# When Being Men Matters: Exploring Health Literacy Determinants in a rural community, Malaysia

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**ABSTRACT:**
Promotion programs are widely conducted in rural communities to improve health outcomes. Hence, understanding the health literacy (HL) of a community is crucial in planning purposeful health promotion programs. However, HL data on the rural setting in Malaysia is scarcely known. This study aimed to determine the prevalence and determinants of HL among adults living in the district of Sabak Bernam, Malaysia. 382 villagers participated in this cross-sectional study by answering questionnaires. Most of the villagers had adequate HL, with 14.1% having limited HL. This study established that the elderly, males, and those with non-communicable disease (NCD) comorbidities were significantly associated with limited HL. Whereas having formal education and being non-Malay residents were protective determinants. Being male was a predictor of having limited HL in this research. These findings highlight the importance of tailored health promotion programs focusing on vulnerable groups, including elderly men with NCD. Public health activities in rural communities should consider demographic, cultural and educational status when developing health education materials and interventions. Improved health interventions, curated to address these identified determinants, are the stepping stone towards bridging health literacy disparities in alignment with other efforts to achieve Sustainable Development Goals (SDGs) 3-5 and 10.

*Keywords: Health literacy, rural, elderly, men, health promotion, community, non-communicable diseases.*

## 1. Introduction

Health literacy (HL) refers to one's cognitive and social skills, which shape an individual's means of accessing, comprehending, and utilising information for the promotion and maintenance of good health (Nutbeam, 1998). These positive health outcomes are visible through improved knowledge and understanding of health determinants, changes in attitudes in terms of health behaviors and improved self-efficacy for specified tasks, commonly attributed to health education activities (Nutbeam, 2000). Limited HL has been vastly associated with adverse health outcomes (Urstad et al., 2022) including frequent revisits to the hospital and higher hospital admission rates (Shahid et al., 2022). Studies have also reported limited HL as a risk factor for the development of diseases and high mortality (Moser et al., 2015). Lack of participation in preventive measures activities and practice of a healthy lifestyle are made apparent among those with low HL (Nurjanah & Mubarokah, 2019).

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Previous studies proposed the implementation of various community-level health promotion programs targeted at the rural community, given their limited health literacy (Khozanatuha et al., 2023; Xie et al., 2019; Yu et al., 2025). This is in comparison to the community at the hospital or urban setting, in which access to health facilities and information is better (Abd-Rahim et al., 2021; Rajah et al., 2019). Furthermore, the usage of technologies is more widely used by people in urban areas, in contrast to the dwellers of rural areas (Abdul Karim, 2020). Conclusion of a systematic review conducted in comparison between the HL of the rural and urban residents demonstrates better HL among the urban residents (Aljassim & Ostini, 2020).

A well-planned health promotion program, implemented, may empower the community to take steps towards self-change for better health outcomes. Health education could also raise awareness of the social, economic and environmental determinants of health, and be directed towards the promotion of individual and collective actions which may lead to modification of these determinants (Nutbeam, 2000). For example, a disease prevention intervention program that was conducted in the rural community was significantly associated with an increase in pneumococcal and influenza vaccination uptake (Guclu et al., 2019).

In the context of the dissemination of health information in the rural community, it was noted that the rural community accesses health information better through face-to-face communication by health care workers as compared to mass media and non-mediated communication (Abdul Karim, 2020). Apart from medical health care workers, such as nurses and medical doctors, student-led programs were found to be beneficial in empowering community members in accessing health information and taking responsibility for practising a healthy lifestyle (Foronda et al., 2022; Mat Ruzlin et al., 2021).

Medical students in Malaysia are trained to conduct health programs during their public health posting as part of their undergraduate medical training (Minhat & Mat Din, 2019). The students' engagement with the community is proven to cultivate their leadership skills, teamwork and professionalism as future doctors (Minhat & Mat Din, 2019). Nonetheless, to aid students in planning for the development of impactful health education materials and activities, some background on the community's health understanding and health status would be beneficial to determine beforehand. Furthermore, health literacy is crucial in ensuring effective health promotion at the community level, yet it is meagerly known about its status among the rural population in Malaysia (Abdul Karim, 2020; Jaafar et al., 2021). This study aims to determine the prevalence and determinants of HL among the rural community of Sabak Bernam. Sabak Bernam, being one of the districts in Selangor, represents a typical rural Malaysian district with scarce existing health literacy data. It entails a population with a high percentage of non-communicable diseases (Isa et al., 2020; Nik Ramli et al., 2024) and health service access challenges (Ab Hamid et al., 2023). Hence, Sabak Bernam is ideal for identifying vulnerable groups and tailoring targeted health promotion efforts.

## 2. Methodology
### 2.1 Study area, design and population
This study was conducted in a rural community in the Sabak Bernam district. Sabak Bernam is located in Selangor state and is reported to be the least developed district

within the most advanced state in Malaysia (Kamarudin & Rashid, 2020). A cross-sectional study was conducted in October 2024 among the residents of a village in the district of Sabak Bernam, Selangor, Malaysia. Household members aged 18 years and above, permanent residents in the area for more than a year, and who were able to communicate in either English or Malay were eligible to participate in this study. Household members who are bedridden and have psychiatric or neurologic illnesses were excluded from this study. Based on the main objective, the sample size was determined using the single proportion formula with a 95% confidence level and 5% precision. Considering the 35% of limited HL attained from the NMHS 2019 (Institute of Public Health, 2020) with an undetermined population size, the minimum sample size calculated for this study is 351. The addition of 10% for non-response rate adds up to a total of 386.

## 2.2 Survey tools

The data in this study were collected through a 20-page online questionnaire consisting of questions divided into 6 main sections (Part A, B, C, D, E, and F). Part A comprises 15 questions regarding sociodemographic characteristics such as age, gender, ethnicity, and education level. Part B with 18 questions on environmental factors using the validated Malay version of the Heat Strain Score Index (HSSI) tool (Lim et al., 2023). Part C with a total of 20 questions regarding physical factors, including nutritional status, non-communicable disease, physical activity, and modified Barthel Index. Part D mainly focuses on social factors, including family relationships, social support, and health literacy. Part E comprises 7 subsections of behavioural factors with a total of 49 questions, including cigarette dependence, smartphone addiction, sleep quality, health & treatment seeking behaviour, and cancer health screening. Lastly, Part F is a psychological factor section, using the 12 questions of the General Health Questionnaire-12, which assesses psychological distress. A score of 0-15 is considered normal, and more than 15 is categorised as having distress.

The questionnaire used to assess health literacy in this study is the validated, self-administered HLS-M-Q18 used for NHMS 2019 (Mohamad et al., 2020). It was adapted from the European Health Literacy Survey (HLS-EU-Q47) developed by the European Literacy Consortium (Sorensen et al., 2012). The 18-item questionnaire focuses on the ability to access, understand, appraise, and apply information on healthcare, disease prevention, and health promotion (Mohamad et al., 2020). It is a self-reported tool with Likert-type responses ('very easy', 'fairly easy', 'fairly difficult', 'very difficult'), and the final score will be given when respondents complete all 18 questions. All scores will be transformed into a unified metric with a minimum score of 0 and a maximum score of 50, whereby 0 represents the 'lowest possible' and 50 represents the 'highest possible' health literacy score. All key areas in this questionnaire had a Cronbach's alpha value over 0.7, indicating high instrument reliability. These tools demonstrated satisfactory fit indices and good convergent and discriminant validity (Mohamad et al., 2020). The scores are divided into three levels: 0-33: Limited Health Literacy Level >33–42: Sufficient Health Literacy Level >42–50: Excellent Health Literacy Level (Mohamad et al., 2020) In this study, the scores were categorised into 0-33: Limited Health Literacy Level and adequate Health Literacy Level >33-50.

### 2.3 Data collection

The data collectors for this study were year four medical students undergoing a Public Health posting. 40 students were divided into four smaller groups of ten students and were assigned to cover the houses in the specified street in the village. Villagers were recruited from the conveniently selected homes located on the map of the village. In each household, students interviewed everyone who met the inclusion criteria. The students were trained before the commencement of this research. Students interviewed the villagers using a set of questionnaires via a Google form online and entered the villagers' responses into the form. Only the collector will have access to the Google form, and the villagers gave consent by selecting the "yes" option before the survey began.

### 2.4 Data analysis

Data were analysed using the IBM SPSS version 25.0 software. Analysis employed the descriptive statistical methods to demonstrate the sociodemographic characteristics of the participants and other relevant study variables. The associated factors of respondents' HL were demonstrated through simple linear regression and multiple linear regression.

## 3. Ethical consideration

This research had obtained ethical approval from the Research Ethics Committee of Universiti Teknologi MARA with the reference number REC/07/2024 (ST/MR/134) before the commencement of the study.

## 4. Results

The largest age group falls within the $\geq 60$-year-old category (40.3%). This was followed by the 18–39 age group (30.4%) and the 40–59 age group (29.3%) (Table 1). Most respondents were male (50.5%), of Malay ethnicity (92.4%), had graduated from secondary school (41.8%), were unemployed (38.7%), were married (73.3%), lived with their family (39.0%), and had a low income (39.5%). In addition, the prevalence of psychological distress was 27.0%.

The prevalence of comorbidities was found to be 178 (46.6%). This study shows that the largest group of people in this village spent their day being inactive (68.1%). Concerning the Heat Strain Scoring Index (HSSI), the data from this study indicate that most of the respondents experienced heat exposure classified within the "green zone," accounting for 89.8% of the sample. It shows that the levels of social support are 100% high. Regarding smartphone addiction, 10.8% of respondents were identified as having smartphone addiction. Moreover, for sleep quality, 93.7% of respondents were found to have good sleep quality, indicated by a PSQI score of 5 or below (Table 1).

**Table 1:** Sociodemographic Characteristics of a Village in Sabak Bernam (n=382)

| Variables | Frequency (%) |
|---|---|
| **Age** | |

| | |
|---|---|
| 18-39 years | 116 (30.4) |
| 40-59 years | 112 (29.3) |
| ≥60 years | 154 (40.3) |
| **Gender** | |
| Male | 193 (50.5) |
| Female | 189 (49.5) |
| **Ethnicity** | |
| Malay | 353 (92.4) |
| Chinese | 3 (0.8) |
| Indian | 1 (0.3) |
| Others | 25 (6.5) |
| **Educational Level** | |
| No formal education | 70 (18.3) |
| SRP/LCE/PMR/Equivalent | 66 (17.3) |
| SPM | 156 (40.8) |
| STPM/Diploma/Certificate | 60 (15.7) |
| Bachelor's degree and above | 30 (7.9) |
| **Employment Status** | |
| Student | 17 (4.5) |
| Unemployed | 148 (38.7) |
| Self-employed | 104 (27.2) |
| Government employee | 23 (6.0) |
| Private sector employee | 36 (9.4) |
| Government pensioner | 42 (11.0) |
| Private retiree | 12 (3.1) |
| **Marital Status** | |
| Single | 54 (14.1) |

| | |
|---|---|
| Married | 280 (73.3) |
| Divorced | 6 (1.6) |
| Widow | 42 (11.0) |
| **Living Status (n=167)** | |
| Alone | 16 (4.2) |
| With Family | 149 (39.0) |
| With a friend/co-worker | 2 (0.5) |
| With Guardian | 0 (0) |
| **Monthly Household Income (n=167)** | |
| ≤RM 4850 (B40) | 151 (39.5) |
| ≤RM 10970 (M40) | 16 (4.2) |
| **Psychological Distress (GHQ-12)** | |
| Normal | 279 (73.0) |
| Have distress | 103 (27.0) |
| **Presence of comorbidities\*** | |
| No | 204 (53.4) |
| Yes | 178 (46.6) |
| **Physical Activity Questionnaire (IPAQ) (n=381)** | |
| Inactive (<600 MET-mins/week) | 260 (68.1) |
| Minimally Active (600 - <3000 MET-minutes/week) | 64 (16.8) |
| HEPA active (≥3000 MET-minutes/week) | 57 (14.9) |
| **Heat Strain Score Index (HSSI)** | |
| Green Zone | 343 (89.8) |
| Yellow Zone | 29 (7.6) |
| Red Zone | 10 (2.6) |
| **Multidimensional Scale of Perceived Social Support (MSPSS)** | |

| | |
|---|---|
| Low Support | 0 (0.0) |
| Moderate Support | 0 (0.0) |
| High Support | 382 (100) |
| **Smartphone Addiction (n=378)** | |
| Yes | 41 (10.8) |
| No | 337 (88.2) |
| **Sleep Quality** | |
| Good sleep quality (Global PSQI score ≤5) | 358 (93.7) |
| Poor sleep quality (Global PSQI score >5) | 24 (6.3) |

*Including hypertension, diabetes mellitus, cardiovascular diseases, stroke, chronic respiratory disease and cancer. GHQ-12, General Health Questionnaire; PSQI, Pittsburgh Sleep Quality Index; HEPA, Health Enhancing Physical Activity.

Table 2 shows that the health literacy scores ranged from 11 to 54, mean of 43.5 (SD 9.6), in which 54 (14.1%) had a limited level of HL and 328 (85.9%) had an adequate level of HL.

**Table 2:** Health Literacy Level among Study Participants of a Village in Sabak Bernam.

| Health literacy | n | % |
|---|---|---|
| Limited | 54 | 14.1 |
| Adequate | 328 | 85.9 |

Univariable regression analysis indicated that five factors were significantly associated with health literacy, namely age, gender, ethnicity, education, and presence of comorbidities. After adjusting for covariates, only one factor emerged as a significant factor of health literacy, which is gender (Table 3). Concerning gender, males had around two times the odds of being of limited health literacy compared with females (AOR=1.93, 95% CI=1.01 to 3.72).

**Table 3**: Univariate analysis for the factors associated with health literacy in a village of Sabak Bernam.

| Variables | COR | 95% CI Lower border | Upper border | P value | AOR | 95% CI Lower border | Upper border | P value |
|---|---|---|---|---|---|---|---|---|
| **Age** | | | | | | | | |
| 18-39 years old (ref.) | | | | | | | | |
| 39-59 years old | 0.936 | 0.381 | 2.299 | 0.885 | 0.606 | 0.226 | 1.623 | 0.319 |
| >60 years old | 2.603 | 1.254 | 5.406 | 0.010* | 1.247 | 0.489 | 3.180 | 0.645 |
| **Gender** | | | | | | | | |
| Male | 1.982 | 1.089 | 3.608 | 0.025* | 1.936 | 1.006 | 3.725 | 0.048* |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Female (ref.) | | | | | | | |
| **Ethnicity** | | | | | | | |
| Malay (ref.) | | | | | | | |
| Others | 0.325 | 0.139 | 0.757 | 0.009* | 2.241 | 0.899 | 5.585 | 0.083 |
| **Educational Level** | | | | | | | |
| No formal education | | | | | | | |
| Formal education (ref.) | 0.419 | 0.220 | 0.800 | 0.008* | 1.592 | 0.756 | 3.355 | 0.221 |
| **Employment Status** | | | | | | | |
| 66 | 0.792 | 0.445 | 1.410 | 0.428 | | | |
| Employed | | | | | | | |
| **Marital Status** | | | | | | | |
| Single (ref.) | | | | | | | |
| Married | 0.903 | 0.396 | 2.060 | 0.808 | | | |
| Separated but not divorced | 1.150 | 0.381 | 3.474 | 0.804 | | | |
| Widower/Divorcee | 1.150 | 0.118 | 11.182 | 0.904 | | | |
| **Living Status** | | | | | | | |
| Alone (ref.) | | | | | | | |
| With Family | 0.959 | 0.255 | 3.600 | 0.951 | | | |
| With a friend/co-worker | 4.333 | 0.207 | 90.847 | 0.345 | | | |
| Not relevant | | | | | | | |
| **Monthly Household Income** | | | | | | | |
| ≤RM 4850 (B40) (ref.) | | | | | | | |
| ≤RM 10970 (M40) | 0.601 | 0.129 | 2.792 | 0.516 | | | |
| > RM 10970 (T20) | | | | | | | |
| **Psychological Distress** | | | | | | | |
| Normal (ref.) | | | | | | | |
| Have distress | 1.429 | 0.771 | 2.650 | 0.257 | | | |
| **Presence of comorbidities*** | | | | | | | |
| No (ref.) | | | | | | | |
| Yes | 2.383 | 1.308 | 4.341 | 0.005* | 2.045 | 0.976 | 4.285 | 0.058 |
| **Physical Activity Questionnaire (IPAQ)** | | | | | | | |
| Inactive (<600 MET-mins/week) (ref.) | | | | | | | |
| Minimally Active (600 - <3000 MET-minutes/week) | 1.018 | 0.463 | 2.238 | 0.964 | | | |
| HEPA active (≥3000 MET-minutes/week) | 1.167 | 0.527 | 2.581 | 0.704 | | | |
| **Heat Strain Score Index (HSSI)** | | | | | | | |
| Green Zone(ref.) | | | | | | | |
| Yellow Zone | 2.162 | 0.873 | 5.358 | 0.096 | 2.121 | 0.794 | 5.666 | 0.134 |
| Red Zone | 2.912 | 0.726 | 11.681 | 0.131 | 3.285 | 0.745 | 14.472 | 0.116 |
| **Smartphone Addiction** | | | | | | | |
| Yes (ref.) | | | | | | | |
| No | 1.302 | 0.545 | 3.112 | 0.552 | | | |
| **Sleep Quality** | | | | | | | |

| | | | | |
|---|---|---|---|---|
| Good sleep quality (Global PSQI score ≤5) (ref.) | | | | |
| Poor sleep quality (Global PSQI score >5) | 1.869 | 0.427 | 8.188 | 0.407 |

*Significant at p<0.05
†COR estimates from simple logistic regression.
‡AOR estimates from multiple logistic regression; assumptions of logistic regression have been met, and the Hosmer-Lemeshow goodness of-fit test indicated good fit (p=0.098).
AOR, adjusted OR; COR, crude OR; GHQ-12, General Health Questionnaire; PSQI, Pittsburgh Sleep Quality Index; HEPA, Health Enhancing Physical Activity.

## 5. Discussion

Sabak Bernam was chosen due to its sociodemographic characteristics, mainly consisting of a high percentage of rural and ageing population, with predominant dependency on agricultural livelihood (Kamarudin & Rashid, 2020). Most of the participants in this study were men, above 60 years old, unemployed or self-employed in agricultural livelihood and with low household income. These identified characteristics, as depicted by previous studies, were among the social disparities associated with limited health literacy (Institute of Public Health, 2020; Khozanatuha et al., 2023; Rajah et al., 2019). Prominently, the prevalence of limited HL in this study is low (14.1%) as compared to other local studies (Abd-Rahim et al., 2021; Abdul Karim, 2020) and abroad (Baccolini et al., 2021; Institute of Public Health, 2020; Mursa et al., 2024). Malaysia's overall limited HL prevalence is 35% and specifically 32.3% among the rural population (Institute of Public Health, 2020), distinctly reflects that robust nationwide findings cover all states, as compared to this study, which only focuses on Selangor state. However, in the cultural context, HL attainment may be accentuated by a close-knit community structure with frequent health engagement through an active religious centre, thus contributing to the low prevalence of limited HL in this study.

Globally, a distinct variation of limited HL prevalence from 1.6% to 99.9% was observed across the Southeast Asian countries (Rajah et al., 2019) akin to the European countries, from 27% to 48%, accounted for by a variation of HL measurement tools used (Baccolini et al., 2021). An array of definitions of health literacy, incongruent with the tools used to measure health liter acy, has been researched and discussed extensively over time (Sorensen et al., 2012; Urstad et al., 2022). On this basis, it is worth noting that the Malaysian tailored version of the HL questionnaire (Mohamad et al., 2020), used in this study fits the demographic, social and cultural context and consists of questions best suited to convey this study's understanding of health literacy despite the low prevalence of limited HL acquired. The determinants identified would be beneficial to discuss further.

This study, similar to previous research, highlights that those with formal education serve as a protective factor from having limited health literacy (Abd-Rahim et al., 2021; Khozanatuha et al., 2023; Xie et al., 2019). Low education level was also identified as the source of poor utilisation of media literacy to access health information (Abdul Karim, 2020). Coherently, this link could be due to the majority of this study population

having received at least a tertiary education. Residents in this study with comorbidities, who were mainly the elderly and men, were also found to be significantly associated with having limited HL. Having comorbidities like diabetes may reflect poor preventive practices and an unhealthy lifestyle, possibly contributing to the initial formation of Non-Communicable Diseases (NCD). One's lifestyle influences their level of knowledge, awareness and motivation for self-care for disease prevention (Abdul Karim, 2020). In this study, the causality cannot be established, affirming the results of other studies, which prove the other way round; having limited HL to be a factor for the development of NCDs (Khozanatuha et al., 2023; Shahid et al., 2022). This perpetual cycle of inadequate health literacy may contribute to the development of NCDs and worsen existing medical conditions, and vice versa.

Interestingly, this bidirectional link can also be explored in future studies to show the association between physical activity with HL and vice versa, as this study reveals majority of the residents were physically inactive. Although physical inactivity was not proven to be significantly associated with limited HL in this study, it is worth noting that a lack of physical activity may be the result of inadequate knowledge of the benefits of regular exercise (Buja et al., 2020; Nurjanah & Mubarokah, 2019) or inactive people may disengage with health information. Inadequate facilities and areas for physical activity in this community may be barriers which can be addressed by innovating health education materials, such as easily accessible exercise videos played in community centres or shared with the community on social media and WhatsApp groups via handphones.

We also note that the elderly in this study, aged more than 60 years, were significantly two times more likely to have limited health literacy than the younger residents. These findings align with the elderly rural populations of the local and abroad, demonstrating a significant association with limited HL (Abd-Rahim et al., 2021; Khozanatuha et al., 2023; Nurjanah & Mubarokah, 2019; Rajah et al., 2019). On the contrary, findings of a study in the rural area of New South Wales, Australia, suggested that the elderly, despite being in the rural area, had a long-standing relationship with their healthcare provider, and their wealth of experience in optimising the healthcare system helps fortify the health literacy capabilities among the elderly as compared to their younger respondents (Mursa et al., 2024). This distinct disparity can be further understood in the light of the limited access to public health services and facilities. The rural Selangor area, including the district of Sabak Bernam, was reported to have a low proportion of households within 5 km coverage of public health facilities, and despite Selangor being one of the most populated states, it also has a low ratio of 1 public health facility to 32,555 population (Ab Hamid et al., 2023; Ali & Marhazlinda, 2023). These spatial determinants would impede the elderly from accessing healthcare facilities, leading to poor health-seeking behaviour, as we note that the majority in this study are the B40S with low income. Most elderly people in this community depend on younger family members coming to visit them or must use public transportation to reach public health facilities. On this note, improvement of access to healthcare facilities without improvement in their income status may still deter these elderly from going out of their village. Sabak Bernam is known for its rice farming activities (Kamarudin & Rashid, 2020), which reflects the majority of self-employed agricultural activities observed in most family men in this setting, implying that any time taken out from work would affect their daily income, even at the cost of their

health. The youth or younger adults mainly migrate out of the rural area for better job opportunities, which may also explain why limited HL are more profound among the elderly men.

Being a man is the sole predictor of having limited HL in this study. The men were two times likely to have limited health literacy as compared to the women in this community. This finding differs from the result conducted among the rural community in Indonesia, whereby male is said to have better education than females, thus contributing to better HL among males (Khozanatuha et al., 2023). Interestingly, the women in this community had special classes at least twice a week, which not only incorporated religious content but also served as their means of gaining knowledge in other areas, including health, as compared to the men. This may contribute to the men having limited HL in this study, especially with the majority being self-employed, engaging in agricultural activities to support their families. Culturally, men are decision makers; thus, men must be as well informed and empowered on their health as women (Nurjanah & Mubarokah, 2019). Recognising the barriers faced by groups like men helps in curating effective strategies to improve health literacy and preventive measures (Mursa et al., 2024). Findings of these studies identifying vulnerable groups like elderly men, akin to our study, support the effort to bridge disparities in attainment of SDG 10. This discovery bears a profound basis for public health activities conducted by medical students to steer their attention towards this group of men.

## 6. Limitations and recommendations

Findings of this study should be considered with some limitations in mind. Cross-sectional research design hampers causal interpretation. Secondly, the purposive sampling recruitment of the villagers makes the study findings unique to Sabak Bernam, thus limiting generalizability to the other rural communities. Thirdly, the self-reported nature of the HL questionnaire, although validated and widely used in many other HL studies, may still elicit recall biases and provide variation in the scoring, contributing to an inherent degree of research bias, which can be overcome by triangulating with qualitative methods in future studies. Apart from expanding the study population to cover the rural population in other states in Malaysia, future studies should also consider urban-rural comparative analyses, using standardised tools like HLS-M-Q18 to unfold geographical and structural disparities. In the context of youth migration from rural areas to the cities, intergenerational patterns of health literacy can be explored to demonstrate evolving HL dynamics. It is also essential to address deep-rooted inequities by tailoring interventions for vulnerable groups in this study, like the elderly male agricultural workers. Finally, efforts to fortify HL at the community level via school health activities, workplace health education, and religious community centres may cultivate inclusive, SDG-aligned health promotion policies.

## 7. Conclusion

This study reveals crucial implications for rural health promotion policies and programs. Notably, men, especially elderly men with comorbidities and lower educational attainment, emerged as a vulnerable group, necessitating targeted health interventions. Addressing this gender-specific disparity is essential to achieving SDG 3 (health), SDG 5

(gender equality), and SDG 10 (reduced inequalities). Subsequently, policies and health programs should not only improve access to health information and services for rural men but also consider structural barriers such as occupational restraints and educational deficits. Understanding the community's HL landscape enables healthcare providers and medical students to tailor community engagement programs impactfully.

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