

## Health Literacy Research in Malaysia: A Scoping Review (Penyelidikan Literasi Kesihatan di Malaysia: Suatu Ulasan Penskopan)

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### ABSTRACT

*Research on health literacy is expanding worldwide. Health literacy has been recognised as a critical determinant of health at the 2016 Shanghai Declaration. Little is known about health literacy research in Malaysia. This scoping review aims to identify and summarise published studies on health literacy in Malaysia. PubMed, Scopus and the Malaysian Medical Repository (MyMedR) databases were searched for published work by Malaysian researchers. Searches were conducted up to November 2019. The search terms used are related to 'health literacy' and 'Malaysia'. Studies included were those involving Malaysian citizens and reporting on various aspects of health literacy. Studies were reviewed by two independent reviewers to determine their eligibility. Data extraction for the year of publication, name of authors, geographical location, research focus, and summary of findings from the full-text articles was carried out independently and any disagreement was resolved by consensus. A total of 29 articles were included with the earliest article published in 1985. Fifteen of the articles are on general health literacy, four on medication literacy, five on mental health literacy, three on media and e-health literacy and four on oral health literacy. Four articles are qualitative studies and the rest are quantitative studies. A few of the studies used validated health literacy tools such as Newest Vital Signs and HLS-EU-Q47. Therefore, we can conclude that there are only a limited number of articles published in the field of health literacy in Malaysia. Future work using validated international tools to allow comparison of the findings should be considered.*

*Keywords: Health literacy; Malaysia; medication literacy; mental health literacy*

### ABSTRAK

*Penyelidikan literasi kesihatan semakin mendapat perhatian di seluruh dunia. Literasi kesihatan telah diiktiraf sebagai penentu kesihatan yang kritikal pada Deklarasi Shanghai 2016. Amat sedikit yang diketahui tentang penyelidikan literasi kesihatan di Malaysia. Kajian ini bertujuan untuk mengenal pasti dan meringkaskan terbitan kajian tentang literasi kesihatan di Malaysia. Pangkalan data PubMed, Scopus dan Malaysian Medical Repository (MyMedR) digunakan sebagai sumber untuk kajian yang diterbitkan oleh penyelidik Malaysia. Carian telah dijalankan sehingga November 2019. Terma carian yang digunakan berkaitan adalah 'literasi kesihatan' dan 'Malaysia'. Kajian yang terlibat adalah dalam kalangan rakyat Malaysia tentang pelbagai aspek literasi kesihatan. Kajian dikaji semula oleh dua pengulas bebas untuk menentukan kelayakan mereka. Pengekstrakan data melibatkan tahun penerbitan, nama pengarang, lokasi geografi, fokus penyelidikan dan ringkasan penemuan daripada artikel teks penuh dijalankan secara bebas dan sebarang perselisihan diselesaikan melalui persetujuan. Sebanyak 29 artikel disertakan dengan artikel terawal yang diterbitkan pada tahun 1985. Lima belas artikel itu adalah tentang literasi kesihatan umum dengan empat literasi perubatan, lima literasi kesihatan mental, tiga di media dan literasi e-kesihatan dan empat literasi kesihatan mulut. Empat artikel adalah kajian kualitatif dan selebihnya adalah kajian kuantitatif. Beberapa kajian menggunakan alat literasi kesihatan yang disahkan seperti Newest Vital Signs dan HLS-EU-Q47. Oleh itu, secara kesimpulan, terdapat hanya sedikit artikel yang diterbitkan dalam bidang literasi kesihatan di Malaysia. Pada masa hadapan penggunaan alat antarabangsa yang disahkan untuk membolehkan perbandingan penemuan harus dipertimbangkan.*

*Kata kunci: Celik kesihatan mental; literasi kesihatan; literasi perubatan; Malaysia*

### INTRODUCTION

Health literacy plays an important role in empowering citizens to make healthy choices and participate in their healthcare. Health literacy is often defined as people's ability to access, understand, appraise and apply health information to make judgement and decisions concerning their health (Nielsen-bohlman et al. 2004). Population

studies showed that nearly half of European adults have less than sufficient health literacy and only 12% of American adults have proficient health literacy. People with limited health literacy are less likely to use preventive services (Scott et al. 2002) to seek help when they are sick, (Bennett et al. 1998), and more likely to overuse healthcare services with higher rate of hospitalisation and use of

emergency services (Baker et al. 2002, 1998; Gordon et al. 2002). As a result, this leads to higher healthcare costs (Howard et al. 2005). Limited health literacy in patients with non-communicable diseases such as high blood pressure (Williams et al. 1998), diabetes (Schillinger et al. 2003, 2002; Williams et al. 1998a) or HIV/AIDS (Kalichman & Rompa 2000; Kalichman et al. 2000) have less knowledge of their illnesses and how to manage them.

There is an increasing number of health literacy studies published each year (Kondilis et al. 2008). Health literacy research published in the United States and Europe (EU) had been used to draw up documents which shaped health system policy and law. In the United States, the first of these documents is 'Health Literacy: A Prescription to End Confusion' which was published by the Institute of Medicine in 2004 and led to the formation of the Plain Writing Act of 2010 (Nielsen-bohlman et al. 2004). In recent years, several EU Member States such as Germany, Ireland, Scotland, Austria, and Switzerland published their own policy documents relating to health literacy (Heijmans et al. 2014).

Recently, at the Ninth Global Conference on Health Promotion in Shanghai, member countries endorsed the Shanghai declaration (which recognised health literacy as a critical determinant of health) and made a commitment to invest in its development (World Health Organization 2017). Malaysia is one of the signatories of this declaration, committed to develop, implement and monitor intersectoral, national and local strategies for strengthening health literacy in all populations and in all educational settings. Unfortunately, little is known about the studies on health literacy done in our country, Malaysia. Results from health literacy research done in other countries are not transferable to our local setting. Health literacy is a social construct and greatly influenced by culture (Shaw et al. 2009). Culture gives significance to health information and can shape an individual's perception and definition of health and illness. This, in turn, influences the understanding of health literacy in different countries and settings.

So far, findings on the levels of population health literacy are alarming. In 2015, the National Health and Morbidity survey measured the population health literacy for the first time. It was found that only 6.6% of Malaysian adults have adequate health literacy (Institute for Public Health (IPH) 2015). This finding warrants further examination of research already done in the area of health literacy in Malaysia. This scoping review aims to identify and synthesise published health literacy research done in Malaysia thus far. It will be the first review to summarise published work in this area and to provide recommendations for future research.

#### MATERIALS AND METHODS

We searched databases archiving published work by Malaysian researchers, the PubMed, Scopus and the Malaysian Medical Repository (MyMedR) databases.

MyMedR is an open-access database of published Malaysian health and biomedical research. The materials are imported from PubMed and MyJurnal. The search terms used for health literacy were ('health literacy' OR 'health literate' OR 'medical literacy') OR 'sexual health literacy') OR 'mental health literacy') OR ('health'[Title/Abstract] AND 'literacy'[Title/Abstract]) OR 'numeracy') OR 'health literacy'[MeSH Terms] and Malaysia (all fields). These were restricted to English and Malay language. The searches were conducted up to November 2019. Two papers were found by tracking authors known for their research on health literacy in Malaysia.

Two unanimous reviewers assessed the articles to see if they fulfil the inclusion criteria. The inclusion criteria were as follow: the study was conducted in Malaysia, on Malaysian populations, and the study reported on health literacy. Any disagreement was resolved by consensus. Definitions of health literacy had gone through many evolutions; the one used in this review was "the capacity of individuals to obtain, process, and understand basic health information and services needed to make appropriate health decisions" (Nielsen-bohlman et al. 2004). Therefore, only studies that measured patients' capability to obtain, process and understand health information will be included. Studies focused solely on measuring disease knowledge were excluded. Only original studies published in full manuscript were included.

Full-text articles were obtained for those that fulfilled the inclusion criteria. Duplicates were excluded. Reviewers carefully read the articles and extracted relevant information. Study quality was not assessed as the focus of this review was to know the breadth of health literacy research in Malaysia rather than excluding studies based on their quality. The reason for this was to be as inclusive as possible. Data on the year of publication, authors, state in Malaysia where the research was conducted, area of health literacy tackled, and summary of findings were extracted.

## RESULTS

#### STUDY SELECTION AND CHARACTERISTICS

Figure 1 shows the flow chart of the article selection process. The search resulted in 203 articles and another 2 articles were found through authors' tracking. We assessed 126 articles for eligibility after excluding 79 duplicates. Only 29 fulfilled the inclusion criteria and were included in this review. These studies could be grouped into five main areas of health literacy, mainly: general health literacy, mental health literacy, medication literacy, media and e-health literacy, and oral health literacy. Articles from the same area will be discussed together.

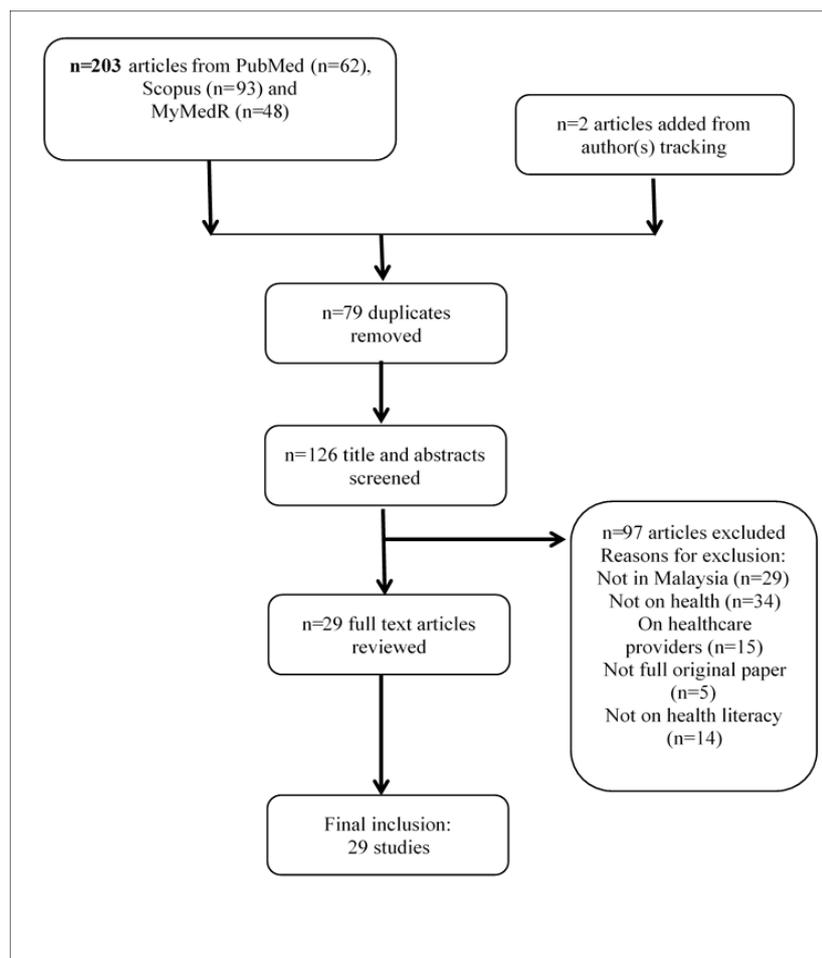


FIGURE 1. Flow chart of study selection

## DATA EXTRACTION AND SYNTHESIS

Table 1 summarised articles that were reviewed. Four studies used a qualitative study design, one used a mixed methods design and the rest employed a quantitative study design. Table 2 provides information on health literacy tools used in the quantitative studies included in this review. The first article we identified was published in 1985. However, majority of the articles were published

after 2010. Most studies were conducted in the states of Peninsular Malaysia (n=27) and in Klang Valley, namely the urban states of Kuala Lumpur and Selangor (n=12). Two papers published data from multi-country collaboration studies, allowing direct comparison of health literacy findings in Malaysia to that in other countries.

TABLE 1. Summary of included studies

Author(s)	Location	Main aim	Study design	Setting	Results
General Health Literacy					
(Bee 1985)	Sarawak	NR	Cross-sectional study	Community	The study population experienced a moderate prevalence of morbidity, the bulk of which were mild conditions easily treated by primary health care workers. The interviews on health literacy also show large gaps in the knowledge of the respondents with regards to the causation, spread and prevention of diseases. Another important finding stemmed from the study is the possible deleterious effects of food taboos on the diets of women during the post-partum period.

(Khan et al. 2010)	Pulau Pinang	to evaluate and compare the knowledge, attitude and perception about breast cancer among the students from different ethnic groups	Qualitative study	Malaysian public university	The findings demonstrate that the Thai students had comparatively better knowledge than the other groups. In terms of diagnosis, mammography and physical examination were recommended by a majority of the students. Surgery and radiation therapy were the preferred options to treat breast cancer. Thai students had good knowledge about the symptoms of breast cancer. However, the knowledge level on the diagnosis of breast cancer was the best among the Malays and the Arabs.
(Cheah & Su 2012)	Pulau Pinang	to investigate the impact of socio-demographic factors on the acquisition of health information on Non-Communicable Diseases (NCDs) among Malaysian adults	Cross-sectional study	Public area including university, shopping malls, offices and cafes,	The results suggest that old individuals, rural dwellers, those having chronic disease and with history of serious family illnesses are 0.19%, 2.39%, 2.2% and 2.71% less likely to acquire poor health information on NCDs than others, whereas Malays, Chinese, males and those of low education are 8.76%, 6.22%, 2.94% and 21.62% more likely to acquire poor health information on NCDs than others.
(Norrafizah et al. 2016)	Pahang	to determine the use of the Newest Vital Sign (NVS) in the Malay language as a tool to measure the level of health literacy among adults in the rural population in Malaysia	Cross-sectional study	Community	The study showed that, of the 111 respondents, 34 completed the questionnaire within three minutes. Seven (20.6%) adults were of adequate literacy having the ability to answer a minimum of four questions correctly within three minutes given. Meanwhile, 17 (50.0%) adults were of limited possible literacy and 10 (29.4%) were of the limited likely group.
(Skau et al. 2016)	Negeri Sembilan	to evaluate the efficacy of a complex behavioural change intervention combining behaviour change counselling provided by community health promoters (CHPs) and utilisation of an E-health platform to enhance women's health prior to pregnancy	RCT	Community	This study protocol describes the first community-based randomised controlled trial, to examine the efficacy of a complex intervention in improving the pre-pregnancy health of young Malaysian women and their spouses. Results from this trial will contribute to improved policy and practices regarding complex behavioural change interventions to prevent diabetes in the pre-conception period in Malaysia and other low- and middle-income country settings.

(Azreena et al. 2016)	Selangor	to determine the level of health literacy and its associated factors among type 2 diabetes mellitus patients attending a government health clinic	Cross-sectional study	Government health clinic	Majority of the respondents have limited health literacy level (85.8%). There is a significant association between ethnic group and health literacy level ( $\chi^2=6.317$ , $P=0.042$ ), level of education and health literacy level ( $\chi^2=6.304$ , $P=0.043$ ) and diabetes knowledge score and health literacy level [Odds Ratio (OR)=1.254, 95% Confidence Interval (CI) (1.063,1.479)]. Finally, the significant predictors for adequate health literacy level were the Chinese ethnic group [Adjusted OR (AOR)=4.441, 95% CI (1.472,13.392)] and diabetes knowledge score [AOR=1.238, 95% CI (1.031,1.488)].
(Hamzah et al. 2016)	Malaysia, multi-states	to determine the influence of health literacy towards health information-seeking behaviour among Malaysian university students	Cross-sectional study	University	The level of health literacy among Malaysian university students is moderate. Results also showed that 23.6 percent of the studied factor contributed to health information-seeking behaviour model.
(Chuen et al. 2016)	States in Malaysia	to examine the influences and effectiveness of newspaper in conveying health literacy of obesity among Malaysian youth	Cross-sectional study	NR	It was found that newspaper-oriented respondents have a higher awareness of obesity than non-newspaper-oriented respondents. However, awareness among the overall respondents is still mainly average.
(Duong et al. 2017)	Kuala Lumpur, Selangor, Perak	to validate a comprehensive health literacy survey tool European health literacy questionnaire (HLS-EU-Q47) for the general public in several Asian countries	Validation study	Public secondary school	The questionnaire was shown to have good construct validity, satisfactory goodness-of-fit of the data to the hypothetical model in three health literacy domains, high internal consistency (Cronbach's $\alpha>0.90$ ), satisfactory item-scale convergent validity (item-scale correlation=0.40), and no floor/ ceiling effects in these countries.
(Shahrir et al. 2018)	Klang Valley	to assess limited health literacy level and its associated factors among obese and overweight housewives	Sub-analysis of RCT findings	Public low-costs flats	The mean (SD) NVS score was 1.07(1.19) with most (87.5%) housewives having limited health literacy. Factors that were significantly associated with limited health literacy were older age of 45 to 59 years old ( $p = 0.040$ ), primary education and below ( $p = 0.001$ ) and absence of internet connectivity ( $p = 0.001$ ). In the final model, absence of internet connectivity (OR 2.61; 95% CI 1.31 to 5.22) was associated with limited health literacy.

(Hagger et al. 2018)	Malaysia, multi country	to examine the prevalence and predictors of HL in FH patients attending clinics in seven countries	Cross-sectional study	Familial hypercholesterolemia (FH) clinics	Inadequate HL was lowest in the UK (7.0%), Australia (10.0%), Hong Kong (15.7%), and Taiwan (18.0%) samples, with higher rates in Brazil (22.0%), Malaysia (25.0%), and China (37.0%) samples. Income was an independent predictor of HL levels, accounting for effects of age. HL was also independently related to China national group membership.
(Hamzah et al. 2018)	Klang Valley	to research the influence of parental and peer attachment on the health literacy of adolescents	Cross-sectional study	Secondary School	The level of health literacy among these adolescents was moderate ( $M = 3.61$ , $SD = 0.51$ on a scale of 5). While the level of peer attachment among them was moderate ( $M = 3.48$ , $SD = 0.58$ ), the level of parental attachment was high ( $M = 3.73$ , $SD = 0.83$ on a scale of 5). Both parental attachment ( $b = 0.30$ , $p < 0.05$ ) and peer attachment ( $b = 0.37$ , $p < 0.05$ ) were shown to have significant independent effects on the level of adolescents' health literacy.
(Cheong et al. 2018)	Kuala Lumpur	to determine the change of HL scores and to investigate the difference of intervention outcomes at the weight loss (WL) intervention and WL maintenance phase between the HL groups	RCT	Low-cost flat	Both intervention and control participants have low HL. The intervention group increased the NVS mean score from baseline (1.19 scores) to the end of the WL maintenance phase (1.51 scores) compared to the control group. There was no significant difference in sociodemographic characteristics between the group with HL improvement and the group without HL improvement at baseline. Most of the dietary intake measurements at WL intervention were significantly different between the two HL groups among intervention participants. Physical activity and body composition did not differ significantly between the two HL groups among both intervention and control groups.
(Froze et al. 2019)	Sarawak	to identify the determinants of health literacy and healthy lifestyle practice against metabolic syndrome among the multi-ethnic group of Sarawak based on health literacy skills framework	Cross-sectional study	NR	Female respondents and those with higher education status were more likely to have a better healthy lifestyle practice. A greater level of health literacy was positively significant with both disease knowledge and healthy lifestyle practice. Participants with a good understanding of disease knowledge can directly influence healthy lifestyle. Health literacy and metabolic syndrome knowledge can mediate the relationship between sociodemographic variables, service accessibility, medical and family history with the practice of a healthy lifestyle.

(Duong et al. 2019)024	Kuala Lumpur, Selangor, Perak	to develop and validate a short-form HL instrument derived from the 47-item European Health Literacy Questionnaire (HLS-EU-Q47)	Validation study	NR	The HLS-SF12 was demonstrated to have adequate psychometric properties, including high reliability (Cronbach's alpha = .85), good criterion-related validity, a moderate and high level of item-scale convergent validity, no floor or ceiling effect, and good model-data-fit throughout the populations in these countries.
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#### Medication Literacy

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(Chan et al. 2015)	Kedah	to explore the health literacy of the Malaysian caregivers who received medications for their children by using a validated tool. Besides, the influences of their health literacy on comprehension of information on medication labels were examined	Cross-sectional study	A government-funded tertiary hospital	Health literacy was measured using the Newest Vital Sign, and only 5.8% of caregivers demonstrated adequate health literacy skills. Caregivers with only primary or secondary educational levels (adjusted odds ratio: 36.44; 95% confidence interval: 6.2, 214.08; $P < 0.001$ ) and monthly incomes below the poverty threshold (adjusted odds ratio: 11.12; 95% confidence interval: 1.13, 109.75; $P = 0.039$ ) are more likely to have limited health literacy skills. The majority (81.2%) of caregivers reported difficulty in reading medication labels, which was significantly associated with their health literacy (phi coefficient = 0.46; $P < 0.001$ ).
(Tan et al. 2015)	Pulau Pinang	to evaluate Malaysian consumers' practices, perceptions and understanding regarding the use of acetaminophen	Qualitative study	University based health and outpatient clinics and two selected community pharmacies.	Consumers have a positive attitude towards the popularity, safety and efficacy of acetaminophen. Consumers predominantly used acetaminophen for pain and fever. Some consumers tend to increase the frequency and dosage of acetaminophen consumption if their condition persisted. Consumers have difficulty recognising generic acetaminophen-containing products available in the market. Health literacy investigations found that consumers lack knowledge of the correct dosing regimen for acetaminophen in adults and children. Consumers are not aware of the precautions and toxicities of acetaminophen. To increase awareness of acetaminophen poisoning in Malaysia, educational tools regarding the proper use of acetaminophen are needed from the Ministry of Health and policy-makers.

(Zulkifli et al. 2016)	Klang Valley	Why the public is still buying unregistered drugs in Malaysia although there are awareness campaigns throughout Malaysia? How are the performances of the current awareness and educational programmes? How can these awareness and educational programmes be improved and be targeted to reduce unregistered drugs purchases amongst the public?	Mixed-method	NR	Most of the participants believed that the best tools for educating people about the dangers of unregistered drugs are television, Facebook (social media) and the internet. The majority of participants, 75% (n=12) also believed that raising awareness about the bad impact of unregistered drugs may discourage public purchase of unregistered drugs. The majority of pharmacists believed that health literacy is the most important aspect of developing a good sense of consumer understanding of unregistered drugs in consumers. The pharmacists believed that low health literacy would influence the public to purchase unregistered drugs.
(Nazatul Yusrina et al. 2017)	Negeri Sembilan	to study the predictors of health literacy on childhood immunisation among antenatal women	Cross-sectional study	Health clinics	81.2% of antenatal mothers have inadequate health literacy. The predictors were maternal education (AOR= 2.608, 95% CI 1.477-4.604), parity (AOR= 1.067, 95% CI 1.103-3.876), residential area (AOR= 2.344, 95% CI 1.184-4.641) and utilisation of government hospital (AOR= 2.344, 95% CI 1.184-4.641).

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#### Mental Health Literacy

(Khan et al. 2010)	Pulau Pinang	to determine the level of knowledge of depression among students at a Malaysian university	Cross-sectional study	Public university	Overall, the findings demonstrate a moderate level of knowledge among students. Of the different cultural groups, the findings showed that Chinese students have the best knowledge of the symptoms of depression, followed by the Malays and Indians. Regarding beliefs on the causes of depression, the majority identified educational issues such as failures in achievement and education-related problems (such as examinations and projects) as the major cause of depression. However, the death of a loved one, relationship problems and home/family disharmony were found to be perceived as significant causes of depression. The findings showed only a cursory knowledge of the medications used in the treatment of depression among respondents. The majority recommended alternative treatments, such as yoga, massage and traditional medicines. Ethnic background and religion have been observed as underpinning the belief in traditional ways of curing depression, such as yoga and meditation.
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(Loo et al. 2012)	Malaysia, multi country	to examine the ability of British, Malaysian and Hong Kong participants to identify nine different psychiatric vignettes. The second aim of the study is to compare treatment preferences in the form of recommended help for the person in the vignette	Cross-sectional study	Community	The British were the most adept at correctly identifying the cases of mental disorders in the vignettes followed by the Hong Kong Chinese and Malaysians. Overall, depression cases were the best identified and social phobia was the least identified. In terms of help recommendation, a higher percentage of British participants endorsed professional help as useful for the person in the vignette compared to Hong Kong and Malaysian participants.
(Mohamad et al. 2012)	Northern states	to identify caregivers' mental health literacy in Malaysia	Qualitative study	Community clinics	Most of the caregivers have some understanding of their relatives' mental illnesses. More than half of the participants found that the doctors were considered as their primary source of information about mental health. Most of the caregivers used religious and traditional coping mechanisms in their help-seeking processes. Each ethnic group had its own strong cultural beliefs about mental illness.
(Siti Fatimah et al. 2016)	Selangor	to investigate the effectiveness of a 4-week Web-based sychoeducational intervention program for depressive and anxiety symptoms in the community of Selangor, Malaysia	RCT	Community	The program aims to address the predictors that contribute to depression and anxiety in our community. This brief Web-based program will enable the community to use easy, user-friendly, valid, and reliable tools for assessing their mental health status. Second, the availability of the program in both English and Malay languages is an additional plus point. Participants can choose their preferred languages to complete the sessions. Third, the assessments are available in both languages and have been validated in our population. Fourth, the intervention program was designed to be as brief as possible to increase the acceptability of the program versus other lengthier interventions, which could further increase the dropout rates.
(Ibrahim et al. 2019)	Malaysia, multi-states	to examine the factors associated with a mental help-seeking attitude among students from the B40 income bracket	Cross-sectional study	Secondary school and University	Mental help-seeking attitude had a significant relationship with self-stigma on seeking help ( $r = -.258, p < .001$ ), general help-seeking attitude ( $r = .156, p = .027$ ), and age ( $r = .187, p < .001$ ). However, the strongest predictor for mental help-seeking attitude was self-stigma on seeking help ( $F(2,199) = 8.207, p < .001$ with $R^2$ of .076). University students had better depression literacy and lower levels of self-stigma and negative beliefs toward mental illness compared to secondary school students.

Media and e-Health literacy					
(Zalma et al. 2015)	Selangor	to determine the reliability and validity of television food advertising questionnaire	Validation study	Primary school	The questionnaire on television food advertising is reliable and valid to assess the effect of media literacy education on television food advertising on schoolchildren.
(Mohamad et al. 2015)	Klang Valley	to examine the media's role in health literacy and mothers' ability to access, understand, appraise and apply information on children growing up milk	Qualitative study	NR	Media could contribute towards mothers' health literacy, particularly through the information portrayed. However, the access, level of understanding and judgement of this information do not guarantee their health behaviours.
(Yilma et al. 2019)	NR	to assess the search behaviour of consumers and identify contextual factors affecting health information searching on the Web	Cross-sectional study (experimental design)	University campus	Frequent health information seeking led to more queries and long query length. English as a mother tongue and being healthy contributed to long query length. Queries with spelling errors and those formulated outside task descriptions were found to be ineffective.
Oral health literacy					
(Fabillah et al. 2015)	Kuala Terengganu	to assess the oral health literacy among carers of special needs children	Cross-sectional study	Community- Based Rehabilitation Centres	Majority of the participants had 'marginal' and 'adequate' OHL level of 32.5% and 52.5%, respectively. Only four (10%) participants had 'inadequate' OHL level. The 'reading comprehension' and 'numeracy' sections' mean scores were 37.54 (95% CI 35.7-39.4) and 38.17 (95% CI 34.8-41.6). The total OHL mean score was 75.7 (95% CI 71.2-80.2).
(Ismail et al. 2018)	Pahang	to assess the parental Oral Health Literacy (OHL) and its association with the oral health status of preschool children	Cross-sectional study	Preschool	The negative correlation between parental OHL and the oral health status of children indicates that when parental OHL level increases, the total dental caries experience (dmft) and oral hygiene status (visible plaque index: VPI) decreases ( $p < 0.05$ ). Lower dmft and VPI scores were also observed among preschool children of parents in the group with high parental OHL ( $p < 0.05$ ).

(Rani et al. 2019)	Kuala Lumpur	to evaluate the oral health literacy level among adolescents, prior to and after the oral health education program using visual oral health literacy tool	Cross-sectional study	Secondary schools	At the baseline, the students had a low visual oral health literacy score for both gingival, and tooth scores with the gingival score being significantly lower. The upper tooth and gingival scores were higher than the lower tooth and gingival scores. Comparison of scores before and after oral health education showed that both the tooth and gingival scores improved significantly. Visual oral health literacy tool allows evaluation of students' oral health literacy both visually and quantitatively.
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NR = Not reported

TABLE 2. Health literacy tools used in Malaysia

Measure	Type of Measure	No of items/ questions	Administration mode/ time	Scoring	Validation study	Language available
NVS (Newest Vital Signs)	Reading, comprehension; numeracy	6 questions on an ice-cream nutrition label	Self-administered; 3 min	Each item answered correctly is given a score of 1. Scores range: 1-6 (score <4 = limited HL)	(Norrafizah et al. 2016)	Malay
HLS-EU-Q47 (European Health Literacy Questionnaire)	Prose: Comprehension, Information seeking; Document, Application/function	47 items across 3 domains (healthcare, disease prevention, and health promotion)	Self- or interview administered; 15 min	The 47 items are adapted to a 50-point scale: 0–25: inadequate health literacy, 26–33: problematic health literacy, 33–42: sufficient health literacy, and 42–50: excellent health literacy	(Duong et al. 2017)	Malay
HLS-SF12 (the Health Literacy Short-Form 12)	Prose: Comprehension, Information seeking; Document, Application/function	12 items	Self- or interview administered	The HL indices were standardised to unified metrics from 0 to 50. An index value was thus obtained in which 0 represented the lowest HL and 50 the highest HL	(Duong et al. 2019)024	Malay

HeLD-14 (14 items Health Literacy in Dentistry)	Functional oral health literacy	14 items (seven conceptual domains of HL: access understanding, support, utilisation, economic barriers, receptivity, and communication)	Self-reported;	Each item was scored using a 5-point Likert scale ranging from 1 (“without any difficulty”) to 5 (“Unable to do”). After re-coding of 5 to 0, 4 to 1, 3 to 2, 2 to 3, and 1 to 4, the possible range of summary scores is from 0-56 (HeLD-14). Higher scores indicate higher oral health literacy.	(Muhd Noor et al. Malay 2019)
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#### SYNTHESIS OF RESULTS

The articles were grouped into five important areas of health literacy namely; general health literacy (n=15), medication literacy (n=4), mental health literacy (n=5), media and e-health literacy (n=3) and oral health literacy (n=4). The earliest study (1985) on general health literacy explored patients' perception of disease causation, choice of treatment, preventive measures and food taboo related to infectious disease (Bee 1985). Four studies reported the validation of health literacy tools in a local language, one on NVS, HeLD-14 HLS-EU-Q47 and HLS-SF12. (Duong et al. 2017; Norrafizah et al. 2016). The NVS was used the most to measure the level of health literacy in Malaysia. However, the Malay version of NVS was found to be inappropriate and inadequate to measure health literacy among adults in the rural population and its validity among urban adults has not been tested (Norrafizah et al. 2016).

For medication literacy, one study measured the health literacy levels of Malaysian caregivers and parents and tested the influence of their health literacy on the comprehension of medication information and childhood immunisation score (Chan et al. 2015; Nazatul Yusrina et al. 2017). Other studies explored Malaysian consumer's practices, perceptions and understanding regarding the use of acetaminophen and the use of unregistered drugs (Tan et al. 2015; Zulkifli et al. 2016).

Studies on mental health literacy focused on measuring mental health literacy among caregivers, students from the B40 income bracket and university students (Ibrahim et al. 2019; Khan et al. 2010; Mohamad et al. 2012). In one study, psychiatric vignettes were used to examine the mental health literacy of British, Malaysian, and Hong Kong participants (Loo et al. 2012). Another study is a randomised control trial

investigating the effectiveness of a 4-week Web-based psychoeducational intervention program for those with depressive and anxiety symptoms in the community of Selangor, Malaysia (Siti Fatimah et al. 2016)

Studies in the last five years concentrated on new areas of health literacy, namely oral health literacy and media and e-health literacy. Given that the field of media and e-health literacy is a fairly new area of health literacy research in Malaysia, studies were focused on the validation of food advertising tool (Zalma et al. 2015) and exploration of media's role on health literacy (Mohamad et al. 2015). A recent study on e-health literacy looked at the search behaviour of students and identified contextual factors affecting health information searching on the Web (Yilma et al. 2019).

Another area of health literacy that is of research interest in Malaysia is on oral health literacy. Research in oral health literacy is catalysed by the availability of validated tools to measure oral health literacy, such as the Malay Health Literacy in Dentistry (HeLD-14) (Muhd Noor et al. 2019). Oral health literacy was measured in children with special needs (Fabillah et al. 2015), and the association between parental oral health literacy and oral health status of preschool children was tested (Ismail et al. 2018). There is also an intervention study looking at the effect of an oral health education program using visual oral health literacy tool on adolescents oral health literacy (Rani et al. 2019).

#### DISCUSSION

There were two major findings from this review. First, research on health literacy in Malaysia is limited and second, most published studies focused on general health literacy. Health literacy research done in developing countries trailed behind that of developed countries,

such as the United States and European countries. In a bibliometric analysis of published papers on health literacy by authors in the European Union from 1991 to 2005, Kondilis et al. (2008) identified 13,710 articles. More articles were published by researchers in the United States, approximately three times the number of articles published in Europe. Developing countries may be focusing on economic development for the improvement of health rather than tackling issues related to health literacy. Since its independence, health reforms in Malaysia focused on restructuring community and eradication of poverty (Sebastian et al. 2016). Health literacy which focuses on patient empowerment and individual attributes, such as knowledge and attitudes are often overlooked. In developing countries where there is rapid economic development, societal resources such as literacy and educational attainment may not have caught up with the expansion in healthcare infrastructure and human resource. Health literacy research needs to be expanded in these countries to adequately deal with this shortfall.

This review identified five main areas of health literacy research in Malaysia. General health literacy was the most studied with fifteen papers published. Five studies used a local language adapted functional health literacy tool, Newest Vital Sign to measure health literacy levels in a variety of populations (Azreena et al. 2016; Chan et al. 2015; Cheong et al. 2018; Norrafizah et al. 2016; Shahrir et al. 2018). Levels of adequate health literacy vary according to the population surveyed; with the highest proportion reported in community-dwelling adults and lowest in caregivers of sick children. As for patients with type 2 diabetes mellitus in primary care, only 14.2% of Malaysian patients have adequate health literacy compared to 23.7% in Taiwan (Tseng et al. 2018). There could be many reasons for this observed difference. Critical examinations of health education interventions delivered to patients with type 2 diabetes mellitus in Taiwan compared to Malaysia and comparing the factors associated with lower health literacy levels in these two settings may show some answers. So far, public health researchers have resorted to these small cross-sectional studies to inform them about the burden of limited health literacy in the Malaysian populations.

Health literacy had been measured using different tools in the Asia-Pacific regions, thus making the comparison of health literacy levels across countries difficult. This review identified two studies validating international and regionally used health literacy measurement tools, the HLS-EU-Q47 and HL-SF12. Both validation studies recruited patients from six Asia-Pacific countries (Duong et al. 2019, 2017). The Malay version of the HLS-EU-Q47 was validated in 462 Malaysian and was shown to have good construct validity, satisfactory goodness-of-fit of the data to the hypothetical model in three health literacy domains, high internal consistency (Cronbach's  $\alpha > 0.80$ ), satisfactory item-scale convergent validity (item-scale correlation = 0.40), and

no floor/ceiling effects. In the same study, Malaysia was found to have the second-highest general health literacy index, 1.5 points behind Taiwan (32.9 vs. 34.4) (Duong et al. 2017). The Malay version of the HLS-SF12 index score was  $32.7 \pm 7.9$  in Malaysia. The correlation between HL index scores of HLS-SF12 and HLS-EU-Q47 by the Pearson correlation coefficient was satisfactory with a rho-value of 0.96. The variance of the full form was explained by the HLS-SF12, with 93% in Malaysia (Duong et al. 2019).

Mental health literacy and medication literacy are two important areas of health literacy research in Malaysia. Mental health literacy is defined as "the knowledge and beliefs about mental disorders, which aids their recognition, management or prevention" (Jorm et al. 1997). Studies included in this review focused more on the assessment of mental health literacy in common mental health conditions, such as anxiety and depression. We identified only one study testing the effectiveness of a web-based psychoeducational intervention program for those with depressive and anxiety symptoms. Future studies should be focusing more on the development of interventions to improve mental health literacy and to include other important mental health conditions, such as schizophrenia. The intervention studies should be carried out by researchers championing mental health literacy in Malaysia.

Lower health literacy scores are associated with patients forgetting to take their medications (Pouliot & Vaillancourt 2016). Patients with non-communicable diseases in Malaysia were found to have low medication adherence. Studies on medication literacy will be valuable to help tackle this problem. Unfortunately, studies included in this review are limited and have a narrow focus on one drug (i.e. acetaminophen) or one group of drugs only (i.e. unregistered drugs). More studies should be conducted in this area to further our understandings of the role of health literacy in medication adherence in Malaysia.

This review has several limitations. Only three databases were used in this review and given that the MyMedR partly extracts articles from PubMed, there may be duplications. In this review, we wanted to focus on articles dealing with the greater concept of health literacy, which is adequately identified by the review's search term. Quality assessment of the included studies was not done in order to be more inclusive. Future reviews should look into this aspect and may include contacting authors whose work were included in this review to obtain an update of their work in health literacy.

#### CONCLUSION

Articles published in the field of health literacy in Malaysia are limited. Future work may be required to build on previous work and to study the challenges faced by these researchers. There are issues with some of the health literacy tools used in recently published

studies. Therefore, a locally well-validated tool used internationally will enable better measurement of health literacy levels and comparison across countries. There is still much work to be done in the area of health literacy in Malaysia.

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