between female's intended timing of childbirth and their conceptions about fecundity. Based on the study by C.Lampic, A.Skoog Svanberg, P.Karlström and T.Tydén (2005), their female participants who choose to postpone their childbearing after the age of 30 years have overly optimistic perceptions of the chances to become pregnant during that age period. This suggests that women may base their decision regarding the timing of parenthood on

misconceptions concerning women's fecundity. In the study by Kemkes-Grottenthaler (2003), only a few female academics had actively made the decision to forgo children, while a majority merely were postponing motherhood. A majority of the latter group hoped to have their first child by age 38 years (with a maximum age of 48 years). While few female participants (4.1%) of this study preferred to have their first child in their late 30s, many wanted to have their last child during this age period, and 11.3% planned to have their last child in their 40s. However, the natural decline in fertility often come across at this age period may obstruct women from having their desired number of children.

Table 4 Female's and male's opinion on the impact of parenthood

	Male (n = 78)		Female (n = 97)	
	%	n	%	N
I will develop as a person				
Very important	55.1	43	49.5	48
Important	43.6	34	49.5	48
TOTAL	98.7	77	99	96
I will give and receive more love				
Very important	67.9	53	61.9	60
Important	26.9	21	33	32
TOTAL	94.8	74	94.9	92
Another view on what is important				
Very important	48.7	38	39.2	38
Important	41	32	46.4	45
TOTAL	89.7	70	85.6	83
Less time to devote to work and a career				
Very important	11.5	9	5.2	5
Important	30.8	24	34	33
TOTAL	42.3	33	39.2	38
New interests in life				
Very important	30.8	24	40.2	39
Important	41	32	48.5	47
TOTAL	71.8	56	88.7	86
Less time for my own interests				

Very important	6.4	5	7.2	7
Important	28.2	22	21.6	21
TOTAL	34.6	27	28.8	28

Less freedom

Very important	3.8	3	5.2	5
Important	16.7	13	23.7	23
TOTAL	20.5	16	28.9	28

A stronger relationship with my partner

Very important	60.3	47	56.7	55
Important	29.5	23	35.1	34
TOTAL	89.8	70	91.8	89

Poorer economy

Very important	3.8	3	1	1
Important	5.1	4	4.1	4
TOTAL	8.9	7	5.1	5

A poorer status on the labour market

Very important	5.1	4	4.1	4
Important	32.1	25	37.1	36
TOTAL	37.2	29	41.2	40

More contact with my close family

Very important	39.7	31	34	33
Important	48.7	38	55.7	54
TOTAL	88.4	69	89.7	87

That I do the thing that is the meaning of life

Very important	47.4	37	45.4	44
Important	39.7	31	45.4	44
TOTAL	87.1	68	90.8	88

Strains on my relationship with my partner

Very important	25.6	20	24.7	24
Important	21.8	17	22.7	22

TOTAL	47.4	37	47.4	46
That we become a ‘real family’				
Very important	61.5	48	60.8	59
Important	34.6	27	32	31
TOTAL	96.1	75	92.8	90
Every day life will be more enjoyable				
Very important	62.8	49	57.7	56
Important	30.8	24	33	32
TOTAL	93.6	73	90.7	88
That I feel ‘complete’ as a woman/man				
Very important	56.4	44	61.9	60
Important	30.8	24	28.9	28
TOTAL	87.2	68	90.8	88

Table 5 Female's and male's awareness of fertility issues

	Male (n = 78)		Female (n = 97)	
	%	n	%	N
At what age are women the most fertile?				
15 - 19 y/o	19.2	15	15.5	15
20 - 29 y/o	76.9	60	79.4	77
30 - 39 y/o	3.8	3	5.2	5
At what age is there a slight decrease in women’s ability to become pregnant?				
15 - 19 y/o	0	0	2.1	2
20 - 29 y/o	1.3	1	2.1	2
30 - 39 y/o	26.9	21	38.1	37
40 - 49 y/o	47.4	37	47.4	46
50 - 59 y/o	21.8	17	7.2	7
60 - 69 y/o	2.6	2	3.1	3
At what age is there a marked decrease in women’s ability to become pregnant?				
15 - 19 y/o	0	0	1	1
20 - 29 y/o	3.8	3	8.2	8
30 - 39 y/o	41	32	39.2	38

40 - 49 y/o	39.7	31	37.1	36
50 - 59 y/o	15.4	12	14.4	14

A young woman (<25 years) and a man have unprotected intercourse at the time of ovulation—how large is the chance that she will then become pregnant?

0% - 19%	2.6	2	1	1
20%-39%	3.8	3	4.1	4
40%-59%	14.1	11	9.3	9
60%-79%	23.1	18	22.7	22
80%-89%	24.4	19	23.7	23
90%-100%	32.1	25	39.2	38

A woman and a man who regularly have unprotected intercourse during a period of 1 year: How large is the chance that she will become pregnant if she is 25–30 years old?

0% - 19%	0	0	1	1
20%-39%	2.6	2	3.1	3
40%-59%	12.8	10	6.2	6
60%-79%	26.9	21	24.7	24
80%-89%	29.5	23	40.2	39
90%-100%	28.2	22	24.7	24

How large is the chance that she will become pregnant if she is 35 – 40 years old?

0% - 19%	1.3	1	6.2	6
20%-39%	9	7	9.3	9
40%-59%	38.5	30	40.2	39
60%-79%	39.7	31	36.1	35
80%-89%	10.3	8	6.2	6
90%-100%	1.3	1	2.1	2

How many couples in Malaysia are involuntarily childless?

0% - 19%	21.8	17	11.3	11
20%-39%	33.3	26	32	31
40%-59%	23.1	18	40.2	39
60%-79%	14.1	11	15.5	15
80%-89%	6.4	5	1	1
90%-100%	1.3	1	0	0

Couples that undergo treatment with IVF—what is their chance, on average, of getting a child?

0% - 19%	3.8	3	2.1	2
20%-39%	10.3	8	14.4	14
40%-59%	38.5	30	33.8	32
60%-79%	20.5	16	23.7	23
80%-89%	17.9	14	16.5	16
90%-100%	9	7	10.3	10

Table 6 Presumed behaviour in case of infertility

	Male (n = 78)		Female (n = 97)	
	%	n	%	n
Undergo IVF	37.2	29	36	35
Adoption	55.2	43	55.5	50
Abstain from children	7.6	6	9.3	9

The present study has some methodological limitations. Limited resources restricted the size of the study sample in PERMATApintar™ National Gifted Centre, but the random selection of individuals adds to the external validity of the study. While there were no available background data for non-participants, comparison with the target population did not indicate response bias based on age. However, the relatively low response rate among male limits the conclusions that can be drawn from the results for the male sample. Due to the lack of standardized instruments of relevance for the focus of the present study, a questionnaire was developed and underwent pilot testing among groups of students from the target population.

Hence, the present results indicate that female and male community in PERMATApintar™ National Gifted Centre have largely positive attitudes towards parenthood, although women expressed more concerns about problems related to combining work and children. Female and male want to have children, accurately estimate the chances of achieving a pregnancy and are aware of the natural age-related decline of female fertility. Based on the study by C.Lampic, A.Skoog Svanberg, P.Karlström and T.Tydén (2005), many female academics intend to have children during age periods when women's fecundity is markedly decreased and may subsequently end up involuntarily childless or suffer secondary infertility. This is particularly alarming in view of the great importance these women put on parenthood. However, a significance difference encountered when the result of the present study and the latest study was compared. Since 94.9% of the participants are students, the result did not accurately indicate the rate of awareness of the whole community towards parenthood and fertility. These findings indicate that this community especially the students should get more information regarding fertility in order to make informed decisions regarding family planning in the future.

CONCLUSION

To conclude, youngsters need to be aware about fertility and attitudes towards parenthood as it will affect the rate of childbirth in Malaysia. This is because low fertility awareness will increases the risk

of involuntary infertility in this group, which is alarming in view of the great importance they put on parenthood.

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INDIVIDUAL FINANCIAL MANAGEMENT AMONG UNIVERSITY STUDENTS TOWARDS POST-GRADUATE STUDENTS FROM DIFFERENT FACULTIES OF UNIVERSITI KEBANGSAAN MALAYSIA, UKM

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ABSTRACT

In our society nowadays, there are many financial problems faced by the people. Hence, it is very important to have a good financial management especially university students. This research was taken to measure the awareness of the university students towards their financial problem, examine their accounting skills, to show the importance of having good financial management and proposing solutions based on the findings. This study used a quantitative approach. The data was collected by distributing questionnaire to forty UKM students from different faculties and courses. The students were chosen by random samplings method. The questionnaire comprises of two parts, which is financial condition and financial management. The students were chosen by random samplings method. Based on the survey that they had filled, 95% students find it's very hard to keep up a very good financial data. The results revealed that most of them do not keep their financial data as only 28% student who keep their financial properly. Students were busy and did not find enough time to spend on managing their expenses. Findings also indicated that most students who know how to manage their money wisely are the one who basically had a mathematic based education, such as students from Economics and Management Faculty. As a conclusion, the awareness of the students needs to be raised as it can help the students to manage their money properly. In addition, a basic accounting education needs to be introduced in our education system.

INTRODUCTION

Money is a current medium of exchange in the form of coins and banknotes. It is necessary in every life aspect as everything requires money. Money allows us to have more control over our life which we are free to crave our own path with the choices we have. Money plays a significant role in helping us fulfil our needs nowadays. Without money, less choice can be made. Most people agree that only money can be a medium to gain comfort, safety, happiness and peaceful life other than fulfilling physiology needs in life.

According to Faudziah et.al (2005), financial actually kind of art and science in managing money while financial management includes variety of economics theory and accounting objectives to achieve firm and individual target.

Money to students is as important as it is to human beings. Students, especially in higher level need money to support their studies cost and life as university students. However, those cost on studies in government or private education institution are increasing recently. According to Siti Alida et.al (2006), this has happened due to the increase in cost and change in education orientation.

Financial needs in schools and higher education institution are totally different. Expenditure in schools is being support by parents and also some help from the government. Moreover, school education is given free as it stated in Berita Harian (12 September 2007), which the Prime Minister have announced in Bajet 2008 to exclude annual fees for schools and enlarge the Skim Pinjaman Buku Teks to all students without considering monthly house salary and number of children qualified.

However, a completely different scenario will be faced by the students when they started their journey in university. Financial needs are needed higher than in schools before. Those aspects that need to be consider include studies fees, books and other educational stuff, foods, accommodation, transportation, clothes and telecommunication services.

LITERATURE REVIEW

According to NFEC, financial literacy is defined as "possessing the skills and knowledge on financial matters to confidently take effective action that best fulfils an individual's personal, family and global community goals". It is important to have a good financial literacy to help us manage our money properly.

There are many researches that relate to the financial issue among university students. The financial issues are mostly about students' attitudes, behaviours, and perceptions that relate to their spending habits, credit usage, and money (A.C. Lyons, 2008). Ramen (2013) found that many of the students have a low financial literacy. Low of financial literacy is due to the education process and being informed, knowledgeable and educated. According to The Economic Times (2012), the management of money should start at home when they still a child.

According to PISA (2012), younger generations are not only likely to face ever-increasing complexity in financial products, services and markets, but they are more likely to have to suffer more financial risks in adulthood than their parents. It also stated that it is important to have skills of accounting from young ages.

OVERVIEW

This research was conducted in order to measure the awareness of university students towards their financial issue, to measure the accounting skills of the university students, to stress the importance of having a good financial health and to propose a solution that would overcome the problems of creating a good financial base. In order to answer these research goals, we opted to obtain the view of some university students in line with this topic. Specifically, a total of 40 respondents from various courses and faculties within Universiti Kebangsaan Malaysia (UKM) were randomly selected to make up the sample. Selected participants answered a survey questionnaire that we had created. The data gathered from this research instrument were then interpreted. Along with primary data, the researcher also made use of secondary resources in the form of published articles and literatures to support the survey results.

Research Design

The descriptive method of research was used for this study. To define the descriptive type of research, Creswell (1994) stated that the descriptive method of research is to gather information about the

present existing condition. The emphasis is on describing rather than on judging or interpreting. The aim of descriptive research is to verify formulated hypotheses that refer to the present situation in order to elucidate it. The descriptive approach is quick and practical in terms of the financial aspect. Moreover, this method allows a flexible approach, thus, when important new issues and questions arise during the duration of the study, further investigation may be conducted.

Descriptive research on the other hand is a type of research that is mainly concerned with describing the nature or condition and the degree in detail of the present situation. This method is used to describe the nature of a situation, as it exists at the time of the study and to explore the cause/s of particular a phenomenon. The aim of descriptive research is to obtain an accurate profile of the people, events or situations. With this research type, it is essential that the researcher already has a clear view or picture of the phenomena being investigated before the data collection procedure is carried out. The researcher used this kind of research to obtain first hand data from the respondents so as to formulate rational and sound conclusions and recommendations for the study. The descriptive approach is quick and practical in terms of the financial aspect.

In this study, the descriptive research method was employed so as to identify the role and significance of using personality questionnaire in measuring the awareness of university students' towards their financial issue during the time of research. The researcher opted to use this research method considering the objective to obtain first hand data from the respondents. The descriptive method is advantageous for the researcher due to its flexibility; this method can use either qualitative or quantitative data or both, giving the researcher greater options in selecting the instrument for data-gathering. The aim of the research is to measure the awareness of university students towards their financial issue as well as measuring their accounting skills; the descriptive method is then appropriate for this research since this method is used for gathering prevailing conditions.

The research is using university students as respondents from various courses and faculties from UKM in order to gather relevant data; the descriptive method is then appropriate as this can allow the identification of the similarities and differences of the respondents' answers. For this research, one type of data was gathered. This is the primary data type. The primary data were derived from the answers the participants gave during the survey process. With the use of the survey questionnaire, this study took on a quantitative approach of research.

Quantitative data collection methods are centred on the quantification of relationships between variables. Quantitative data-gathering instruments establish relationship between measured variables. When these methods are used, the researcher is usually detached from the study and the final output is context free. Measurement, numerical data and statistics are the main substance of quantitative instruments. With these instruments, an explicit description of data collection and analysis of procedures are necessary. An approach that is primarily deductive reasoning, it prefers the least complicated explanation and gives a statement of statistical probability. The quantitative approach is more on the detailed description of a phenomenon. It basically gives a generalization of the gathered data with tentative synthesized interpretations.

Quantitative approach is useful as it helps the researcher to prevent bias in gathering and presenting research data. Quantitative data collection procedures create epistemological postulations that reality is objective and unitary, which can only be realized by means of transcending individual perspective. This phenomenon in turn should be discussed or explained by means of data analysis

gathered through objective forms of measurement. The quantitative data gathering methods are useful especially when a study needs to measure the cause and effect relationships evident between pre-selected and discrete variables. The purpose of the quantitative approach is to avoid subjectivity by means of collecting and exploring information which describes the experience being studied.

Quantitative methods establish very specific research problem and terms. The controlled observations, mass surveys, laboratory experiments and other means of research manipulation in qualitative method makes gathered data more reliable. In other words, subjectivity of judgment, which is not needed in a thesis discussion, can be avoided through quantitative methods. Thus, conclusions, discussion and experimentation involved in the process are more objective. Variables, both dependent and independent, that are needed in the study are clearly and precisely specified in a quantitative study. In addition, quantitative method enables longitudinal measures of subsequent performance of the respondents. Fryer (1991) noted that qualitative researchers aim to decode, describe, analyze and interpret accurately the meaning of a certain phenomena happening in their customary social contexts. The focus of the researchers utilizing the framework of the interpretative paradigm is on the investigation of authenticity, complexity, and contextualization, mutual subjectivity of the researcher and the respondent as well as the reduction of illusion.

Contrary to the quantitative method, qualitative approach generates verbal information rather than numerical values (Polgar & Thomas, 1995). Instead of using statistical analysis, the qualitative approach utilizes content or holistic analysis; to explain and comprehend the research findings, inductive and not deductive reasoning is used. The main point of the quantitative research method is that measurement is valid, reliable and can be generalized with its clear anticipation of cause and effect (Cassell & Symon, 1994). Being particularistic and deductive in nature, quantitative method is dependent on the formulation of a research hypothesis and confirming them empirically using a specific data set (Frankfort-Nachmias & Nachmias, 1992). The scientific hypothesis of a quantitative method holds no value. This means that the researcher's personal thoughts, subjective preferences and biases are not applicable to this type of research method.

Participants

In order to determine our objectives, a total of 40 respondents were asked to participate. To achieve pertinent information, certain inclusion criteria were imposed. The participants qualified for sample selection must be university students from within the UKM. This qualification ensured that the participants understand the nature of personality questionnaire and its use for us, making the survey items easy for them to accomplish. The respondents were selected from various courses and faculties in UKM, we did not consider choosing students from outside universities as it will make the research becomes harder. Simple random sampling was done for the sample selection where we went to the Perpustakaan Tun Seri Lanang (PTSL) and picked our respondents from there.

Instruments

The survey questionnaire was used as the main data-gathering instrument for this study. The questionnaire was divided into two main sections: a profile and the survey proper. The profile contains socio-demographic characteristics of the respondents such as age, gender, courses and faculties, and their years of study. The questionnaire proper section contains two more section which is Part 1 and Part 2. The questions in Part 1 mostly asked about our respondents' financial health

while Part 2 mainly asked about their accounting and financial skills. In this survey type, two choices are provided for most question or statement which is yes and no. Some of the question or statement needs the respondents to write their answers on the questionnaires.
We use the selected questionnaire type as this enabled the respondents to answer the survey easily. In addition, this research instrument allowed the research to carry out the quantitative approach effectively with the use of statistics for data interpretation. In order to test the validity of the questionnaire used for the study, the researcher tested the questionnaire to five respondents. These respondents as well as their answers were not part of the actual study process and were only used for testing purposes. After the questions have been answered, the researcher asked the respondents for any suggestions or any necessary corrections to ensure further improvement and validity of the instrument. The researcher revised the survey questionnaire based on the suggestion of the respondents. The researcher then excluded irrelevant questions and changed vague or difficult terminologies into simpler ones in order to ensure comprehension.

Data Processing and Analysis

After gathering all the completed questionnaires from the respondents, total responses for each item were obtained and tabulated. We did not use any specific system to analyse our data since the result is easy to be tabulated. The processes however, was done for a few time to make sure that the results are valid and usable.

Ethical Considerations

As this study required the participation of human respondents, specifically university students, certain ethical issues were addressed. The consideration of these ethical issues was necessary for the purpose of ensuring the privacy as well as the safety of the participants. Among the significant ethical issues that were considered in the research process include consent and confidentiality. In order to secure the consent of the selected participants, the researcher relayed all important details of the study, including its aim and purpose. By explaining these important details, the respondents were able to understand the importance of their role in the completion of the research. The respondents were also advised that they could withdraw from the study even during the process. With this, the participants were not forced to participate in the research. The confidentiality of the participants was also ensured by not disclosing their names or personal information in the research. Only relevant details that helped in answering the research questions were included.

FINDINGS

Based on the data that we've obtained, 95% of the respondents find it is important to practice good financial management but only 28% of the respondents record their expenditure. Other than that, 17% of the respondents think their monthly expenses is enough and 40% of the respondents do part time job to increase their pocket money. 73% of the respondents have a stable financial health while 83% of the respondents know how to manage their money, and about 88% of the respondents agree that keeping a good financial management help them in making the right financial. The data that we obtained were not what we expected, but it has come to our knowledge that 13 respondents from our total respondent were from Economics and Management Faculty, which had a basic accounting education before. We found out that most people who had a mathematic-based education do know how to make a good financial management.

So, in order to solve the problems, we came up with a solutions on how to records a financial data in a handy way. We had created simple software, Agihan Perbelanjaan.exe using Microsoft. Net language C++. The beta-version software is just for presentation purposes only although we do want to make it happen, using a very much more powerful system of course. This application can encourage people especially students to record their financial data in an easy way. The application is so simple that most of the beta users find it very useful and not so difficult. We also had proposed a new syllabus that can be applied in our education system, probably to secondary school students. As we know, people with mathematic-based knowledge tend to have a better management towards their money. So, the syllabus can give an early exposure to the students towards a good financial management so that they know how to manage their money.

CONCLUSION

We can conclude that people especially students are not managing their money well and have the thought that it is not important. Good financial management is very necessary to be practised as it guaranteed future. The awareness of the students needs to be raised as it can help the students to manage their money properly. A basic accounting education needs to be introduced in our education system. This is because knowledge is needed for a skill to be practised.

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GIFTED STUDENTS' PERCEPTIONS ON THE USEFULNESS OF BLOGS IN LEARNING ENGLISH LANGUAGE WRITING

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ABSTRACT

Writing has not been an easy task to all students of a second language as it requires practice and understanding of key concepts in the target language. Gifted students too have this difficulty despite their excellent reasoning skills and being able to learn quickly with less practice and repetition. The presence of online blogs provides the potential for easy access to more information in cyber space. This study aims to investigate gifted students' perceptions on the usefulness of blog in learning English language writing. Data was gathered using a mixed-method design with 105 gifted students from Pusat PERMATApintar Negara. Survey data was analyzed using descriptive analysis. It provides mean, percentages of responses and level of frequency. Data was also collected through interviews with three respondents and was analyzed according to themes. Results indicate that a majority of the gifted students had positive perceptions on the usefulness of blogs in learning English writing. They are also aware of the benefits of blogs in learning English writing and the advantages of blogs to the English writing development.

KEYWORDS: Gifted students; ESL writing; teaching and learning language; ICT; secondary school

INTRODUCTION

In recent years, innovations in the information, communication technology (ICT) has made ways for many discoveries in the computer technology. These development and innovations of computer technology have brought a lot of improvement to the medium of communication, one of which gives way to the introduction of weblogs. It is simply an online diary and essentially a webpage managed by a writer who is responsible for the content and materials written in it. However, writing has not been an easy task to all learners of a second language. It requires a lot of practice and understanding of key concepts in the target language. Gifted learners too have this difficulty despite their excellent ability in reasoning skills, and able to learn quickly with less practice and repetition (Bainbridge t.th). With the presence of advanced internet applications in technology such as blogs, it is highly expected that this application could be a stepping stone which may benefit students, specifically gifted students, in learning language writing.

The main aim of the study is to explore the perception of gifted students on the usefulness of blog in learning English language writing. Based on the problem statement, this research paper aims to investigate:

1. Gifted students' perceptions towards the usefulness of blogs in learning English language writing.
2. Benefits of using blogs in learning writing as perceived by gifted students.
3. Advantages of blogs in gifted students' English writing development.

With the purpose of facilitating the study, the researcher formulated the following research questions:

1. What are the gifted students' perceptions towards the usefulness of blogs in learning English language writing?
2. What are the benefits of using blogs in learning writing as perceived by gifted students?
3. What are the advantages of blogs in gifted students' English writing development?

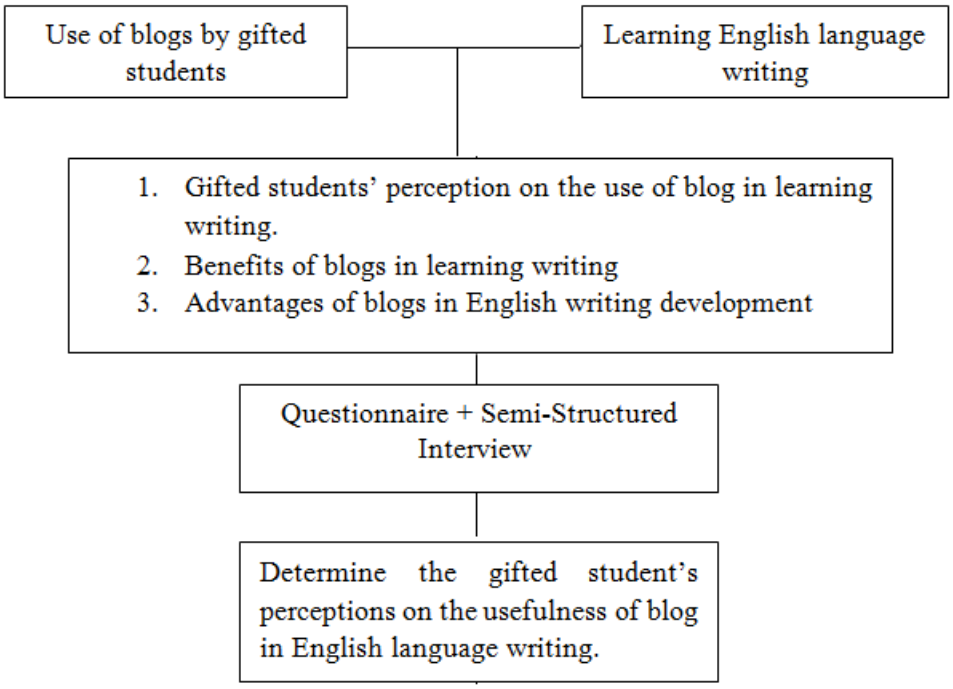

Figure 1 Conceptual framework of the study

LITERATURE REVIEW

The first criterion to identify gifted learners is that they have an above average cognitive ability. According to Robert E. Slavin (2009), giftedness can be defined as "exceptional intellectual ability, creativity, or talent". However, there is no clear definition of giftedness. In general, giftedness is defined in terms of type and degree of exceptional ability that comes together with high level of motivation and creativity. This lack of clarification led Gagne to state that the concept of giftedness is at times difficult to support because it is "defined too loosely while being measured too restrictively" (Gagne 1995:104).

According to Gagne (2004), giftedness is a superior natural ability whereas a talent is ability or skill that has been developed exceptionally well. The distinction between giftedness and talent reflects the distinction between potential and achievement. The Differentiated Model of Giftedness (Gagne 2009) in Figure 1 comprises of six in which the progression from Natural Abilities to Systematically Developed Skills is facilitated through the Developmental Process. Gagne (2009) describes the Developmental Process is either assisted or hindered by factors that Gagne describes as catalysts which are Interpersonal (IC), Environmental (EC), and also the element of Chance (CH). Thus, a person is described as gifted and talented and when they have favourable developed his natural

abilities in which their exceptional abilities is highlighted. Clarks (2002) lists the characteristics of gifted students in different categories which include:

1. Cognitive (thinking) characteristics, such as retention of large quantities of information, advanced comprehension, varied interest and high curiosity, and a high level of language development and verbal ability.
2. Affective (feeling) characteristics, such as unusual sensitivity to the feelings of others, keen sense of humour, heightened self-awareness, feelings of being different, and idealism and sense of justice.
3. Physical (sensation) characteristics, such as heightened sensory awareness, unusual discrepancy between physical and intellectual development, and low tolerance for lag between their standards and their athletic skills.
4. Intuitive characteristics, such as being open to intuitive experience and creativity apparent in all areas of endeavour.
5. Societal characteristics, such as strongly motivated by self-actualization needs, advanced capacity for conceptualizing and solving societal problems, leadership and involvement with meta-needs of society (i.e., justice, truth, beauty).

In Malaysia, there is not much emphasis on the differentiated learning that can benefit gifted students. Gifted students need a fundamentally different approach as in the day-to-day classroom. At the moment, there is no such Act to impose emphasis on the learning process for gifted and talented students. According to Noriah, Rosadah and Siti (2009), such act is vital to make sure the needs of gifted students in Malaysia can be fulfilled thus the natural potential in them will not be neglected.
Pusat PERMATApintar Negara (PPpN), Universiti Kebangsaan Malaysia is the first centre for gifted education program in Malaysia. Universiti Kebangsaan Malaysia was given the mandate by the Ministry of Prime Minister Department to conduct this program. The PERMATApintar Education Program was started in January 2011. Students will only be selected for the program after they have passed 3 levels of test namely UKM1 and UKM2; online intelligence tests, and UKM;3 comprehensive assessment (Noriah, Rosadah and Siti 2009).

According to Siti et al. (2012), this gifted and talented education system aims to challenge gifted students to match their abilities, in order to illuminate their full potential. Besides that, it aims to prepare students with an early experience of studying higher education. The gifted learners in Pusat PERMATApintar Negara are individuals with high cognitive level; however, their language ability need is generally average and needs improvement. It is very important that their education system is integrated with the current development of ICT tools such as blogs to help in their language development especially in language writing. Murphy and Manzanares (2008) found that learners using instant messaging (IM) are more comfortable, advanced and proficient in writing (or typing) than orally. This finding proves that ICT tools have the positive impact in learning English language writing.

The term “blog” is a contraction of two words: web and log. Sometimes it is also called weblog. In general, blogs are tool for written communication and interaction. According to Susana & Sergio (2007), blogs or weblogs are personal web pages written in chronological order and maintained through specific software that helps their administration.

Blogs have also gained popularity in education, particularly in language classes (Nadzrah & Kemboja 2009). They explained that the ease of using blogs for writing development means that blogs provide an advantage for writers who publish their writing online. In addition, they also noted that blogs can easily replace or become an alternative to traditional journal writing.

Many researchers have claimed that blogs can improve writing skills (Downess 2004, Hall and Davidson 2007). Blackmore-Squires (2010) mentioned that Oravec (2002) claimed that blog can empower students to become analytical and critical, which in turn improving a student's self-confidence. According to Nadzrah (2005), the use of computers in the classroom has increased tremendously, and it is quickly becoming one of the learning tools used in language classes. Thus, blogs can be used to teach writing in ESL classroom (Yang 2008).

METHODOLOGY

The research design applied to this study is a mixed method design. It aims to increase the likelihood to complete findings that are more trustworthy and relevant than using the research design separately. There are four major types of mixed method design which are triangulation, embedded, explanatory and exploratory (Creswell & Plano Clark 2007). In this study, the researcher chose to use the triangulation design. This is because in the triangulation design, the researcher collects both quantitative and qualitative data simultaneously using survey and interview techniques. The triangulation method has the ability to cross-check itself, meaning it combines several two research methods to study one thing and explain more fully.

A total of 105 Level 2 gifted students from Pusat PERMATApintar Negara (PPpN) in Universiti Kebangsaan Malaysia were selected for this study. These students were identified as gifted children as measured by the validity of UKM1 and UKM2 intelligence tests and UKM3 comprehensive assessment (Fatimah, Shahrir, Noriah 2009). This background information helps to provide significant correlation between the findings and the objective of the study.

The research instruments used in this mixed-method study are questionnaire surveys and semi-structured interviews adapted from various studies relevant to the research objective in order to answer the research questions. The survey questionnaire provides data which is numerical in nature. The semi-structured interview provides information which is not numerical in nature that compliments the quantitative data.

Some of the items in the questionnaire surveys were adapted from previous studies. The items are adapted from the studies entitled 'Using Blogs to Encourage ESL Students to Write Constructively in English' by Nadzrah and Kemboja (2009). Besides that there are some items were adapted from Park, Heo and Lee (2011) in a study entitled 'Blogging for Informal Learning: Analysing Bloggers' Perceptions Using Learning Perspective'. The questionnaire survey was divided into four sections: Section A (Demographic Information), Section B (Usefulness of Blogs in Learning English Writing), Section C (Benefits of Using Blogs in Learning English Writing), and Section D (Advantages of Blogs in English Writing Development). Sections B, C, and D used the 4-point likert scale ranging from 'Strongly Disagree', 'Disagree', 'Agree', and 'Strongly Agree', so that the participant will not have an inconclusive opinion on the issue. Semi-structured interview was also employed in this study as it provides flexibility in which allowing new questions to be brought during

the interview, depending on the responses of the interviewee. The interview comprised of five open-ended questions.

RESULT & ANALYSIS

Table 1 Gifted Students' Perception on the Use of Blog

Statement	**Strongly Disagree and Disagree N (%)**	**Agree and Strongly Agree N (%)**
I feel comfortable using the blog to express my opinions.	48 (45.7)	57 (54.3)
I can express my ideas better on the blog.	47 (44.7)	57 (55.3)
I can be more creative when writing on my blog.	42 (40.0)	63 (60.0)
I feel enjoyable in writing on the blog.	45 (42.9)	60 (57.2)

Based on the Table 1, it can be seen that majority of the participants favours the usage of blog in learning writing. 57 participants (54.3%) had chosen 'Agree' and 'Strongly Agree' for the statement that they feel comfortable using blog to express their opinions while 48 participants (45.7%) was not in agreement with the statement. This is probably due to the feeling of insecurity about their opinion posted online. As one of the female respondents commented:

I don't sell much to the people who know me in real life, and my blog apparently has some people…you know…my friends reading it so I feel insecure about that.

(Respondent AA, Female)

Meanwhile, 57 participants (55.3%) had chosen 'Agree' and 'Strongly Agree' with the statement that they can express ideas better on blog. And there were 63 respondents (60.0%) had selected 'Agree' and 'Strongly Agree' that they can be more creative when writing on my blog. In addition to that, 60 participants (57.2%) feel enjoyable in writing on the blog. The features in blog are very interactive and user friendly in such a way that it provides a distraction-free writing environment, thus allowing bloggers to be able to express ideas better on blog. This is elaborated by the female respondent:

Because I think when I'm writing, I think (writing in blog) I can think more and elaborate my opinion and I can add my personal experience.

(Respondent BB, Female)

On the other hand, 47 respondents (44.7%) had chosen 'Disagree' and 'Strongly Disagree' that they can express ideas better on blog. Similarly, 42 participants (40.0%) had chosen Disagree' and 'Strongly Disagree' that they can be more creative when writing on my blog.

Table 2 Gifted Students' Perception on the Use of Blog

Statement	Strongly Disagree and Disagree N (%)	Agree and Strongly Agree N (%)
I have more time to write on the blog, so I feel relaxed.	62 (59.0)	43 (40.9)
I benefited from writing and reading blog postings.	29 (27.6)	76 (72.3)
A medium for me to improve my writing skills.	28 (26.6)	77 (73.3)
It does not help me in my writing skills at all.	82 (78.1)	23 (21.9)
Blog increases my confidence in writing.	29 (27.7)	76 (72.4)

The Table 2 shows that 77 participants (73.3%) agreed that blog is a medium for them to improve writing skills. This was probably because participants are essentially writing for an audience where they read and comment on each other's work. Thus, this feature of blog causes students to improve their writing capacity especially writing skills (Zhang 2009). Meanwhile, 82 participants (78.1%) had chosen 'Disagree' and 'Strongly Disagree' with the statement that blog does not help in their writing skills at all. Only 23 participants (21.9%) had chosen 'Agree' and 'Strongly Agree' that blog does not help in writing skills at all.

On the other hand, 76 participants (72.3%) had chosen 'Agree' and 'Strongly Agree' with the statement that they benefited from writing and reading blog postings. This was probably because writing and reading blog encourage feedback which gives benefits to its users (Godwin-Jones 2006). Meanwhile, 29 participants (27.6) were not in agreement with the statement that they benefited from writing and reading blog postings.

A total of 76 participants (72.4%) had stated 'Agree' and 'Strongly Agree' with the statement that blog increases confidence in writing. This was probably because students were able to manipulate and produce more complex sentences after practicing writing on blog. However, 29 participants (27.7%) were not in agreement with the statement.

CONCLUSION & IMPLICATION

This study has achieved its three objectives as well as answered the research questions. The first research question, 'What are the gifted students' perceptions on the usefulness of blogs in learning English language writing?' showed that majority of the gifted students had positive perception on the usefulness of blogs in learning English language writing. From the total of 9 items to answer this research question, the range of percentage of the gifted students' positive perception on the usefulness of blogs in learning English language writing are from 45.9% to 78.1%. It is found that gifted students' perceived blogs as tools to increase confidence in writing as well as a medium to improve their writing skills.

In relation to the second research questions, 'What are the benefits of using blogs in learning writing as perceived by gifted students?', there are 6 items to answer to research question which were related to learning acquisition process, reflection process, practice based community process, and co-

emergent process. It is discovered that the range of percentage of the gifted students' perceptions on the benefits of using blogs in learning writing are from 70.5% to 88.5%. It is noticeable that gifted students perceived blogging can be useful in acquiring various kind of knowledge and information and it help students to engage more actively in learning ESL writing.

In addition, majority of the gifted students had positive perceptions towards the third research question that is 'What are the advantages of blogs in gifted students' English writing development?' It is found that the range of percentage of the positive perceptions of the advantages of blogs in gifted students' English writing development is from 56.2% to 69.5%. It is obvious that the gifted students believe that blog gives them more opportunities to practice writing and writing on the blog can increase their productivity in writing.

There are a few limitations of this study. The first and a major limitation of this study is the number of sample size is small. The sample sizes of this study only include 105 participants and only 3 respondents for the interview. It will be difficult to find a significant relationship from the data, as a statistical test normally require a larger sample size to ensure a representative distribution of the population and to be considered representative of the whole population to whom the results will be generalized or transferred.

Secondly, the respondents were limited to only Form 5 gifted students. Their perception is solely based on previous experience of encountering the usage of blog. Due to time constraint, the researcher is unable to conduct a session on how to use the blog and shows the benefits of the usage of blogs to the gifted students. Thus, they might not know some features on blogs that they can use for many purposes especially in language writing and for information sharing.

The findings of this study will be more accurate and detailed if it is done involving a larger sample of the respondents. Larger samples will represent a more elaborated perception not only limited to the Form 5 gifted students but also the gifted students that come from different language and technological background.

The finding of this study will be more precise if the quantitative data from the questionnaires and qualitative data from the semi-structured interview are combined to formulate a more detailed discussion. But doing this, it will provide opportunity for the gifted students to voice out their views and opinions with regard to the issues. Likewise, it will provide genuine and reliable data that represents the population.

Both research objectives and research questions are successfully answered in this study. The findings of this study may be specifically for the Form 5 gifted students in Pusat PERMATApintar Negara (PPpN) in Universiti Kebangsaan Malaysia but the context of perceptions here refer to the gifted students' own perceptions on the usefulness of blogs in learning English language writing. Therefore, the finding of this study can be taken into account if any usage of blogs for the gifted students will be carried in future.

The findings of this study are useful to understand gifted learners' needs in using the blog for learning English language writing. Majority of the gifted students had positive perception of the usefulness of blogs in learning English writing. Yet, despite this positive perception, there a lot more variables that have to be taken into account. The writing preference and genre of gifted students'

writing have to be identified for future research needs. This is important to understand what the topics of interest are if the research on writing is to be carried out. By identifying the factors, researchers will be able to understand the mechanism for peer-to-peer knowledge sharing and acquisition of learning writing through blogging.

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