

Association of Health Literacy and Socio-Demographic Factors among Malaysian Adults: Findings from National Health Morbidity Survey (NHMS) 2019

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Abstract

This study aimed to investigate the prevalence of health literacy levels among Malaysian adults and associated socio-demographic markers of communities with limited health literacy. A population-based self-administered survey using the HLS-M-Q18 instrument was conducted as part of Malaysia's National Health Morbidity Survey (NHMS, 2019). Responses from 8,933 respondents were included for analysis. The nationwide survey utilized a two-stage stratified random sampling method. The health literacy score was divided into three levels; limited, sufficient and excellent. The Association between the health literacy level of the Malaysian population and the demographic characteristics was analysed with a multinomial logistic regression model. Complex sampling multinomial logistic regression models were used for estimations where the dependent variable has more than two nominal categories that are discrete, while the independent variables are of Likert scales. Comparison between the Malaysian population having limited health literacy level and sufficient health literacy level shows significant association in specific demographic characteristics and level of health literacy; gender, age group, education level and ethnicity. Comparison between the Malaysian population having limited health literacy and excellent health literacy shows significant association in terms of age group, education level and ethnicity. The study results highlighted the significant association of social demographic characteristics contributing to the health literacy level among populations. It is recommended that public health interventions and health promotion strategies are developed based on the existing socio-demographic disparities among the population.

Keywords: Health Literacy, Malaysia, Socio-Demogra

Introduction

Health Literacy is the cognitive and social abilities required to obtain, comprehend, and apply knowledge in ways that advance and safeguard health. The definition emphasizes a person's capacity to use health information and apply it to make well-informed decisions about one's health and the health of people (U.S. Department of Health and Human Services, 2010), (Ratzan SC & Parker RM, 2000). Health stakeholders and policymakers view health literacy as an essential public health concern as it directly impacts how people effectively utilise health resources for better health outcomes. Health literacy is crucial for an individual to respond effectively towards managing life events, practising a healthy lifestyle and managing complexity in the healthcare system (Robb & Shellenbarger, 2014).

Limited health literacy profoundly affects the community's physical and mental health outcomes. It may contribute to poor management of chronic conditions, misinterpretation of treatment and medication instructions, lack of understanding of medical management options, and decreased self-reported health concerns (Polster et al., 2018). Limited health literacy among populations significantly negatively influences public health outcomes and the global disease burden, as well as quality-adjusted life years, morbidity, and death worldwide (Stormacq et al., 2020).

Based on the National Health and Morbidity Survey, two-thirds of Malaysians have at least one of the three non-communicable diseases (NCDs)—diabetes, hypertension, or hypercholesterolemia (high cholesterol levels). Nearly 10% of people have all three NCDs, and one-third of the Malaysian population also possess limited health literacy. This morbidity may affect their ability to understand and act on medical or clinical information and instructions, to seek and update themselves on health promoting information and take action against health risk factors (National Health and Morbidity Survey [NHMS], 2019). Numerous research pieces of evidence highlighted the effect of increased health literacy and self-management of clinical conditions leading to better health-related behaviours and clinical outcomes. Studies have shown that individual involvement and ability to comprehend provided messages lead to the overall improvement in health-related quality of life, clinical indicators, an increase in healthy behaviour, and a considerable decrease in health-related cost implications (Greene et al., 2015).

Research pieces of evidence have highlighted the positive effects of adequate health literacy towards health outcomes. Thus, increasing health literacy is a successful method for promoting and maintaining an individual's state of health (Cho YI et al., 2008). An individual's level of health literacy is a helpful indicator of how well they can make decisions about and manage their health, as studies have shown a strong correlation between health literacy levels and health-promoting and preventive behaviours (Mahdavi et al., 2017).

A person's health literacy may be influenced by various socio-demographic variables, such as poverty, education, race or ethnicity, age, location and disabled (Schillinger, 2020). Study evidence reflects how socio-demographic factors significantly affect an individual's lifestyle and act as a moderator to many underlying health issues (Ohlsson & Manjer, 2020). Social determinants of health, including the physical environment, access to education, sufficient housing, job, and income, are regarded as the primary proximal factors of variances in personal health, together with individual traits (genetics) and actions. Data conducted from 48 least-developed countries (LDC) highlights the correlation between socio-demographics and life expectancy (Mondal & Nazrul, 2015), and past studies show that social determinants generally had a more significant impact on life expectancy (Nutbeam & Lloyd, 2021).

Thus, this study was conducted to measure the prevalence of the current status of health literacy among Malaysians and to determine the primary contributing sociodemographic elements that influences an individual' health literacy capacities.

Methodology

Study sources and participants

The data used for this study was retrieved from the National Health and Morbidity Survey (NHMS) 2019. It is a cross-sectional national household survey involving a two-stage stratified sampling method. It was carried out among Malaysian citizens who were not institutionalised and had lived in the chosen houses for at least two weeks prior to the data collection. States and federal territories made up the major stratum, and urban and rural regions within the states were regarded as the secondary stratum. The sampling frame for this survey was provided by the Department of Statistics Malaysia (DOSM) based on the National Population and Housing Census 2010. All 13 states and 3 federal territories were included in this survey. Within each state, the required number of Enumeration Blocks (EBs) from urban and rural areas were randomly chosen. A random selection of EBs were applied for the first round of sampling, then followed the random selection of LQs for the second sampling. All households within the chosen LQs were invited to take part in the survey. A total of 8933 Malaysian adults aged 18 years and over selected in the survey. Only data of respondents with complete responses on sociodemographic characteristics; locality, sex, age group, ethnicity, education level, occupation and household income, and health literacy status were included in this study (National Health and Morbidity Survey, [NHMS], 2019).

Data collection instrument and procedure

Along with other modules on non-communicable diseases and lifestyle patterns, the HLS-M-Q18 for health literacy module was distributed as part of the NHMS survey. This instrument comprises 18-item questionnaire which adapted and compressed from the Health Literacy Survey European Questionnaire 47 (HLS-EU-Q47) with reliability value of Cronbach's Alpha greater than 0.7 (Mohamad et al., 2020). The instrument assessed four components of health literacy skills: the capacity to acquire, comprehend, evaluate, and use health information in three domains: health promotion, illness prevention, and healthcare. These were created using Likert-type responses ('extremely easy,' 'pretty easy,' 'somewhat difficult,' and 'very difficult').

Data was collected from respondents using self-administered approach with minimal guidance. Trained research assistants approached respondents above 18 years old who are able to read and understand the questionnaire which was available in 4 languages; Bahasa Malaysia, English, Chinese and Tamil language. Research assistants explained the objectives of the study, and informed respondents that their participation is voluntary and their anonymity will be assured. Once respondents agreed to participate, they were informed of the study objectives and assured of the privacy and confidentiality of the information provided. The data collection sessions commenced once respondents provided written consent. Respondents were given the option to answer the instrument via a tablet or by hardcopy (National Health and Morbidity Survey (NHMS), 2019). Respondents were guided if they faced difficulties in reading the questionnaire whereby the questionnaire and answer option were read out to them.

Dependent Variable

Health literacy was the main outcome of this study. Respondents will be assessed on their literacy status based on the final score for 18 questions answered from 0 to 50 as maximum. The score will then be categorized into three main groups, limited health literacy taking the score in between 0 and 33, sufficient health literacy (score > 33-42), and excellent health literacy (score > 42-50) (National Health and Morbidity Survey (NHMS), 2019).

Independent Variables

The independent variable used for analysis in this study focused on sociodemographic factors only whereby it will be beneficial in identifying significantly sociodemographic characteristics that influences Malaysia's population health literacy level that has different ethnicity background. These sociodemographic factors comprised locality (rural, urban), sex (male, female), age (<35, 35-64, >64 years), ethnicity (Malay and other Bumiputera, Chinese, Indian, others) and education level (no formal education, primary, secondary, tertiary). Respondents who had never been to school to get any form of education or did not complete primary school were categorized into 'no formal education, while those who had completed Standard Six were categorized as 'primary' education level. 'Secondary' education level represented those with at least five years of schooling at secondary school, whereas 'tertiary' education level represented those who completed Form Six or received certificates, diplomas, or academic degrees.

Respondents' occupation was classified and combined according to their nature of generating the income which were; Not working or outside labour force, employed which having paid by company as government or private servant, self-employed or unpaid family worker. Whereas for income classification, it is based on the amount determined by DOSM for each state, taking into account the various economic circumstances and lifestyles (National Health and Morbidity Survey (NHMS), 2019).

Statistical Analysis

The characteristics of the study sample were described using the prevalence and estimated population. Bivariate and multivariable analysis was performed to determine the association between each sociodemographic factors and health literacy using a complex sample logistic regression with limited group of health literacy as reference. Multicollinearity and interaction terms for final model were checked. The classification table and Nagelkerke R square were reported. The strength of association for each sociodemographic factor was reported using crude (COR) and adjusted odd ratio (AOR). All the analyses were performed using IBM SPSS Statistics version 28.0 (Armonk, NY: IBM Corp). All results having p-value < 0.05 considered as statistically significant. Sample weights were used in the analysis to represent the general population aged 60 years and over.

Results**Descriptive Analysis**

Overall, study found that 40.9% of the Malaysian population age 18 and above were in the sufficient health literacy level, followed by limited (34.8%) and excellent (24.3%). Of 8933, more than half of respondents was urban residents (77.9%), male (52.7%), Malay ethnicity and other Bumiputera (64.2%) and those categorized under B40 income group, (64.0%). Half of respondents found to have secondary education level and had employed as government

or private servants. The prevalence of those age less than 35 years (46.2%) was quite similar with 35 to 64 years group (46.5%).

In terms of health literacy (HL) level, study finding shows the prevalence of sufficient HL and excellent HL level were slightly higher among urban residents with 41.3% (95%CI: 38.9 to 43.6) and 25.8% (95%CI: 23.6 to 28.0), female 43.1% (95%CI: 41.0 to 45.3) and 24.6% (95%CI: 22.7 to 26.5), tertiary education level 44.4% (95%CI: 41.4 to 47.4) and 31.3% (95%CI: 28.1 to 34.6) and top-20 income group [42.4% (95%CI:36.0 to 49.1) and 27.5% (95%CI: 22.5 to 33.2)] respectively. Sufficient HL level was also high among age group of 35 to 64 years old; 44.9% (95%CI: 41.6 to 48.3) and unpaid family; 43.2% (95%CI: 41.5 to 45.0), while prevalence of excellent HL level was high among those aged less than 35 years; 25.0% (95%CI: 22.2 to 28.0) and employed as government or private servants; 26.5% (95%CI: 24.0 to 29.2) (Table 1).

Univariate Analysis

Statistically significant and positive associations of sufficient HL level were observed for urban residents, female, those aged less than 64 years, those having education for at least primary level, Malay and other Bumiputera and all types of occupation. Similarly goes for excellent HL level whereby crude results found to have statistically significant for same locality, age group and occupation group. Apart from that, education with at least secondary level, Indian by ethnicity, and those at middle 40 income had significant association. All this individual effect regardless of their statistically significant was then used in multivariable analysis to see the changes of their effect after taking consideration of other factors.

Multivariable Analysis

The multivariable logistic regression showed that sufficient health literacy was significantly higher among female with AOR=1.23 (95%CI: 1.04 to 1.46), those aged less than 35 years and between 35 to 64 years [AOR=1.53 (95%CI: 1.12 to 2.09) and AOR=1.87 (95%CI: 1.42 to 2.46)] respectively, Malay and other Bumiputera [AOR= 1.43 (95%CI: 1.05 to 1.96)] and unpaid family worker, AOR=1.30 (1.01 to 1.68). Those with tertiary education level was more sufficient with AOR=3.77 (95%CI: 2.31 to 6.16) followed by secondary level [AOR=2.61 (95%CI: 1.65 to 4.12)] and primary level [AOR=1.68 (95%CI: 1.03 to 2.72)] (Table 2).

For excellent HL level, it was significantly higher among urban resident with AOR=1.31 (95%CI: 1.03 to 1.66) and Indian [AOR=1.59 (95%CI: 1.01 to 2.50)] compared to Chinese. Compared to those with no formal education level, tertiary group found higher excellent with AOR=5.67 (95%CI: 2.67 to 12.03) followed by secondary level [AOR=3.58 (95%CI: 1.73 to 7.39)]. Employed worker and unpaid family worker also found to have significant association with AOR=1.43 (95%CI: 1.09 to 1.86) and AOR=1.36 (95%CI: 1.01 to 1.82) respectively (Table 2).

Table 1
 Respondents sociodemographic characteristics (N=8933)

Variable	Limited (N=3135)			Sufficient (N=3818)			Excellent (N=1980)		
	Estimated Population	n	Prevalence (95%CI)	Estimated Population	n	Prevalence (95%CI)	Estimated Population	n	Prevalence (95%CI)
Overall	6471803	31 35	34.8 (32.7, 37.0)	7601010	38 18	40.9 (39.0, 42.8)	4516012	19 80	24.3 (22.6, 26.1)
Locality									
Rural	1697043	13 46	41.3 (37.8, 44.8)	1628038	14 39	39.6 (36.8, 42.4)	788459	66 1	19.2 (17.0, 21.6)
Urban	4774760	17 89	33.0 (30.5, 35.6)	5972972	23 79	41.3 (38.9, 43.6)	3727553	13 19	25.8 (23.6, 28.0)
Sex									
Male	3631917	14 75	37.1 (34.1, 40.2)	3808925	17 84	38.9 (36.1, 41.7)	2357562	91 6	24.1 (21.7, 26.6)
Female	2839886	16 60	32.3 (30.2, 34.4)	3792085	20 34	43.1 (41.0, 45.3)	2158450	10 64	24.6 (22.7, 26.5)
Age group									
< 35	2933154	93 3	34.2 (31.0, 37.5)	3507177	13 62	40.9 (37.9, 43.9)	2144810	69 8	25.0 (22.2, 28.0)
35 - 64	2769010	16 17	32.0 (29.8, 34.3)	3734532	21 47	43.2 (40.9, 45.5)	2146966	11 34	24.8 (22.6, 27.2)
> 64	769639	58 5	56.9 (51.7, 61.9)	359301	30 9	26.6 (22.6, 30.9)	224236	14 8	16.6 (13.0, 20.9)
Ethnicity									
Chinese	1367217	40 3	37.0 (31.2, 43.2)	1327030	36 1	35.9 (30.8, 41.3)	1003535	25 2	27.1 (22.6, 32.2)
Malay + Other Bumiputras	3845401	23 10	32.2 (30.4, 34.1)	5163243	30 77	43.2 (41.5, 45.0)	2933626	15 02	24.6 (22.8, 26.4)
Indian	311117	17 2	29.6 (23.6, 36.4)	371970	19 3	35.4 (30.3, 40.8)	368835	16 5	35.1 (29.7, 40.9)
Others	948068	25 0	50.0 (41.2, 58.8)	738768	18 7	38.9 (30.7, 47.9)	210015	11 61	11.1 (7.0, 17.1)
Highest education level									
No formal education/ unclassified	538426	30 4	65.2 (55.8, 73.5)	209463	98	25.3 (18.3, 34.0)	78448	35	9.5 (5.1, 17.0)
Primary education	1596477	89 0	50.6 (45.7, 55.5)	1135427	61 1	36.0 (31.4, 40.8)	421648	25 0	13.4 (10.8, 16.4)
Secondary education	3041199	13 98	32.7 (30.3, 35.3)	3894943	19 83	41.9 (39.5, 44.4)	2351887	10 57	25.3 (23.2, 27.5)
Tertiary education	1295701	54 3	24.4 (21.6, 27.3)	2361177	11 26	44.4 (41.4, 47.4)	1664028	63 8	31.3 (28.1, 34.6)
Occupation									
Not working/ Outside labour force	1414641	81 5	43.4 (39.2, 47.6)	1184392	65 4	36.3 (32.6, 40.1)	664263	33 3	20.4 (17.8, 23.2)
Employed (Government/ private)	2935001	11 11	31.8 (28.8, 35.0)	3845538	17 76	41.7 (38.8, 44.7)	2444738	94 6	26.5 (24.0, 29.2)
Self employed	1246524	63 6	36.8 (32.9, 40.8)	1354505	71 2	39.9 (35.9, 44.1)	790430	34 9	23.3 (19.5, 27.6)
Unpaid family worker	875637	57 3	32.3 (29.3, 35.6)	1216575	67 6	44.9 (41.6, 48.3)	616580	35 2	22.8 (19.9, 25.9)
Household Income (RM)									
Bottom 40%	4337113	22 80	36.4 (33.9, 39.0)	4882774	24 91	41.0 (38.6, 43.4)	2685885	12 24	22.6 (20.5, 24.8)
Middle 40%	1613850	65 2	32.6 (29.2, 36.1)	1983661	98 5	40.1 (37.0, 43.2)	1353749	54 7	27.3 (24.3, 30.6)
Top 20%	520841	20 3	30.1 (23.0, 38.2)	734574	34 2	42.4 (36.0, 49.1)	476377	20 9	27.5 (22.5, 33.2)

Table 2

Association of health literacy towards the socio-demographic factor using complex sample logistic regression

Variable	Sufficient			Excellent						
	COR (95%CI COR)	p-value	AOR (95% CI AOR)	COR (95%CI COR)	p-value	AOR (95% CI AOR)	p-value	AOR (95% CI AOR)	p-value	
Locality										
Rural	1		1			1		1		
Urban	1.30 (1.08, 1.57)	0.006	1.21 (0.99, 1.46)	0.060	1.68 (1.33, 2.12)	<0.001	1.31 (1.03, 1.66)	0.025		
Gender										
Male	1		1			1		1		
Female	1.27 (1.09, 1.49)	0.002	1.23 (1.04, 1.46)	0.016	1.17 (0.99, 1.38)	0.061	1.14 (0.94, 1.38)	0.189		
Age group										
< 35	2.56 (1.98, 3.31)	<0.001	1.53 (1.12, 2.09)	0.008	2.51 (1.78, 3.55)	<0.001	1.23 (0.82, 1.85)	0.315		
35 - 64	2.89 (2.29, 3.65)	<0.001	1.87 (1.42, 2.46)	1	2.66 (1.92, 3.70)	<0.001	1.41 (0.97, 2.03)	0.068		
> 64	1		1		1		1			
Education level										
No formal education/ unclassified	1		1			1		1		
Primary education	1.83 (1.15, 2.89)	0.010	1.68 (1.03, 2.72)	0.036	1.81 (0.95, 3.45)	0.069	1.51 (0.78, 2.95)	0.223		
Secondary education	3.29 (2.14, 5.07)	<0.001	2.61 (1.65, 4.12)	1	5.31 (2.66, 10.59)	<0.001	3.58 (1.73, 7.39)	0.001		
Tertiary education	4.68 (2.96, 7.41)	<0.001	3.77 (2.31, 6.16)	1	8.81 (4.39, 17.69)	<0.001	5.67 (2.67, 12.03)	<0.001		
Ethnicity										
Chinese	1		1			1		1		
Malay + Other Bumiputras	1.38 (1.04, 1.85)	0.028	1.43 (1.05, 1.96)	0.024	1.04 (0.76, 1.43)	0.812	1.10 (0.78, 1.55)	0.571		
Indian	1.23 (0.81, 1.87)	0.325	1.19 (0.76, 1.86)	0.441	1.62 (1.06, 2.46)	0.026	1.59 (1.01, 2.50)	0.045		
Others	0.80 (0.50, 1.30)	0.371	1.08 (0.66, 1.77)	0.764	0.30 (0.17, 0.55)	<0.001	0.47 (0.27, 0.84)	0.010		
Occupation										
Not working/ Outside labour force	1		1			1		1		
Employed (Government/ private)	1.56 (1.24, 1.97)	<0.001	1.24 (0.96, 1.61)	0.096	1.77 (1.38, 2.27)	<0.001	1.43 (1.09, 1.86)	0.009		
Self employed	1.30 (1.00, 1.68)	0.046	1.16 (0.86, 1.56)	0.324	1.35 (1.01, 1.81)	0.045	1.29 (0.92, 1.80)	0.134		
Unpaid family worker	1.66 (1.33, 2.07)	<0.001	1.30 (1.01, 1.68)	0.045	1.50 (1.16, 1.94)	0.002	1.36 (1.01, 1.82)	0.044		
Household income										
Bottom 40%	1		1			1		1		
Middle 40%	1.09 (0.91, 1.31)	0.353	0.91 (0.75, 1.10)	0.315	1.35 (1.07, 1.71)	0.010	0.99 (0.78, 1.26)	0.925		
Top 20%	1.25 (0.85, 1.86)	0.261	0.95 (0.66, 1.38)	0.799	1.48 (0.97, 2.25)	0.070	0.93 (0.63, 1.37)	0.730		

Limited health literacy as reference, COR= Crude Odd Ratio, AOR=Adjusted Odd Ratio, Multicollinearity and interaction were checked; Model fitting-Chi-square Likelihood Ratio Tests =736.47 ($p < 0.001$), Nagelkerke R Squares, 8.8

Discussion

The findings from the present population-based survey show majority of Malaysians possess a sufficient health literacy level (40.9%), followed by limited (33%) and excellent (24.3%). The survey indicated an adequate health literacy level among Malaysia's population, which would enable them to function appositely in the context of the ability to find, understand, and use health information and services to make informed health-related decisions and actions for

themselves and others. Based on other countries' studies on population health literacy level, this country's prevalence of limited health literacy is relatively similar (Jaafar N et al., 2021). A systematic review of the prevalence of health literacy level in Southeast Asia showed that the overall prevalence of limited health literacy varies within a range of 1.6%–99.5%, with a mean of 55.3% (Rajah et al., 2019). The European Health Literacy Survey (HLS-EU) across eight countries shows that 47.6% of respondents showed inadequate or problematic health literacy. In contrast, another study in Japan found that inadequate health literacy was 49.9%, and a 2015 study in England estimated that 43% of the people had inadequate comprehension of health information (Economist Intelligence Unit Limited, 2021).

However, comparing health literacy levels across populations has some challenges due to differences in measuring instruments, conceptual definitions, methodologies and settings. For example, the majority of the population who responded to this survey were from urban settings based on the representation of population demography. It may have reflected the higher level of respondents having sufficient literacy, which correlates with a systemic review on health literacy among urban and rural populations. Most studies in the review found that urban populations had higher health literacy than rural populations (Aljassim N & Ostini R., 2020). Evidence suggests that rurality alone does not explain the rural-urban health literacy differences. Other socio-demographic variables such as socioeconomic background, ethnicity and formal education also play an essential role (Asharani et al., 2021).

The analysis in this study shows that other socio-demographic factors, such as age, gender, and ethnicity, significantly affect the health literacy level of populations. The comparative multinomial regression for female and male (sufficient vs limited and excellent vs limited) showed female respondents have higher odds to be in the sufficient and excellent health literacy level compared to males.

Similarly, a study on gender differences in the levels of health literacy and relevant factors associated with health literacy in Korea shows that women reported a significantly higher level of health literacy than men (Lee HY et al., 2015). Another study among the elderly in Switzerland reflected similar findings; this result was statistically significant with other general measures of health literacy (Swiss Med Wkly, 2022). Other studies on general populations also highlighted that in comparison with men, women perceived fewer difficulties regarding health-related issues (The HLS19 Consortium of the WHO Action Network M-POHL, 2021).

Possible factors cited were women's increased familiarity in navigating the health care system from dealing with health issues for themselves or others in the family. Women often anchor their role and responsibility as caregivers, contributing to their increased health-related knowledge and skills (Colombo F et al., 2011). Results from this study also showed an association between ethnicity and literacy levels. Comparing sufficient and excellent health literacy versus limited health literacy levels shows that Bumiputera has higher odds of having insufficient and excellent health levels than other races. Chinese ethnicity has higher odds of being in a limited health literacy level. Past studies have indicated that knowledge gaps exist among immigrant and racial/ethnic minority populations. It is also highlighted that an individual's health information-seeking behaviour and ability to understand and process the information received is considered one of the critical mediating factors in determining their health literacy level.

This information will eventually impact health behaviours and decisions making (Janet N. Chu et al., 2022). A study on assessing health literacy levels among asthma patients highlighted the language barriers patients face. Most of the paper-based information provided at the healthcare centres is in Malay or English.

Even though most could read Malay, some struggled to understand these languages and preferred information and services in their native language to facilitate self-care (Salim et al., 2021). Thus, the higher odds for other races to have a limited health literacy level compared to Bumiputera can be associated with the existing language barriers and unavailability of health information in native languages, whereby consistent associations were found between limited health literacy and information-seeking experiences (Chu et al., 2022).

This study finding also shows a significant association between health literacy level, education attainment, and age group. Respondents with lower education levels and older age groups have higher odds of falling into limited health literacy. This study echoes similar findings from another study that demonstrated a direct correlation between health literacy and educational attainment (Bayati et al., 2018).

Possessing excellent or sufficient health literacy levels involves the capacity to read, listen, analyze facts, make decisions, and apply. Studies have shown that people with higher education are more likely to be in good health than those with less education (Jansen et al., 2018). People with higher education attainment are well-informed and experience better health, as reflected in the high levels of self-reported health and low morbidity, mortality, and disability. The study pieces of evidence have highlighted the strong linkage between education and health determinants such as practices of preventative care, sustenance of healthy lifestyles, and improved overall well-being of the individual, the family, and the community (Raghupathi & Raghupathi, 2020).

In terms of age group, this study's findings show older age group has higher odds of having a limited health literacy level. Similarly, the population health literacy assessment in Germany showed that perceived health literacy was higher among younger and elderly respondents (Berens et al., 2016). Another study conducted among literate adults in Iran shows a statistically significant association between age groups and level of health literacy. The level of health literacy decreases with increased age (Joveini et al., 2019).

Research evidence has shown that even in developed countries, the elderly population are reported to have poor health literacy. This evidence can be associated with undesirable health outcomes and is quite concerning because, at this age group, they are prone to be diagnosed with chronic diseases and require health information to be understood and applied for better self-care (Geboers et al., 2018).

Poor health literacy among the elderly also can hinder them from utilising healthcare services optimally. In the current era, patients are expected to take an active role in their disease management (Bostock & Steptoe, 2012). Low levels of health literacy among the elderly are involved by age-related problems like general cognitive decline and diminished physical capacities, such as hearing loss or vision loss. These problems may affect their ability to read or comprehend medical instructions (Geboers et al., 2018). Few other studies also associate poor cognitive functioning with lower health literacy levels. Health literacy requires reading and numeracy abilities and other cognitive abilities such as speed, the efficiency of thought processes, and problem-solving capability (Nguyen et al., 2013).

Conclusion and Recommendation

In conclusion, this study shows associations between health literacy level and demographic factors among the Malaysian population. Limited health literacy affects vulnerable populations such as people with lower educational attainment, lower socioeconomic status and from ethnic groups who are not proficient with the main common languages used in mainstream media to disseminate health information. These findings highlight the

importance of planning health education and communication activities based on health literacy capacity and requirements of all levels of the population group. The differences in educational attainment, socioeconomic background, language proficiency, hard-to-reach community locations, accessibility to health information and services, and other demographic factors are essential elements that must be considered when planning health communications activities. The complexity of many demographic factors affects health literacy, especially when it involves accessibility barriers to reach out to all populations at one point in time. Stakeholders and policymakers must collaborate across various stakeholder groups from various health and social sectors to reach a broader population in implementing health literacy-based interventions.

Contribution of Research

This study was conducted to reveal the current status of health literacy and its associations with specific parameters and this type of data has not been conducted yet in Malaysia previously on a national scale. This gives an indication of status that needs to be taken into account for planning by the relevant stakeholders to take action on improving the health literacy levels that eventually will improve the quality of life. Since this is the first and will be conducted on a cyclical basis, future iterations of the study will look into the trends and improvements of the data with the expected changes implemented by the stakeholders and assessed by the researchers.

Data Availability Statement

Data are available upon reasonable request. The data set used for this study belongs to the Institute for Public Health, National Institutes of Health, Ministry of Health, Malaysia. The data set may be available from the corresponding author via a formal request through relevant authorities at the Ministry of Health, Malaysia.

Ethics Approval

This study involves human participants and ethical approval was granted by the Medical Research Ethics Committee of the Ministry of Health, Malaysia. Participants gave informed consent to participate in the study before taking part.

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