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A Causal Model of Factors Affecting Health Information–Seeking Behavior of Muslim Older Adults in Pattani Province, Thailand

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Abstract

Background: Muslim older adults in Pattani Province, Thailand, face persistent challenges in health literacy, particularly in accessing and critically evaluating health information. The abundance of online resources complicates identifying credible content. Despite the importance of health literacy, limited research has examined how theoretical constructs such as health literacy (HL) and protection motivation theory (PMT) explain health information-seeking behavior (HISB) among marginalized older populations. Addressing this gap is essential for developing culturally sensitive interventions.

Objective: To develop and validate a causal model of factors influencing HISB among Muslim older adults in Pattani Province, Thailand.

Methods: A causal research design was employed. Data were obtained from 400 Muslim older adults through structured interviews and standardized HISB questionnaires. Statistical analyses included confirmatory factor analysis (CFA) and structural equation modeling (SEM).

Results: Health literacy exerted a strong and statistically significant direct influence on HISB ($\beta = .89, p < .001$). The model explained 44% of the variance in health literacy and 63% in HISB.

Conclusion: Health literacy is a pivotal determinant of HISB among Muslim older adults in Pattani. Interventions that strengthen comprehension, critical appraisal, and application of health information are essential. Guided by HL and PMT frameworks, community-based strategies can enhance health outcomes, treatment adherence, and self-care advocacy. These findings provide evidence for designing culturally tailored interventions and inform public health policy.

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The global demographic shift toward population aging poses critical health challenges. According to the United Nations, the number of people aged 65 years or older was 761 million in 2021 and is projected to more than double, reaching 1.6 billion by 2050, with the most rapid increase occurring in low- and middle-income countries (United Nations, 2023; World Health Organization [WHO], 2021). Thailand is also transitioning into an aging society, where the proportion of older adults is expected to continue rising. This demographic transition coincides with a growing burden of chronic conditions, such as hypertension, diabetes, and cardiovascular diseases, which require lifelong management and exert increasing pressure on healthcare systems (Nakasenee, 2018). At the same time, the complexity of health services and the overwhelming volume of online health information intensify the importance of health information-seeking behavior (HISB) as a means to support disease prevention, self-management, and informed decision-making (Lambert & Loiselle, 2007; Zhao et al., 2022).

These global and national trends are mirrored in southern Thailand, where Muslim older adults in Pattani Province face unique sociocultural and structural barriers to HISB. Many have limited formal education, low digital literacy, and insufficient proficiency in the Thai language, relying primarily on Malay for daily communication (Binbai & Chiangkhong, 2024). Religious beliefs and practices strongly influence health perceptions, while political instability and long-standing inequities restrict access to reliable health resources. Previous studies have also suggested that existing HISB models often underrepresent psychological factors, including motivation, self-confidence, perceived risk, and trust in information sources (Lambert & Loiselle, 2007; Zhao et al., 2022). Despite these challenges, little empirical research has examined the causal determinants of HISB in this minority population, particularly from a behavioral science perspective.

To address this gap, the present study draws on two theoretical frameworks health literacy (Nutbeam, 1998; Sørensen et al., 2012) and protection motivation theory (PMT; Rogers, 1983). Health literacy emphasizes the capacity to access, understand, and apply health information for effective decision-making, while PMT highlights threat appraisal (perceived severity and vulnerability) and coping appraisal (self-efficacy and response efficacy) as motivators of protective health behaviors. Integrating these frameworks offers a comprehensive explanation of how psychological, behavioral, and cultural factors interact to shape HISB. Therefore, this study aimed to develop and validate a causal model of factors influencing HISB among Muslim older adults in Pattani Province, Thailand.

Literature Review

This section presents the theoretical foundations of the study along with review of literature for the main concepts. An integrated approach combines protection motivation theory with health literacy and health responsibility to account for the psychological determinants of health information-seeking behavior (HISB) among Muslim older adults in Pattani, Thailand,

Health Information-Seeking Behavior

Health information-seeking behavior (HISB) is widely acknowledged as a conceptual construct that delineates proactive efforts to obtain and apply health information to maintain or improve health. Scholars have proposed diverse classifications to reflect the heterogeneity of HISB. For example, Lalazaryan and Zare-Farashbandi (2014) identified three primary types of problem-oriented, decision-support, and behavior-change seekers, thereby underscoring the multidimensional nature of HISB across populations.

Recent studies highlight that HISB is shaped by both structural and personal factors, including health literacy, cultural context, and psychological determinants (Lambert & Loiselle, 2007; Zhao et al., 2022). For older adults, limited digital skills, low confidence in online navigation, and language barriers often restrict their ability to access reliable health information (Yamashita et al., 2020). Therefore, understanding HISB requires consideration of both individual capacities and sociocultural as well as systemic contexts.

Protection Motivation Theory and Psychological Determinants of Health Information Seeking Behavior

The protection motivation theory (PMT; Rogers, 1983) provides a useful framework for explaining why individuals engage in HISB. PMT posits that health-protective behaviors are shaped by two cognitive processes: threat appraisal (perceived severity and vulnerability) and coping appraisal (self-efficacy and response efficacy). Individuals are more likely to seek information when they perceive themselves as vulnerable to health risks and believe they have the capacity to act effectively.

Integrating PMT with HISB demonstrates the relevance of psychological determinants such as motivation, self-confidence, perceived risk, and trust in information sources. While health literacy enables individuals to locate and comprehend health information (Nutbeam, 1998; Sørensen et al., 2012), PMT explains how individuals decide whether to act on that information. Integrating both frameworks provides

theoretical coherence: health literacy determines access and comprehension, whereas PMT accounts for behavioral motivation and protective action. Despite this complementarity, prior HISB models have often examined literacy and motivation in isolation, leading to limited explanatory power (Lambert & Loiselle, 2007).

The Context of Muslim Older Adults in Pattani Province in Thailand

Pattani Province in southern Thailand is undergoing a demographic transition toward an aging society. In 2020, adults aged more than 60 years constituted 12.26% of the population, yet only 6.9% reported favorable health behaviors, the lowest in health region 12 in Thailand. Chronic conditions are highly prevalent hypertension (35.72%), diabetes (12.53%), dementia (0.90%), and fall risk (3.92%) with 0.42% categorized as bedridden (Pattani Provincial Office of Social Development and Human Security, 2021). Beyond demographics, Muslim older adults face challenges shaped by sociocultural and linguistic diversity (widespread use of Patani Malay), Islamic practices, and persistent political instability, which contribute to health disparities and constrain access to healthcare services (Binbai & Chiangkhong, 2024).

Despite these constraints, religious practices such as prayer and Qur'anic recitation may enhance resilience and psychological well-being. Evidence also indicates that health literacy (HL) levels are only moderate, with direct implications for quality of life (Rakpanusit et al., 2020), and higher HL is associated with greater engagement in online health information-seeking behavior (HISB) (Lee et al., 2021; Yi et al., 2021).

However, the specific contribution of HL to HISB in this culturally distinctive context remains underexamined, underscoring the need for empirical models that integrate sociocultural and psychological determinants among Muslim older adults in Pattani Province. For clarity, variables are grouped as follows: (i) sociocultural/structural: primary language (Yawi vs. Thai), Thai literacy, educational attainment, household income, smartphone/Internet access and use, living arrangement/community support, and access to health services; (ii) psychological determinants: health literacy (HL), perceived health status (PHS), health responsibility (HR), trust in information sources, and protection motivation theory appraisals (perceived severity, perceived vulnerability, response efficacy, self-efficacy, response costs); and (iii) outcome of health information-seeking behavior (HISB).

Perception of Health Status

Perception of health status is a central construct of protection motivation theory (PMT), which explains how individuals evaluate health threats through two processes: threat appraisal (perceived severity and vulnerability) and coping appraisal (self-efficacy and response efficacy) (Babcicky & Seebauer, 2019; Rogers, 1983). Empirical studies across diverse contexts show that individuals who perceive higher health risks and greater coping ability are more likely to seek health information and adopt protective behaviors (Gedefaw et al., 2020; Kassie et al., 2022; Pourrazavi et al., 2022). For older adults, recognizing threats such as chronic illness and believing in their capacity to act effectively encourage self-protection and engagement in HISB. Despite this evidence, little is known about how Muslim older adults in Pattani perceive health risks and how these perceptions influence their HISB, leaving an important gap for research.

Health Responsibility

Health responsibility (HR) as conceptualized in the health-promoting lifestyle profile (HPLP) refers to proactive, self-directed engagement in one's own health, including acquiring health information, monitoring health status, seeking preventive services, and consulting health professionals when needed (Walker et al., 1987). Empirical studies indicate that higher HR is associated with greater health information-seeking behavior (HISB), adoption of preventive practices, and better health outcomes (Kim & Oh, 2021; Weaver et al., 2010). However, the extent to which HR influences HISB among marginalized older adults particularly Muslim older adults in southern Thailand remains underexamined and warrants further investigation.

Health Literacy

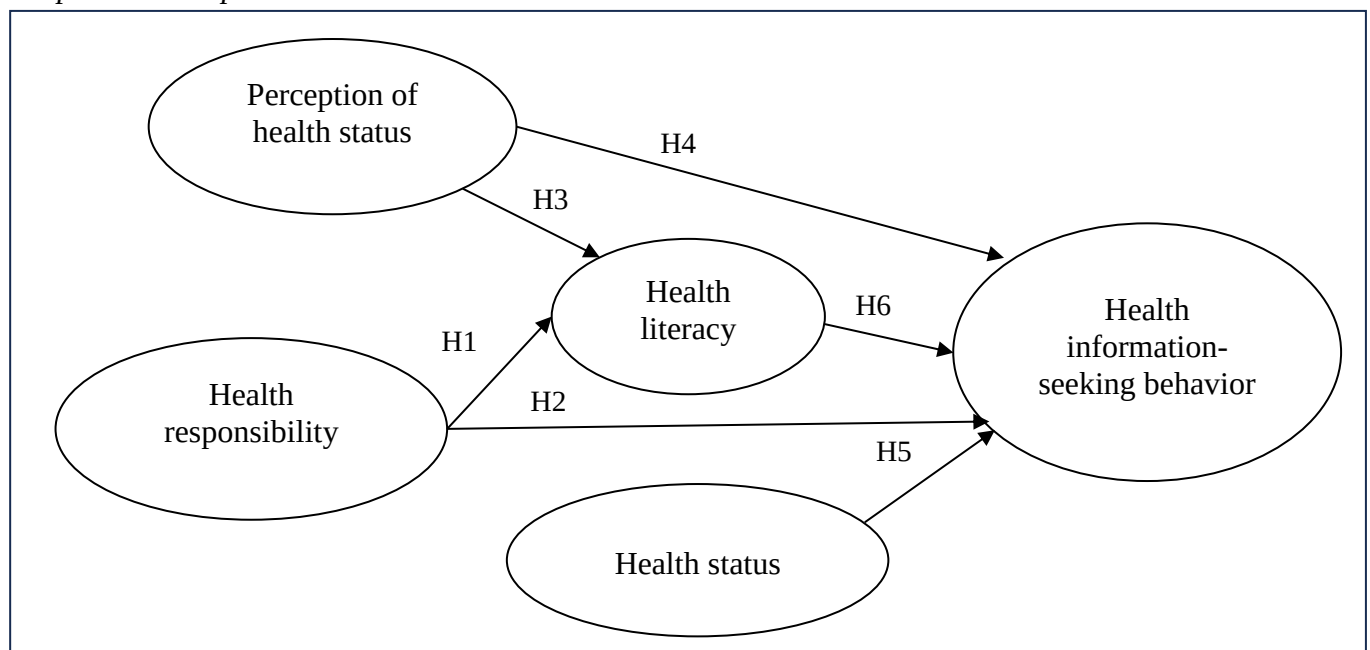
Health literacy refers to the ability to access, understand, and apply health information for informed health decisions (Nutbeam, 2000; Sørensen et al., 2012). It encompasses cognitive and social skills that shape individuals' motivation and capacity to manage their health. Substantial evidence demonstrates that higher health literacy is strongly associated with proactive health information-seeking behavior (HISB), broader use of information sources, and improved health outcomes (Lee et al., 2021; Yamashita et al., 2020). For example, older adults with greater health literacy are more likely to seek health information online, engage in preventive care, and adopt self-care practices (Kim & Utz, 2018; Mengiste et al., 2021). These findings suggest that health literacy directly influences HISB across populations. However, most prior research has focused on general or urban populations. The role of health literacy in shaping HISB among Muslim older adults in southern Thailand remains insufficiently examined, representing a critical gap for investigation. Collectively, this evidence positions health literacy as a key upstream determinant of HISB. Nevertheless, most prior work centers on general or urban populations; the influence of health literacy on HISB among Muslim older adults in southern Thailand remains underexamined and constitutes a critical gap. In Thailand, Kachentawa (2023) developed and validated e-health literacy indicators for older adults adapting to the “new normal,” underscoring the salience of digital health literacy for HISB in later life and providing context for examining Muslim elders in southern Thailand.

Conceptual Framework and the Research Hypotheses

The conceptual framework of this study integrated three groups of variables relevant to HISB. First, health factors emphasize the role of health literacy and perceived health status; older adults with higher literacy are better able to obtain and evaluate information, which enhances disease management and reduces age-related risks. Second, psychological factors, drawn from protection motivation theory, highlight how threat and coping appraisals—such as perceived severity, vulnerability, and self-efficacy—motivate protective health behaviors. Third, behavioral factors reflect health responsibility, or the degree to which individuals actively engage in maintaining their well-being through preventive actions and self-care (Koponrat et al., 2017). Together, these variables provide a comprehensive explanation of HISB. However, their combined influence has rarely been examined in culturally distinct elderly populations, such as Muslim older adults in Pattani Province, underscoring the need for this study.

Figure 1

Proposed Conceptual Framework



Grounded in the conceptual framework and prior evidence, six hypotheses were proposed regarding factors influencing health information-seeking behavior (HISB):

- H1: Health responsibility has a direct effect on health literacy.
- H2: Health responsibility has a direct effect on HISB.
- H3: Perceived health status has a direct effect on health literacy.
- H4: Perceived health status has a direct effect on HISB.
- H5: Health literacy has a direct effect on HISB.
- H6: Health status has a direct effect on HISB.

These hypotheses collectively capture the causal pathways linking behavioral, psychological, and health-related factors to HISB. The research framework (Figure 1) integrates these hypothesized relationships. It is grounded in protection motivation theory and health literacy frameworks, combined with prior empirical findings, to explain HISB among Muslim older adults.

Method

Research Design

This study employed a causal research design to examine relationships between exogenous and endogenous latent variables and to develop a model of factors influencing HISB among Muslim older adults.

Research Setting

This research was conducted among Muslim older adults in Pattani Province, Thailand, from 2022 to 2023. The majority of the population is Muslim and speaks Patani Malay, or Yawi, as their primary language, particularly the elderly. Some of them are unable to read, write, or speak Thai, which presents a challenge in terms of accessing health information. As compared to all provinces in Health Region 12, the elderly population exhibited the least desirable health behavior at only 6.90% (Office of Social Development and Human Security Pattani Province, 2022).

Participants/Sample

The study population consisted of 80,742 Muslims older aged 60 years and above residing in five districts of Pattani Province, Thailand, focusing on older Muslim adults aged 60 and above who resided in five districts of Pattani Province: Muang Pattani, Yaring, Nongjik, Panareh, and Saiburi. The required sample size was determined using the criterion of at least 10 participants per estimated parameter (Hair et al., 2010). With 34 parameters in the model, a minimum of 340 participants was necessary. To account for potential missing or incomplete data, the sample size was increased by 20.0%, yielding a target of 408. Data were successfully collected from 400 participants.

Sampling and Sample Procedures

Multi-stage cluster sampling was employed in Pattani Province. Five districts—Mueang Pattani, Yaring, Nong Chik, Panare, and Sai Buri—each with more than six thousand older adults, were selected as primary sampling units. Within each district, three subdistricts were randomly selected, and eighty-two participants per district were recruited in accordance with the inclusion and exclusion criteria. Eligible participants were Muslim adults aged sixty years or older who provided informed consent. Individuals who were not Muslim, were younger than sixty years, or were unable to communicate were excluded. Participation was voluntary, and respondents were informed of their right to withdraw at any time without penalty.

Instruments

Data were collected using structured questionnaires and interview forms covering six domains. Section 1 assessed demographic characteristics (e.g., age, gender, education). Section 2 examined health status using a checklist of chronic and serious diseases. Section 3 measured health information-seeking behavior with eight items on motivation, sources, evaluation, and barriers, rated on a 5-point Likert scale. Section 4 assessed health literacy (20 items in four components: access, comprehension, analysis, and application), adapted from Srisaeng and Deenamchued (2019) and based on Sørensen et al. (2012). Section 5 evaluated health perception with 14 items addressing severity, risk, self-efficacy, and barriers, also rated on a 5-point Likert scale. Section 6 measured health responsibility with five items on proactive health behaviors. All instruments used 5-point Likert scales, and negative items were reverse-scored so that higher scores consistently indicated stronger literacy, perception, or responsibility.

Procedure

The questionnaire was translated into Patani Malay (Yawi) via forward-back translation with reconciliation, expert/committee review, and cognitive pretesting with older adults to ensure linguistic and cultural equivalence, consistent with cross-cultural adaptation standards. Research assistants completed training in human-subjects protections and culturally sensitive conduct in line with CIOMS (2016) and the WMA Declaration of Helsinki. Formal collaboration letters were secured from local authorities and community stakeholders before fieldwork, consistent with community-engaged research principles (Israel et al., 2013). Data were collected December 2022–March 2023. Analyses used descriptive statistics, confirmatory factor analysis, and structural equation modeling; model evaluation followed established recommendations ($CFI/TLI \geq .95$, $RMSEA \leq .06$, $SRMR \leq .08$).

Results

This research investigated the degree to which these causal factors affect health information-seeking behavior and the underlying mechanisms. The findings are presented in the following steps: i) Results of fundamental data analysis for the sample. ii) Results of confirmatory factor analysis for each variable. iii) Results of fundamental data analysis about variables and their correlation coefficients. iv. Results of structural relationship model analysis.

Sample Characteristics

The final sample comprised $n = 400$ Muslim older adults (female: $n = 220$, 55.0%; male: $n = 180$, 45.0%). Most participants were aged 60–69 years. Regarding education, 52.8% had completed primary school ($n = 211$), whereas 40.0% reported no formal education ($n = 160$).

Confirmatory Factor Analysis

Confirmatory factor analysis (CFA) was conducted to evaluate the structural validity of the study constructs. The health responsibility scale demonstrated excellent fit, $\chi^2(1) = .67$, $p = .42$, $CFI = 1.00$, $RMSEA = .00$, $SRMR = .009$, with factor loadings ranging from .45 to .81; four items were retained. The health perception scale also showed good fit, $\chi^2(34) = 41.21$, $p = .18$, $CFI = 1.00$, $RMSEA = .02$, $SRMR = .026$, with loadings from .55 to .98; 11 items were retained. The health literacy scale yielded acceptable fit, $\chi^2(48) = 58.85$, $p = .14$, $CFI = 1.00$, $RMSEA = .02$, $SRMR = .040$, with loadings ranging from .55 to .89; 16 items were retained. Finally, the health information-seeking behavior (HISB) scale demonstrated satisfactory fit, $\chi^2(472) = 541.02$, $p = .015$, $\chi^2/df = 1.15$, $CFI = 1.00$, $RMSEA = .02$, $SRMR = .050$, with loadings from .53 to .92; 38 items were retained.

All constructs demonstrated robust psychometric properties, with fit indices meeting recommended thresholds ($CFI \geq .95$, $RMSEA \leq .06$, $SRMR \leq .08$; Hu & Bentler, 1999), and factor loadings exceeding the .40 criterion (Kline, 2016), thereby supporting the construct validity of the measurement model.

Descriptive Analysis and Correlation among Student Variables

All facets of the proposed causal model of health information-seeking behavior were analyzed using descriptive statistics. This data presents the mean, standard deviation, skewness, and kurtosis. The mean score ranged from 1.52 to 4.82. The highest average was the belief in the chance of disease or accident ($M = 4.82$), followed by health management skills ($M = 4.73$). The standard deviations ranged from .59 to 1.34. Individual health information evaluations and analyses ($SD = 1.34$) and applications ($SD = 1.33$) exhibit the greatest variability. The skewness increased from 1.89 to 1.10, while the kurtosis increased from $-.89$ to 2.26. Perceived disease or accident risk exhibited the greatest kurtosis ($Ku = 2.26$), whereas health information sources demonstrated the highest skewness ($Sk = 1.10$). Skewness and kurtosis can evaluate normality in samples above 300, despite certain distributions being statistically non-normal. Structural equation modeling (SEM) was used based on the idea that the data had a normal distribution, following the suggested limits of ± 2 for skewness and ± 7 for kurtosis (Byrne, 2010; Hair et al., 2010), as illustrated in Table 1.

Table 1

Descriptive Statistics and Normality Indices of Observed Variables

Variable	<i>n</i>	<i>M</i>	<i>SD</i>	Min	Max	Skew	Kurtosis
Health information-seeking behavior							
Health information needs	400	3.54	1.29	.84	5.10	-.31	-.84
Purpose of health information-seeking	400	4.10	1.19	1.55	5.22	-.59	-.85
Sources of health information	400	1.52	.92	.89	4.23	1.10	-.02
Desired content and format of health information	400	3.90	1.22	1.31	5.22	-.41	-.86
Motivation for health information seeking	400	3.48	1.22	1.00	5.18	-.19	-.74
Evaluation and analysis of health	400	2.98	1.34	.96	5.21	.06	-.89
Utilization of health information	400	3.35	1.33	1.02	5.54	-.03	-.73
Barriers to health information-seeking	400	3.97	1.28	1.13	5.18	-.60	-.80
Health Literacy							
Access to health information	400	2.70	1.12	.42	5.07	.02	-.34
Understanding of health information	400	3.70	1.12	1.04	5.22	-.24	-.64
Analysis of health information	400	3.75	1.20	.93	5.16	-.36	-.74
Application for health information	400	3.77	1.10	.98	5.30	-.23	-.58
Health perception							
Perceived gravity of disregarding personal health	400	4.68	.61	2.81	5.04	-1.34	.50
Perceived vulnerability to accidents and illness	400	4.82	.42	2.98	5.01	-1.89	2.26
Self-efficacy in personal health management	400	4.51	.73	1.91	5.06	-.95	-.19
Perceived effectiveness of personal health management	400	4.73	.59	2.51	5.05	-1.53	1.11
Responsibility for health							
Responsibility for health	400	4.25	.86	1.80	5.17	-.49	-.64

Note. *M* = Mean; *SD* = Standard Deviation; Skew = Skewness; Min = Minimum; Max = Maximum.

Pearson product-moment correlation coefficients were calculated to assess associations among observed variables and to check for potential multicollinearity before SEM. Correlation values below .85 are considered acceptable, indicating that multicollinearity is unlikely, as illustrated in Table 2 (Kline, 2016; Tabachnick & Fidell, 2019).

Table 2*Correlation Coefficient among the Study Variables*

Variable	RS	HP1	HP2	HP3	HP4	HL1	HL2	HL3	HL4	HS1	HS2	HS3	HS4	HS5
RS	1.00													
HP1	.14**	1.00												
HP2	.19**	.46**	1.00											
HP3	.19**	.29**	.40**	1.00										
HP4	.28**	.44**	.51**	.52**	1.00									
HL1	.02	-.09	-.08	.08	.00	1.00								
HL2	.18**	.33**	.27**	.31**	.37**	.34**	1.00							
HL3	.12*	.33**	.26**	.41**	.41**	.32**	.73**	1.00						
HL4	.22**	.27**	.22**	.46**	.36**	.38**	.62**	.63**	1.00					
HS1	.09	.10	.16**	.33**	.24**	.49**	.36**	.38**	.45**	1.00				
HS2	.15**	.26**	.27**	.33**	.33**	.28**	.37**	.33**	.34**	.59**	1.00			
HS3	-.02	.04	-.11*	-.07	-.05	.49**	.25**	.20**	.11*	.19**	.12*	1.00		
HS4	.12*	.14**	.17**	.30**	.25**	.42**	.45**	.51**	.53**	.58**	.62**	.15**	1.00	
HS5	.08	.24**	.17**	.26**	.28**	.36**	.41**	.40**	.45**	.53**	.57**	.12*	.59**	1.00

Note. * $p < .05$, ** $p < .01$, RS=Health Responsibility, HP=Health Perception, HL=Health Literacy, HS=Health Information-Seeking Behavior,

Hypotheses Testing Results**Structural Relationship Model Analysis**

The initial fit test results indicated that the theoretical model did not adequately align with the observed data: $\chi^2 = 913.93$, $df = 114$, $p < .001$; $\chi^2/df = 8.02$; CFI = .89; GFI = .79; AGFI = .72; SRMR = .10; RMSEA = .13. These indices fell short of the recommended thresholds, suggesting poor model fit. To improve congruence, the model was refined by incorporating theoretically justified modifications and accounting for measurement errors in specific item pairs.

The revised model demonstrated a substantially improved and adequate fit: $\chi^2 = 88.60$, $df = 59$, $p = .008$; $\chi^2/df = 1.50$; CFI = 1.00; GFI = .97; AGFI = .93; SRMR = .05; RMSEA = .04. All indices met or exceeded accepted criteria ($\chi^2/df < 2.0$, CFI $\geq .95$, GFI $\geq .90$, AGFI $\geq .90$, SRMR $\leq .05$, RMSEA $\leq .06$), confirming that the refined model provided a satisfactory representation of the data (see Table 3).

Table 3*Goodness Index of the Structural Relationship Model*

Fit index	Acceptable criteria	Before adjustment	Fit status	After adjustment	Results
χ^2/df	< 2.00	8.02	Not Fit	1.50	Fit
SRMR	< .05	.10	Not Fit	.05	Fit
RMSEA	< .05	.13	Not Fit	.04	Fit
CFI	$\geq .90$	.89	Not Fit	1.00	Fit
GFI	$\geq .90$	.79	Not Fit	.97	Fit
AGFI	$\geq .90$	.72	Not Fit	.93	Fit

Note. χ^2/df = chi-square divided by degrees of freedom; SRMR = Standardized Root Mean Square Residual; RMSEA = Root Mean Square Error of Approximation; CFI = Comparative Fit Index; GFI = Goodness-of-Fit Index; AGFI = Adjusted Goodness-of-Fit Index.

The evaluation of the goodness-of-fit measure index value, in conjunction with the criteria for assessing the model's alignment with empirical data, indicated that the revised model of causal factors affecting health information-seeking behavior among the elderly demonstrated a strong fit with the empirical data. The effect size estimates in the model were deemed satisfactory, and the hypothesis was affirmed. The results are presented in Table 4.

Table 4*Standard Scores of Direct Effect, Indirect Effect, and Total Effect*

Causal variables	Effect	Outcome variables	
		Health literacy	Health information-seeking behavior
Health Responsibility	DE	.09	.12
	IE	–	.08
	TE	.09	–.04
Health Perception	DE	.63*	–.11
	IE	–	.56**
	TE	.63*	.45**
Health Literacy	DE	–	.89**
	IE	–	–
	TE	–	.89**
R^2		.44	.63

Note. * $p < .05$, ** $p < .001$, TE = total effect, DE = direct effect, IE = indirect effect.

The structural model of causal factors affecting health information-seeking behavior in older Muslims had a satisfactory match with the empirical data: $\chi^2 = 88.60$, $df = 59$, $p = .008$; $\chi^2/df = 1.50$; CFI = 1.00; GFI = .97; AGFI = .93; SRMR = .05; RMSEA = .04. These indices suggest that the model is suitable for additional hypothesis testing.

Impact on Health Responsibility

Health responsibility directly influences health literacy and the behavior of seeking health information. The findings indicated that health responsibility exerted no substantial direct influence on health literacy or health information-seeking behavior. Health responsibility indirectly influences health information-seeking behavior. The results indicated that health responsibility did not have a substantial indirect effect on health information-seeking behavior. The findings indicate that Hypothesis 1 has been rejected.

Impact of Health Perception

Health perception directly influences health literacy and the need for health information. The findings indicated that health perception exerted a statistically significant direct influence on health literacy at the .05 level, with a path coefficient of .63. Nonetheless, health perception did not have a substantial direct impact on health information-seeking behavior. Health perception indirectly influences health information-seeking behavior. The research indicated that health perception had a statistically significant indirect influence on health information-seeking behavior via health literacy, with a path coefficient of .56. Conclusion: Hypothesis 2 received partial validation.

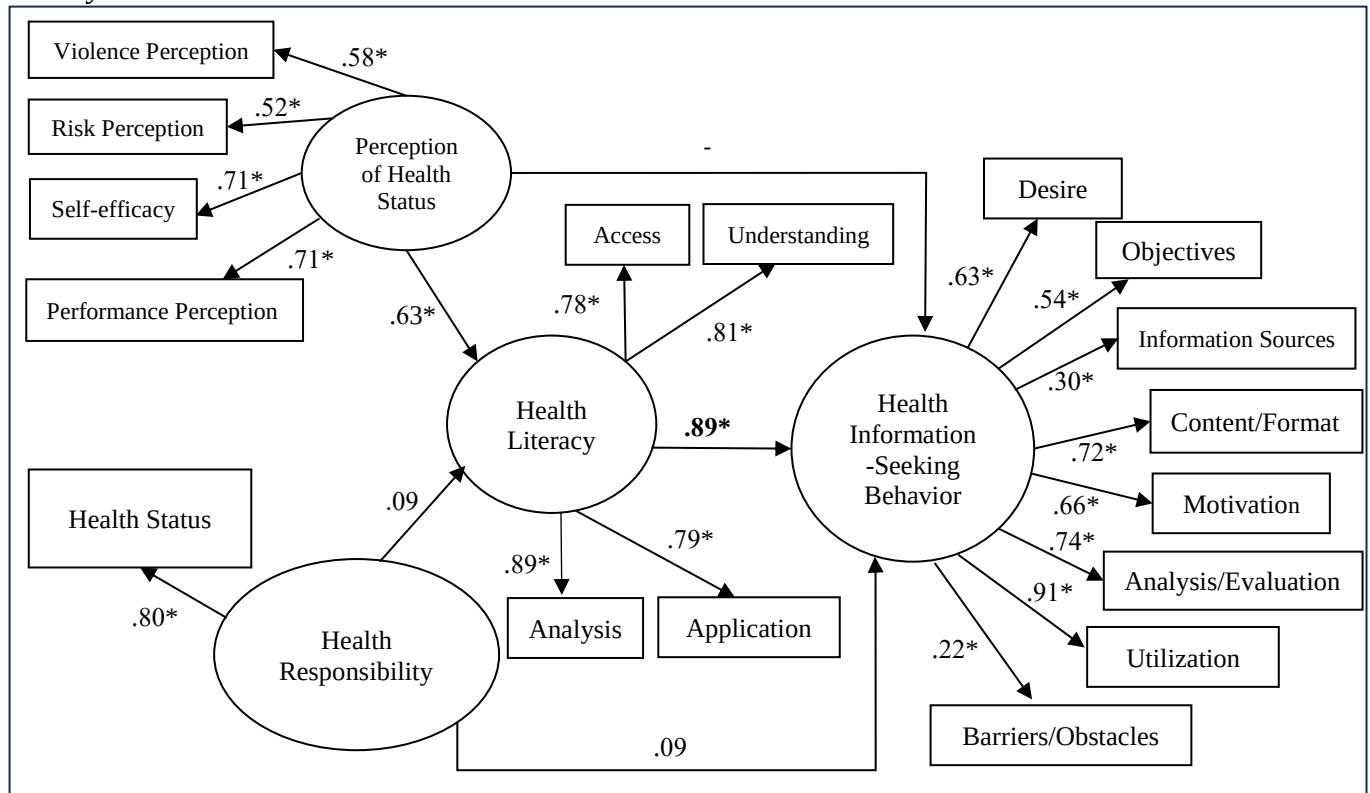
Impact of Health Literacy

Health literacy directly influences the habit of acquiring health information. The results indicated that health literacy exerted a statistically significant direct influence on health information-seeking behavior at the 0.05 level, with a path coefficient of .89. The findings indicated that Hypothesis 3 was validated. The structural model accounted for forty-four percent of the variance in health literacy and sixty-three percent of the variance in health information-seeking behavior among older Muslim individuals.

The outcomes of the model study of causative factors affecting health information-seeking behavior among elderly Muslims in Pattani Province, Thailand, are shown in Figure 2.

Figure 2

Outcomes of a Model Study of Causative Factors Affecting Health Information-Seeking Behavior among Elderly Muslims



Note. * $p < .05$, ** $p < .01$.

Discussion and Conclusion

The final structural equation model demonstrated excellent fit ($\chi^2/df = 1.50$, CFI = 1.00, GFI = .97, AGFI = .93, SRMR = .05, RMSEA = .04). Health literacy (HL) had the largest direct effect on health information-seeking behavior (HISB) ($\beta = .89$, $p < .05$). Perceived health status (PHS) did not directly predict HISB ($\beta = -.11$, $p > .05$) but showed a significant indirect effect via HL (IE = .56, $p < .05$), yielding a positive total effect (TE = 0.45, $p < .05$). Health responsibility (HR) was not a significant predictor of HL ($\beta = .09$, $p > .05$) or HISB (DE = .12; IE = .08; both $p > .05$). The model explained 44% of the variance in HL and 63% in HISB.

The findings can be interpreted using two complementary frameworks: health literacy (Nutbeam, 2000; Sørensen et al., 2012) and protection motivation theory (Rogers, 1983). Health literacy facilitates access to, comprehension of, evaluation of, and application of health information, enabling individuals to make informed health decisions. The significant role of health literacy in this study supports Nutbeam's conceptualization of health literacy as a key determinant of self-management. PMT further clarifies the pathway from perceived health status to HISB. Older adults who perceive greater vulnerability or severity of illness are motivated to seek information, provided they believe they have the efficacy to act on it. This aligns with the observed indirect effects of perceived health status via health literacy, suggesting that literacy mediates the process by which threat appraisals are transformed into protective behaviors.

The strong influence of health literacy corroborates earlier findings. Lee et al. (2021) reported that higher health literacy and digital access significantly predicted online HISB, while Kim and Utz (2018) demonstrated that literacy was a critical determinant of health information needs among Korean seniors. Similarly, Pourrazavi et al. (2022) found that self-efficacy, an element of both PMT and health literacy, predicted online HISB among Iranian older adults. In contrast, the non-significant effect of health

responsibility diverges from Longo (2005) framework, which identified responsibility as a driver of information-seeking. Several contextual explanations may account for this discrepancy. First, older adults in Pattani may place greater trust in healthcare professionals and prefer to rely on their guidance rather than independent searching. Second, some individuals may rely on prior experience or existing knowledge interpreted as past health-related experiences, cognitive confidence, or self-sufficiency beliefs perceiving little need for additional information and thereby reducing their motivation to seek further knowledge (Ma et al., 2023; Pourrazavi et al., 2022). Third, cognitive overload resulting from the abundance of health information may discourage active searching (Anderson et al., 2003). Finally, structural barriers such as limited digital literacy and linguistic constraints (e.g., reliance on Malay in a predominantly Thai-language environment) may further hinder engagement with health information resources (Cutilli & Bennett, 2009) 2010).

Limitations

This study focused only on Muslims older adults in Pattani with may limit generalizability to other religions or regions. In addition, using a quantitative cross-sectional design restricted deeper insights. Future studies should include comparative and mixed-method approaches.

Implications for Behavioral Science

This study offers important implications for behavioral science by demonstrating the indirect influence of psychological factors, particularly the protection motivation theory, on health information-seeking behavior among older adults. According to PMT, individuals' perceptions of threat severity, vulnerability, and coping ability shape their motivation to adopt protective actions (Babcicky & Seebauer, 2019; Rogers, 1983). In this study, perceived health status motivated information-seeking indirectly through health literacy, which is consistent with prior evidence that literacy mediates the translation of risk perception into proactive health behaviors (Pourrazavi et al., 2022; Sørensen et al., 2012). The findings underscore the importance of strengthening health literacy as a pathway to enhance self-care and disease prevention among older populations. Practical applications include the design of tailored health communication strategies and age-appropriate resources to ensure accessibility and comprehension (Lee et al., 2021; Nutbeam, 2000). Health promotion programs should integrate training that builds older adults' capacity to seek, evaluate, and apply health information, thereby empowering them to make informed health decisions and maintain independence.

Conclusion

This study confirmed a causal model in which health literacy and perceived health status significantly influenced HISB among Muslim older adults in Pattani Province. Health literacy emerged as the most powerful determinant, mediating the effects of perceived health status on HISB. In contrast, health responsibility did not predict HISB, suggesting that cultural and contextual factors may attenuate its role. These findings highlight the need for interventions that enhance health literacy and address contextual barriers to promote equitable access to health information. Strengthening literacy and culturally tailored communication strategies may empower older adults to make informed health decisions and improve health outcomes.

Declarations

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Ethical Approval Statement: This study was conducted by the Declaration of Helsinki and approved by the Institutional Review Board (or Ethics Committee) of Prince of Songkla University, Pattani Campus. (protocol code, psu.pn.2-026/65 dated 6 June 2022), for studies involving humans.

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