Socioeconomic Determinants of Health Enhancing Expenditure among the Elderly in Malaysia: An Ethnic Comparison

(Penentu-Penentu Sosioekonomi Perbelanjaan Peningkatan Kesihatan dalam Kalangan Warga Tua di Malaysia: Perbandingan Etnik)

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ABSTRACT

The objective of this study is to examine the effects of socioeconomic factors on consumption of health-enhancing goods and services among different ethnicities of the elderly in Malaysia. The Third National Health and Morbidity Survey (NHMS III) comprising 4573 respondents (aged ≥ 60) is used for analysis. The results suggest that age, income, gender, education and location of residence are significantly associated with consumption of health-enhancing goods and services. Specifically, there are negative relationships between the likelihood of consuming health-enhancing goods and services and older individuals, lower income earners, males, the less-educated, and rural dwellers. Based on these findings, several intervention strategies toward promoting the consumption of health-enhancing goods and services are suggested.

Keywords: Consumption; determinant; elderly; health; socioeconomics

ABSTRAK

Kajian ini bermatlamat meninjau kesan faktor-faktor sosioekonomi terhadap penggunaan barangan peningkatan kesihatan di antara warga tua yang berbeza dari segi etnik di Malaysia. Third National Health and Morbidity Survey (NHMS III) yang mengandungi 4573 responden (umur ≥ 60) digunakan untuk analisis. Keputusan memperlihatkan umur, pendapatan, jantina, pendidikan dan tempat kediaman berkorelasi dengan penggunaan barang-barangan peningkatan kesihatan. Khususnya, terdapat hubungan negatif di antara kemungkinan menggunakan barangan peningkatan kesihatan dengan individu tua, berpendatan rendah, lelaki, berpendidikan rendah dan yang menetap di kawasan luar bandar. Berasaskan penemuan ini, beberapa strategi ke arah meningkatkan penggunaan barangan peningkatan kesihatan telah dicadangkan.

Kata kunci: Penggunaan; penentu; warga tua; kesihatan; sosioekonomi

INTRODUCTION

Notwithstanding the stage of economic development, all countries in the world are now currently experiencing a rising burden of non-communicable diseases (NCDs), most notably cardiovascular diseases, diabetes and cancers (Disease Control Division 2006). While NCDs are preventable, the majority of the mortality and morbidity worldwide are caused by NCDs rather than infectious diseases. In 2008, approximately 36 million global deaths were associated with NCDs, and around 80% of which occurred in low- and middle-income countries (World Health Organization 2011). Worse still, it was predicted that the NCDs induced deaths will increase to about 52 million by 2030 (World Health Organization 2011).

Similar trends are noted in Malaysia, where NCDs are the major contributing factors of mortality and morbidity. More than two-thirds of the total disease burdens in the country are attributed to NCDs (World Health Organization 2012). As pointed out by Disease Control Division (2006), cardiovascular diseases, diabetes and cancers are among the main causes of admissions and deaths in government hospitals. Worse still, there appears to be an increasing trend in the prevalence of diabetes and hypertension. The official reports of Ministry of Health Malaysia showed that the prevalence of diabetes doubled from 6.3% in 1986 to 15.2% in 2011, and the prevalence of hypertension increased from 14.4% in 1986 to 32.7% in 2011 (Institute for Public Health 2008 2011).

Health-enhancing goods and services refer to the types of goods and services that can improve individuals' health and prevent diseases, which include medical care, dietary supplements and health education services. For instance, Rimm et al. (1998) and Giovannucci et al. (1998) find that use of dietary supplements can significantly reduce the risk of developing coronary heart disease and colon cancer among women. Moreover, Kenkel (1991) observes that education can significantly improve individuals' health by increasing individuals' preferences for healthy lifestyles, while Kenkel (1994)

and Cheah (2013) provide the evidence that use of preventive medical care is able to reduce the likelihood of acquiring NCDs through early detections of disease symptoms.

Despite the potential benefits of health-enhancing goods and services, the current literature is nearly silent on how socioeconomic factors affect the decisions of people to consume them, especially in Malaysia, where NCDs are prevalent. While Kefeli and Zaidi (2013) are notable in examining the socioeconomic determinants of healthcare utilisation in Malaysia, they do not look at the consumption of health-enhancing goods and services in detail. It is important for government to identify which type of individual consumes or does not consume health-enhancing goods and services, if the goal of improving health outcomes is to be achieved. To fill the research gap, this study sets out to investigate the effects of socioeconomic factors on consumption of health-enhancing goods and services among different ethnicities of the elderly (aged ≥ 60) in Malaysia. The reason for choosing the elderly is that they are in the age group that possesses the highest rate of prevalence of NCDs (Institute for Public Health 2011). As such, the findings will serve the interests of policy development directed toward improving population health.

Among all the ethnic groups in Malaysia, Malays faced the highest prevalence of hypertension (34%) and hypercholesterolemia (38.4%) in 2011 (Institute for Public Health 2011). In addition, the prevalence of diabetes (16.9%) and obesity (32%) among Malays was the second highest of all the ethnics (Institute for Public Health, 2011). Studies showed that Malays are highly associated with unhealthy behaviours. For example, Yen et al. (2011) use a nationwide data and find that Malays have the lowest likelihood of adopting healthy diet practices. Tan et al. (2009) observe that Malays possess the highest likelihood of smoking. Finally, based on a primary survey sample, Cheah (2011) finds that Malays have the highest tendency to be physically inactive. Therefore, it is important to divide the sample into Malays and non-Malays for an in-depth analysis.

The contributions of this study to the existing literature are three folds. First, the present study provides the first in-depth analysis of the factors affecting consumption of health-enhancing goods and services in Malaysia. Second, a nationally representative data consisting of a large sample size and detailed information on individual's socioeconomic profile is used for analysis. Hence, important academic findings can be generated. Third, the findings can facilitate a comparison of health-enhancing behaviour between a developing country (i.e. Malaysia) and the results for the developed countries documented in the literature.

THEORETICAL FRAMEWORK

The theoretical framework used in this study is based on the Grossman's (1972) demand for health capital model. According to Grossman (1972), health is defined as a capital that produces outputs of 'healthy time', and it can determine the amount of time that people are able to allocate for market and non-market activities such as leisure. Different people may possess different levels of health capital. Heredity, lifestyle and environment, for instance, are the factors that determine health capital. Similar to other types of capital, health can depreciate over time, meaning that people will become weaker as they age. This depreciation can ultimately lead to death when health capital falls below a minimum level, at which, the amount of time that people can spend on market and non-market activities is equal to zero.

As pointed out by Grossman (1972), health serves two purposes. First, people have better well-being when they become healthier, thus better health yields greater utility. Second, health increases the amount of time available in the future that people can allocate for market and non-market activities. The first reason is known as 'consumption benefits of health' or 'consumption commodity', while the second reason is known as 'investment benefits of health' or 'investment commodity'.

In efforts to reduce the depreciation of health capital, it is necessary to raise input of resources, such as, medical care, healthy lifestyle, shelter and food into health. Grossman (1972) defines this as production of health, and claims that people have the capability to control their level of health capital. In other words, people are able to produce health by using appropriate inputs. In brief, the health production function can be expressed as follow:

$$H = f(m, t, g, l, s, e) \qquad (1)$$

where, H is health capital; m is the amount of medical care consumed; t refers to medical technology; g represents genetic make-up; l denotes lifestyle such as participation in physical activity; s is socioeconomic status like income and education; and e is environment such as air and water.

Cropper (1977) develops an alternative health capital model, which mainly focuses on how health investments vary in a life-cycle. According to Cropper (1977), the assumption of Grossman (1972) that perfect certainty in health is somewhat unrealistic. In fact, people do not have perfect information about their own health status. As such, although people invest in their health, people are unable to assure that they will not acquire diseases. In other words, the risk of acquiring diseases is unknown. Hence, Cropper (1977) includes preventive medical care in his health capital model, and argues that people need to consume preventive medical care in order to know their health status.

Based on Cropper (1977), the medical care that people consume can be divided into two main categories:

1) curative; and 2) preventive. Curative medical care refers to the type of medical care used for curing purposes. People use it only when they are diagnosed with diseases. Heart bypass, dialysis, chemotherapy, for instance, are among the common curative medical cares. Preventive medical care, on the other hand, refers to the type of medical care used by healthy people for diseases detection and prevention. This includes health screening, blood test and vaccination. The modified production function based on Cropper (1977) can be expressed as follow:

$$H = f(cm, pm, t, g, l, s, e) \qquad (2)$$

where, *cm* reflects curative medical care; and *pm* refers to preventive medical care. Consumption of health-enhancing goods and services considered in the present study is a component of health production that consists of preventive medical care and other inputs to heath.

LITERATURE REVIEW

The factors determining health-enhancing behaviours have been investigated elsewhere (Duffy 1997; Felton et al. 1997; Pullen et al. 2001; Qi et al. 2006; Beser et al. 2007). The relationship between age and the likelihood of participating in health-enhancing lifestyle is inconclusive. On one hand, Duffy (1997) and Al-Kandari et al. (2008) find that older individuals are more likely to adopt a health-enhancing lifestyle than their younger counterparts. This is simply because older individuals have a higher tendency to suffer from various diseases and consequently are more concerned about their own health (Grossman, 1972). Surprisingly, however, the findings of Pullen et al. (2001) suggest otherwise. With regard to income, it is found to have a positive relationship with health-enhancing lifestyle. Using nationwide data of Canada and Turkey, Qi et al. (2006) and Beser et al. (2007), respectively, find that income increases the propensity to adopt health-enhancing behaviours, such as participation in physical activity and use of preventive medical care.

The effect of gender on health-enhancing lifestyle seems to be contradictory. Felton et al. (1997) draw on a survey data and find that females have higher odds of engaging in health-enhancing lifestyle than males. Similar findings are evidenced by a more recent study by Paulik et al. (2010). The authors find that Hungarian women are more likely to live a healthy lifestyle compared to men. In contrast, Al-Kandari et al. (2008) reveal that males are significantly associated with a higher likelihood of adopting health-enhancing practices. Education variable also shows significant relationship with health-enhancing lifestyle. For instance, Duffy (1997) and Qi et al. (2006) find that well-educated individuals are more likely to engage in health-enhancing lifestyle than their less-educated peers. Perhaps, this is because education can improve an individual's interpreting skill and health

knowledge, thus promoting healthy lifestyle (Grossman 1972; Kenkel 1991). Previous studies also provide some insights into the effect of house locality on health enhancement. For example, Johansson et al. (1999) and Fogelholm et al. (2006) find that individuals who reside in urban area are more devoted to practice health-enhancing lifestyle compared to their rural counterparts.

METHODOLOGY

DATA

Because the latest National Health and Morbidity Survey (NHMS) conducted by the Ministry of Health Malaysia in 2011 and 2013 do not consist of the information on health-enhancing goods and services, this study uses data from the Third National Health and Morbidity Survey (NHMS III). NHMS III was a cross-sectional population-based survey. The survey period was from April 2006 to January 2007. The survey was carried out in all the states in Malaysia. The data was collected based on two stage stratified sampling. The sampling frame was designed by the Department of Statistics Malaysia. The first stage sampling unit was based on geographically contiguous areas of the country [Enumeration Blocks (EBs)]. The second stage sampling unit was based on the Living Quarters (LQs) in each EB, and all the individuals that resided in the selected LQs were surveyed. In particular, each EB consisted of 80-120 LQs with about 600 populations. The inclusion criteria of the survey were: 1) adults aged 18 years and above; 2) Malaysian citizen, 3) both genders; and 4) all ethnic groups.

The piloted bi-lingual (*Bahasa Malaysia* and English) questionnaires were used by the trained health professionals to interview (face-to-face) the respondents. The sample size was calculated based on three criteria: 1) the 10% prevalence rate of the health problems in Malaysia as documented in the Second National Health and Morbidity Survey (NHMS II); 2) the overall response rate of NHMS II, and 3) margin of error of 1.2 and design effect of 2. More detailed information on the calculation was published elsewhere (Institute for Public Health, 2008). The calculated sample size was 34,539 respondents which represented 12,923,504 Malaysian adults. The overall response rate was about 99% (34,194 respondents). The survey was approved by the Medical Research Ethics Committee of Ministry of Health Malaysia.

VARIABLES

The outcome variable of this study, consumption of health-enhancing goods and services,[1] is formatted as a categorical variable with binary outcomes, denoting whether or not the respondents used preventive medical care, dietary health supplements and health education

services to improve their health, even if they did not have any health problems.

Because of the paucity of empirical studies on consumption of health-enhancing goods and services, the explanatory variables of the present study are selected based on previous studies that focus on heath-enhancing behaviours (Duffy 1997; Felton et al. 1997; Hulme et al. 2003; Qi et al. 2006; Beser et al. 2007; Paulik et al. 2010; Pullen et al. 2001). In particular, the selected explanatory variables are: 1) age; 2) income; 3) gender; 4) education; 5) marital status; 6) location of residence; and 7) employment status (see Table 1). Of all the explanatory variables, only age and income are formatted as continuous variables to allow for linear relationships.

ECONOMETRIC SPECIFICATION

Logit models are used for the statistical analysis as they can predict the probability that lies between the unit intervals (Greene 2007). The present study first develops a logit model to examine the effects of socioeconomic factors on the likelihood of consuming health-enhancing goods and services among Malays. Then, another similar logit model is developed for non-Malay sample. Prior to estimating these two logit models, the distributions of the residuals of the regression models are assessed using the Jarque-Bera test, and the results showed that the residuals are not normally distributed. Hence, logit models are appropriate for this study. Maximum likelihood estimation is used to estimate the logit models. In general, the logit models can be written as follow:

$$L_i = \ln\left(\frac{P}{1-P}\right) = \beta_0 + \beta_i X_i + \varepsilon \qquad (3)$$

where, L is the log of the odds ratio; P is the probability that a respondent consumes health-enhancing goods and services; $1 - P$ is the probability that a respondent does not consume health-enhancing goods and services; $P/(1-P)$ is the odds that a respondent consumes health-enhancing goods and services; X is the explanatory variable which is hypothesised to affect the probability of consuming health-enhancing goods and services; β_0 is the constant term; β_i is coefficient of the explanatory variable; and ε is the error term.

The estimated form of the logit transformation is expressed as follow:

$$\ln\left(\frac{P}{1-P}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4$$
$$+ \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8$$
$$+ \beta_9 X_9 + \varepsilon \qquad (4)$$

Where,

P = probability of consuming health-enhancing goods and services
$1 - P$ = probability of not consuming health-enhancing goods and services

X_1 = age (in years)
X_2 = monthly individual income [in hundred Malaysian Ringgit (RM)]
X_3 = male
X_4 = tertiary education
X_5 = secondary education
X_6 = married
X_7 = widowed/divorced
X_8 = urban areas
X_9 = unemployed

Likelihood Ratio (LR) and Hosmer-Lemeshow (HL) tests are conducted to examine the overall model evaluation and goodness-of-fit of the logit models, respectively. All the explanatory variables are tested for multicollinearity problems using Variance Inflation Factor (VIF) test, and the result implies that multicollinearity is not an issue.[2] Since the focus of this study is on the elderly, respondents aged below 60 years are removed. After the removal, a total of 4,573 respondents (aged $\geq$ 60) are used for analysis. Of these respondents, 2,412 are Malays and 2,161 are non-Malays. The statistical analyses are performed using Stata statistical software version 13.1 (StataCorp 2013).

RESULTS

CHARACTERISTICS OF THE SURVEY RESPONDENTS / DEMOGRAPHY

The characteristics of the survey respondents are demonstrated in Table 1. Of the total respondents, only 19.62% consumed health-enhancing goods and services. The average age of the respondents is around 68 years old, while the average monthly individual income is RM 1,380.16. The majority of the respondents are females (53.68%). A large proportion of the respondents have primary education (85.26%), followed by those with secondary (13.03%) and tertiary education (1.71%). In terms of marital status, 68.86% of the respondents are married, 29.46% are widowed/divorced and only 1.68% are single. The sample consists of 51.30% urban dwellers and 48.70% rural dwellers. With regard to employment status, a large percentage of the total respondents are unemployed (74.87%).

MARGINAL EFFECTS OF EXPLANATORY VARIABLES

Malays   The results of the logit analysis of consumption of health-enhancing goods and services among Malays are presented in Table 2. The p-value of LR χ^2 of 78.140 is less than 0.001, thus, the null hypothesis that all the estimated coefficients are simultaneously equal to zero is rejected. Of all the explanatory variables, age, income and education are found to be significant. The p-value of HL χ^2 of 9.190 with 8 degree of freedom is 0.326, hence, the null hypothesis that the model is fit is not rejected.

TABLE 1. Definitions and sample means of variables

Variables	Definitions	%/Mean*
Outcome variable		
Health-enhancing goods and services		
Yes	Consumed health-enhancing goods and services	19.62
No	Did not consume health-enhancing goods and services	80.38
Explanatory variables		
Age	Age in years	68.31
Income	Monthly individual income (RM)	1380.16
Gender		
Male	Gender is male	46.32
Female	Gender is female	53.68
Education		
Tertiary	Highest level of education is tertiary	1.71
Secondary	Highest level of education is secondary	13.03
Primary	Highest level of education is primary	85.26
Marital status		
Married	Marital status is married	68.86
Widowed/divorced	Marital status is widowed/divorced	29.46
Single	Marital status is single	1.68
Location of residence		
Urban	Urban dweller	51.30
Rural	Rural dweller	48.70
Employment status		
Unemployed	Being unemployed (housewife, retiree, student)	74.87
Employed	Being employed	25.13

Note: *For age and income variables, the value refers to mean, whereas for the other variables, the value refers to percentage. RM refers to Malaysian Ringgit.

Taken together, these imply that the model for Malay sample is very good fit.

The following discussion on the factors affecting consumption of health-enhancing goods and services is based on the marginal effects of the logit model. Age, income and education are the statistically significant variables. Holding other factors constant, an additional year of age reduces the likelihood of consuming health-enhancing goods and services by 0.4%, whereas, for every RM100 increase in monthly individual income, the likelihood of consuming health-enhancing goods and services increases by 0.2%. In terms of education, individuals with tertiary and secondary education have a 28.8% and 13.0% higher likelihood of using heath-enhancing goods and services, respectively, compared to their counterparts with only primary education. Considering the correct prediction, if the estimated probability of consuming health-enhancing goods and services is greater than or equal to 0.5, it is classified as consuming. If the probability is less than 0.5, it is classified as not consuming. Overall, 78.61% of the proportions are predicted correctly by the model. Approximately 3.08% of those who consume health-enhancing goods and services are correctly predicted, and 99.37% of those who do not consume health-enhancing goods and services are correctly predicted (see Table 3).

Non-Malays The results of the logit analysis of consumption of health-enhancing goods and services among non-Malays are showed in Table 4. The p-value of LR χ^2 of 154.270 is less than 0.001, thus, the null hypothesis that all the estimated coefficients are simultaneously equal to zero is rejected. The significant variables are age, income, gender, education and location of residence. The p-value of HL χ^2 of 2.450 with 8 degree of freedom is 0.964. Hence, the null hypothesis that the model is fit is not rejected. It is, therefore, concluded that the model for non-Malay sample fits the data very well.

The results of the marginal effects show that age, income, gender, education and location of residence are the statistically significant variables. As age goes up by one year, the probability of consuming health enhancing goods and services reduces by 0.4% if other variables are held constant. However, a RM100 increase in monthly individual income raises the probability of consuming health enhancing goods and services by 0.1%. With regard to gender, males are 5.7% less likely to consume health enhancing goods and services than females. Compared to individuals with only primary education, individuals with tertiary and secondary education are 41.8% and 21.5% more likely to consume health enhancing goods and services, respectively. Holding other factors constant, urban dwellers are 4.5% more likely to

TABLE 2. Results of the logit analysis of consumption of health-enhancing goods and services among Malays (n = 2412)

Variables	Estimated coefficient	Odds ratio	Wald statistic	Marginal effect	Wald statistic
Constant	-0.031 (0.785)	0.969	-0.04	–	–
Age	-0.026*** (0.009)	0.975	-2.93	-0.004*** (0.001)	2.93
Income#	0.013*** (0.003)	1.013	3.64	0.002*** (0.001)	3.49
Gender					
Male	-0.188 (0.126)	0.829	-1.49	-0.027 (0.018)	-1.50
Female	–	1.000	–	–	–
Education					
Tertiary	1.361*** (0.409)	3.899	3.33	0.288*** (0.102)	2.82
Secondary	0.695*** (0.159)	2.003	4.36	0.130*** (0.035)	3.73
Primary	–	1.000	–	–	–
Marital status					
Married	0.325 (0.558)	1.384	0.58	0.045 (0.070)	0.65
Widowed/divorced	0.430 (0.563)	1.537	0.76	0.075 (0.110)	0.68
Single	–	1.000	–	–	–
Location of residence					
Urban	0.113 (0.109)	1.119	1.03	0.018 (0.018)	1.02
Rural	–	1.000	–	–	–
Employment status					
Unemployed	-0.127 (0.131)	0.881	-0.97	-0.020 (0.022)	-0.94
Employed	–	1.000	–	–	–
LR χ^2 (9)	78.140***				
HL χ^2 (8)	9.190				
Correct prediction (%)	78.61				

Note: LR refers to likelihood ratio. HL refers to Hosmer-Lemeshow. Asymptotic standard errors in parentheses. ***indicate significance at the 1% level, **at the 5% level and *at the 10% level. # denotes income divided by 100.

TABLE 3. Predicted probabilities of consuming health-enhancing goods and services among Malays

Predicted	Observed		Overall percentage
	Yes	No	
Yes	16	12	
No	504	1880	
Percentage correct	3.08	99.37	78.61

consume health enhancing goods and services than rural dwellers. In terms of overall correct prediction, 82.88% of the proportions are predicted correctly by the model. Approximately 7.16% of those who consume health-enhancing goods and services are correctly predicted, and 98.88% of those who do not consume health-enhancing goods and services are correctly predicted (see Table 5).

DISCUSSION

The result of the present study suggests that the older elderly from both Malay and non-Malay ethnic groups are less likely to consume health-enhancing goods and services than their younger counterparts. This is somewhat consistent with that of Pullen et al. (2001) using a survey sample consisting of 102 women aged 65 years and above in Nebraska. The authors suggest that age can significantly reduce the frequency of

TABLE 4. Results of the logit analysis of consumption of health-enhancing goods and services among non-Malays (n = 2161)

Variables	Estimated coefficient	Odds ratio	Wald statistic	Marginal effect	Wald statistic
Constant	0.009 (0.767)	1.009	0.01	–	–
Age	-0.027*** (0.010)	0.973	-2.60	-0.004*** (0.001)	-2.60
Income#	0.005** (0.002)	1.005	2.40	0.001** (0.001)	2.39
Gender					
Male	-0.471*** (0.139)	0.625	-3.38	-0.057*** (0.017)	-3.39
Female	–	1.000	–	–	–
Education					
Tertiary	1.937*** (0.311)	6.941	6.23	0.418*** (0.074)	5.61
Secondary	1.117*** (0.148)	3.057	7.56	0.215*** (0.033)	6.53
Primary	–	1.000	–	–	–
Marital status					
Married	0.036 (0.365)	1.036	0.10	0.005 (0.051)	0.10
Widowed/divorced	-0.078 (0.379)	0.925	-0.21	-0.011 (0.051)	-0.21
Single	–	1.000	–	–	–
Location of residence					
Urban	0.358** (0.143)	1.430	2.51	0.045** (0.017)	2.59
Rural	–	1.000	–	–	–
Employment status					
Unemployed	-0.224 (0.153)	0.800	-1.46	-0.034 (0.025)	-1.37
Employed	–	1.000	–	–	–
LR χ^2 (9)	154.270***				
HL χ^2 (8)	2.450				
Correct prediction (%)	82.88				

Note: LR refers to likelihood ratio. HL refers to Hosmer-Lemeshow. Asymptotic standard errors in parentheses. ***indicate significance at the 1% level, **at the 5% level and *at the 10% level. # denotes income divided by 100.

TABLE 5. Predicted probabilities of consuming health-enhancing goods and services among non-Malays

Predicted	Observed		Overall percentage
	Yes	No	
Yes	27	20	
No	250	1764	
Percentage correct	7.16	98.88	82,88

participation in health-enhancing lifestyle when the studied sample is restricted to the elderly. Perhaps, this is due to the fact that the incentive to invest in health decreases with increasing age. As pointed out by Cropper (1977), the pay-off period of health investments reaped by older individuals, who have a shorter lifespan, tends to be shorter compared to younger individuals because health investment only yields benefits in the future when diseases are successfully prevented.

Consistent with the findings of Qi et al. (2006) and Beser et al. (2007), income is found to be positively associated with the likelihood of consuming health-enhancing goods and services among Malays and non-Malays. Using the Canadian National Population Health Survey comprising 13756 respondents, Qi et al. (2006) find that the propensity to adopt healthy lifestyles, such as being physically active, being a non-smoker and use of health screening services increases with income. Similar findings are evidenced by Beser et al. (2007), who use

Health-Promoting Lifestyle Profile (HPLP) of Turkish workers. The reason for this outcome is that since income is the benefit that people receive when they use their healthy time to work, the value of healthy time increases in tandem with income (Grossman, 1972). An equivalent way to express this is to say that income is an incentive to encourage health investment.

This study finds that gender is significantly associated with health enhancement among non-Malay elderly, as females are more likely to consume health-enhancing goods and services than males. This outcome lends some support to previous empirical studies. For instance, Felton et al. (1997) examines the relationship between gender and health-enhancing behaviours among 331 employees and finds that being female is correlated with a higher probability of engaging in health-enhancing behaviours. More recently, in a cross-sectional population-based study conducted in Hungary, the odds of engaging in health-enhancing behaviours are also found to be higher among females than males (Paulik et al. 2010). A likely explanation for this finding is that women are more risk averse than men (Croson and Gneezy 2009). Since health-enhancing goods and services can lower the risk of developing diseases, women are likely to consume them. Besides, women also possess a better family caretaker characteristic and carry more responsibilities to look after their family than men (Hulme et al. 2003; Cheah and Su 2012; Cheah and Naidu 2012), and consequently are more concerned about health improvement.

The finding of this study that well-educated individuals are more likely to consume health-enhancing goods and services than less-educated individuals is in line with those of Qi et al. (2006) and Duffy (1997), whom based their studies on the Pender Health Promotion Model (HPM) and a sample of Mexican American women aged between 19 and 70 years. Two reasons may explain these findings. First, education enhances productive efficiency in producing health by improving an individual's understanding skill and health knowledge (Grossman 1972; Kenkel 1991). This means that well-educated people possess a higher marginal product of direct inputs to health than less-educated people, for example, well-educated people acquire more information about the benefits of consuming health-enhancing goods and services. Second, education reduces the rate of time preference (Fuchs 1982; Van der Pol 2011). People with a lower rate of time preference are more future oriented and rational than people with a higher rate of time preference, and thus are more likely to engage in healthy behaviours.

According to the results of non-Malay sample, there is a significant negative relationship between consumption of health-enhancing goods and services and rural dwellers. It is well-documented in past studies that information can affect the purchase decision of health-related goods (Kenkel 1991; Cawley and Ruhm 2012). Based on the cost-benefit analysis, rational individuals estimate the costs and benefits of market goods, and decide to consume only when the benefits exceed the costs. However, a paucity of information can result in the benefits of market goods to be underestimated, thus, leading to under-consumptions. Since rural areas usually lack health-related information, rural dwellers are likely to be unaware of the benefits of health-enhancing goods and services and consequently have a low likelihood of consuming health-enhancing goods and services. Health-related information is, however, not measured in this study. Therefore, an in-depth qualitative study could supplement evident for this explanation.

Because the present study is a cross-sectional study, the trend of consumption of health-enhancing goods and services cannot be identified. Besides, all the information used in the present study is self-reported. If data is available, it would be worthwhile for future studies to assess the causal relationships between consumption of health enhancing goods and services, and health and lifestyle factors, such as, being diagnosed with chronic diseases, smoking and alcohol consumption.

CONCLUSION

Although there is a growing study on health-enhancing behaviours in developed countries, only limited study has examined the factors affecting consumption of health-enhancing goods and services in developing countries, such as Malaysia. Using a nationally representative dataset and regression, this study finds that age, income, gender, education and location of residence possess significant effects on consumption of health-enhancing goods and services. Specifically, older individuals, lower income earners, non-Malay males, the less-educated and non-Malay rural dwellers are associated with a lower likelihood of consuming health-enhancing goods and services. Therefore, for policy measures, special attention should be devoted to these particular groups of individuals.

Based on the findings of the present study, several policy implications are discussed. First, even though the importance of health-enhancement has been widely advertised to the public, it seems well worth to advocate educating older and less-educated individuals about the benefits of consuming health-enhancing goods and services, especially given the current findings that they have a lower likelihood of consuming health-enhancing goods and services than their younger and well-educated counterparts. Second, owing to low-income is associated with a low likelihood of consuming health-enhancing goods and services, intervention measures toward reducing the price of health-enhancing goods and services may yield promising outcomes. Subsidy that provides low income individuals with vouchers for health-enhancing goods and services can also be considered. Lastly, in view of the findings on gender and location of residence, government should use spokespersons from non-Malay

ethnic groups, as well as language-based mass media such as television, radio and newspaper to promote consumption of health-enhancing goods and services among non-Malay males and rural dwellers.

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ENDNOTES

1. Health-enhancing goods and services refer to the goods and services consumed by healthy individuals to improve and enhance their health status, for example medical equipment, food supplements and health education services and products (Institute for Public Health 2008).
2. The maximum VIFs for the models of Malay and non-Malay sample are 1.51 and 1.33, respectively, which are lower than 5 (Studenmund 2006).

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