

Occupational health literacy work-related safety behaviors among village health volunteers in Ubon Ratchathani Province, Thailand

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ABSTRACT



This cross-sectional study examined the relationship between occupational health literacy (OHL) and work safety behaviors among 245 Village Health Volunteers (VHVs) in Ubon Ratchathani Province, Thailand. Data were collected using validated questionnaires (Cronbach's alpha = 0.962 and 0.88). Descriptive statistics and stepwise multiple linear regression analysis were performed. The majority of VHVs were female (88.6%). The mean age was 51.18 ± 8.54 years. Most participants were married (73.9%), had primary education (53.1%), and worked in agriculture (84.9%). The average monthly income was $3,710 \pm 2,897.79$ THB. Most participants had no history of work-related accidents (89.9%) and no

underlying diseases (73.9%). The mean experience as VHVs was 13.16 ± 7.32 years, and occupational health and safety information was primarily obtained from medical personnel (76.3%). The results indicated that both occupational health literacy and work-related safety behaviors were at moderate levels. Multiple linear regression analysis revealed that monthly income ($\beta = -0.128$, $p = 0.046$), decision-making and application ($\beta = 0.334$, $p < 0.001$), and media literacy ($\beta = -0.242$, $p = 0.008$) were significant predictors of work-related safety behaviors. The model explained 6.5% of the variance ($R^2 = 0.065$). These findings highlight the importance of cognitive dimensions of occupational health literacy, particularly decision-making and application skills, in influencing safety behaviors. Targeted training programs focusing on these competencies may improve work-related safety behaviors and accident prevention practices among VHVs in community-based settings.

Keywords: Occupational health literacy (OHL), Work safety behaviors, Village Health Volunteers (VHVs), Ubon Ratchathani

1. Introduction

Occupational safety among workers is a critical concern in both public and private sectors. Globally, approximately 2.93 million workers die each year from work-related accidents and diseases, with millions more experiencing non-fatal injuries (International Labour Organization, 2019). In Thailand, occupational health risks remain prominent, particularly in informal and community-based settings where access to safety services is limited. Effective community health management and health promotion activities are therefore essential to foster safe behaviors. Health literacy plays a key role in enabling individuals to understand and apply health information to reduce risks. According to the World Health Organization (1998), health literacy encompasses the cognitive and social skills that influence individuals' ability to access, understand, and use information to maintain and improve their health (Nutbeam, 1998). This concept is further supported by global health promotion frameworks, including the Ottawa Charter and the Jakarta Declaration (World Health Organization, 1986, 1997), which emphasize the importance of empowering individuals to adopt safe and healthy behaviors.

Workplace behaviors are a primary cause of accidents. Fuller's model (Fuller, 2005) posits that when job demands exceed an individual's capabilities, the risk of accidents increases. Village Health Volunteers (VHVs) play a crucial role in community health, reaching individuals within their local environments. In many communities, particularly in rural areas, residents are primarily engaged in informal sector work, such as agriculture. VHVs facilitate the timely and accurate communication of health information, acting as change agents for health behaviors within their communities, including occupational health and safety. Despite their important role in preventing and controlling communicable and non-communicable diseases and promoting health behaviors, the occupational health literacy of VHVs has not been extensively developed. Although VHVs are tasked with preventing accidents and diseases and promoting health, aligning with regulations set by the Ministry of Public Health, a significant number of VHVs face challenges related to limited capacity related to limited capacity that does not fully meet their roles and responsibilities (Ndu et al., 2022; Liverani et al., 2024), and they may lack confidence in providing information. Currently, VHV operations are supervised by local Primary Health Care Centers, which oversee their activities and assign tasks.

According to the Medical and Health Information Report (2022) (Strategy and Planning Division, Ministry of Public Health, 2023), Village Health Volunteers (VHVs) are categorized into four area types based on geographical characteristics: urban, semi-urban, rural, and remote areas. Ubon Ratchathani Province falls into the semi-urban category, characterized by a mixture of urban and rural contexts. In Thailand's primary health care system, VHVs play a crucial role in health promotion, disease prevention, and risk communication at the community level. Their responsibilities include disseminating health information, identifying health risks, and supporting preventive measures for both communicable and non-communicable diseases, as well as occupational health and safety issues within the community (World Health Organization, 2020; Ministry of Public Health, 2018; Department of Disease Control, 2021). In addition, VHVs are actively involved in raising awareness of occupational hazards, promoting safe work practices, and assisting in the prevention of work-related injuries and illnesses, particularly in informal and agricultural sectors where formal occupational health services are limited (Kongsombatsuk et al., 2020; World Health Organization, 2020). Therefore, it is essential for VHVs to possess adequate occupational health and safety literacy to effectively communicate risks and promote safety behaviors among community members.

Occupational Health Literacy (OHL) (Polyong C.P. et al., 2020) refers to the ability of workers to access, understand, evaluate, decide on, and apply information related to work-related diseases and

injuries, as well as to recognize their own health status related to their work (Melis et al., 2025). In Thailand, previous research has indicated that occupational health literacy influences health-promoting behaviors among employees (Mayod, 2023). Individuals with inadequate health literacy have a 2.12- and 4.86-times higher risk of physical and mental health problems, respectively, compared to those with adequate health literacy (Huang et al., 2021). Studies on occupational health literacy concerning disease and injury prevention in the industrial sector have found moderate levels of literacy and its influence on preventive behaviors among employees (Güner & Ekmekci, 2019). Additionally, research on the relationship between occupational health literacy and safety behaviors at work has also reported moderate levels (Özaydın et al., 2021), as well as studies on the level of occupational health literacy and its correlation with occupational health literacy among Healthcare Workers in Adana, Türkiye. (Dağlı et al., 2024). Metropolitan Administration hospital, which was found to be at a moderate level Furthermore, a study explored the relationship between occupational health literacy and work-related injuries among intensive care unit nurses (Melis et al., 2025). A study by Magdy et al. (2025) found that older age and lower educational level were associated with lower occupational health literacy. However, there is a lack of research focusing on Village Health Volunteers, a professional group that not only provides health communication and coordinates basic health issues within communities but is also at health risk due to exposure to various hazards leading to work-related illnesses and injuries.

Despite growing evidence on occupational health literacy among industrial and healthcare workers, limited research has focused on Village Health Volunteers, who operate in informal and community-based settings. Given their critical role in health promotion and risk communication, understanding how occupational health literacy influences their safety behaviors is essential. Therefore, this study aims to examine the relationship between occupational health literacy and work-related safety behaviors among Village Health Volunteers in Ubon Ratchathani Province. The findings are expected to inform the development of targeted interventions to enhance safety practices in community health systems.

2. Research method

This study employed a Cross-sectional analytical design conducted between November and December 2023. This study was conducted in Ubon Ratchathani Province, a northeastern Thai region with a significant semi-urban landscape characterized by a mix of developing urban areas and surrounding rural communities, including designated special economic zones with a notable informal labor sector. This area was chosen due to its unique occupational health challenges arising from the blend of formal and informal work and the potential for limited safety awareness in the informal sector.

2.1 Population and sample

According to the study of Kongsombat et al. (2020), the disease prevention behavior and work-related injuries of employees in the Map Ta Phut Industrial Estate, Rayong Province, the disease prevention behavior results were 67.10 percent. The population of this study was village volunteers (VHVs) in Ubon Ratchathani Province. In the public health system in the context of Thailand, areas are classified according to geographical characteristics to suit the context of the area (Type area). Semi-urban areas are defined as areas with both urban and rural characteristics, including special economic zones with a substantial informal labor sector, which are special economic areas and have informal labor (National Health Security Office, 2022). The study specifically targeted the 731 Village Health Volunteers (VHVs) operating in these semi-urban areas. The required sample size was calculated using Daniel's (2010) formula as shown in Equation (1):

$$n = \frac{Z_{\alpha}^2 \cdot NP(1-P)}{Z_{\alpha}^2 \cdot P(1-P) + (N-1)d^2} \quad (1)$$

Where: n = required sample size N = population size Z = Z-score for a 95% confidence level (1.96) P = estimated prevalence of disease prevention behavior (0.671) d = margin of error (0.05)

The finite population correction formulation was used to calculate the sample size for the study as shown in Equation (2):

$$n = \frac{731(1.96^2)0.671(1-0.671)}{(1.96^2)0.671(1-0.671)+(731-1)0.05^2} \quad (2)$$

$$n = 231.53$$

Where: n = required sample size N = population size (731) Z = Z-score for a 95% confidence level (1.96), P = estimated prevalence of disease prevention behavior (0.671) d = margin of error (0.05).

A sample size of at least 232 participants was requirement to estimate the percentage with an error of no more than 5 percent at a 95 percent confidence level. To prevent errors in data collection and analysis, the researcher used a total sample of 245 participants. Purposive sampling was then used to recruit VHVs from semi-urban areas characterized by both urban and rural features, based on the Medical and Health Data Report (Bureau of Registration Administration, 2022).

2.2 Research materials

The primary data collection instrument was a structured questionnaire, administered in person to 245 VHVs by trained researchers. This questionnaire was designed to gather standardized information on their general characteristics, occupational health literacy (OHL), and work-related safety behaviors. Participants completed the questionnaire independently after receiving a thorough explanation after the study's purpose and instructions for each section.

Part 2 : Occupational health literacy was adapted from the questionnaire of Polyong C. P. et al.(2020) , the concept of Nutbeam (2000) , the Health Literacy Scale for Worker: HELSW (Friedrich et al., 2023), and the recommendations of the Health Education Division (Division of Health Education, 2017), totaling 43 items, divided into 6 domains: access to health information, reading and understanding, communication skills, decision-making and application, media literacy, and self-health management. The questions were multiple-choice with 5 options: most, much, moderate, little, and least. The scores were 5 to 1, respectively. The results of the validity test showed that the IOC value was more than 0.5 for all questions. The instrument was tested for reliability with 30 employees in an industrial factory who were not the sample group. The reliability of the instrument was Cronbach's alpha of 0.962 for the whole version and the corrected item-total correlation for each aspect was between 0.322-0.799.

2.3 Research procedure

The questionnaire comprised three sections. Section 1 consisted of general Information items: This section used closed-ended questions to collect factual background data. The content validity of these items was confirmed using the Item-Objective Congruence Index (IOC), with all items scoring above 0.5, indicating they effectively measured the intended demographic and occupational factors. Section 2 is OHL (43 items): This section employed rating scale questions using a 5-point Likert scale. Participants indicated their perceived level of ability across six OHL domains. The reliability of this section was high, with a Cronbach's alpha coefficient of 0.962, indicating good internal consistency.

The scoring ranged from 1 ('Least') to 5 ('Most'), and overall, OHL levels were interpreted based on mean scores categorized into high, moderate, and low based on established statistical principles. Section 3 is work-related safety behaviors (15 items): This section used forced-choice questions with three options ('Always', 'Sometimes', 'Never') to measure the frequency of safety practices across three domains. The reliability of this section was acceptable, with a Cronbach's alpha coefficient of 0.88.

Responses were numerically coded, and mean scores were calculated and categorized into high, moderate, and low levels based on predefined criteria.

Data analysis involved descriptive statistics (frequencies, percentages, means, standard deviations) to summarize the characteristics of the 245 Village Health Volunteers and their levels of OHL and work-related safety behaviors. Normality of data was checked using the Kolmogorov-Smirnov test. Stepwise multiple linear regression was then used to identify factors, including OHL domains, income, and experience, that significantly influenced work-related safety behaviors. The statistical significance level was set at $p < 0.05$. This study received ethical approval from the Human Research Ethics Committee of the Ubon Ratchathani Provincial Public Health Office (Approval Number: SSJ.UB 2566-055) on May 10, 2023.

3. Results and discussion

3.1 General characteristics of Village Health Volunteers (VHVs)

The 245 VHVs revealed a largely female sample (88.6%), with an average age of 51.18 years ($SD = 8.54$) and a mean VHVs experience of 13.16 years ($SD = 7.32$). The majority were married (73.9%), had attained primary education (53.1%), and were primarily engaged in agriculture (84.9%), earning an average monthly income of 3,710 THB ($SD = 2,897.79$). Relatively few reported prior work accidents (10.2%) or underlying health issues (26.1%), and most relied on medical professionals for safety information (76.3%), as shown in Table 1.

Table 1. Personal factors, work characteristics, and information sources of VHVs (n=245)

Table 1. Personal factors, work characteristics, and information sources of VHTVs (n = 245)			
	Factor	n	%
Gender			
	Male	28	11.4
	Female	217	88.6
Age (Years)			
	≤ 52	128	52.2
	> 52	117	47.8
	Mean ± SD	51.18 ± 8.54	
	Median (Min - Max)	53 (35-69)	
Marital status			
	Single	24	9.8
	Married	181	73.9
	Widowed/Divorced	40	16.3
Education level			
	Primary Education	130	53.1
	Secondary Education or Higher	115	46.9
Current primary occupation			
	Agriculture	208	84.9
	Self-employed/ Trading/ Hired labor	28	11.4
	Company employee	9	3.7

Factor	n	%
Monthly income (THB)		
≤ 2,000	151	61.6
> 2,000	94	38.4
Mean ± SD	3,710 ± 2,897.79	
Median (Min - Max)	2,000 (2,000-15,000)	
History of accidents during VHV work		
Never	220	89.9
Ever	25	10.1
Underlying medical conditions		
No	181	73.9
Yes	64	26.1
Experience as a VHV (Years)		
≤ 13	124	50.6
> 13	121	49.4
Mean ± SD	13.16 ± 7.32	
Median (Min - Max)	13.00 (1-38)	
Sources of occupational health and safety Information		
Radio/Television	16	6.53
Medical Personnel (Doctors, Nurses, Public Health Academics)	187	76.32
Online Media (Applications e.g., Facebook, Line)	42	17.14

3.2 Occupational health literacy of VHVs

Overall, the occupational health literacy of the VHVs was generally Moderate. However, the two domains with the lowest levels of high health literacy were Reading and Comprehension (53.3%), Media Literacy (50.2%), decision-making and application (61.2%), and media literacy (49.0%). The domain with the highest level of moderate health literacy was access to health information (40.4%). Detailed levels of occupational health literacy across all domains are presented in Table 2.

Table 2. Levels of OHL of VHVs (n=245)

OHL Domain	Items	Mean ± SD	High n (%)	Moderate n (%)	Low n (%)	Interpretation
Overall OHL	43	161.93± 21.53	46(18.8)	191(78.0)	8(3.3)	Moderate
Access to Health Information	3	11.09± 1.71	36(14.7)	207(84.5)	2(8.0)	Moderate
Reading and Comprehension	12	52.37± 7.47	130(53.3)	112(45.7)	3(1.2)	High
Communication Skills	9	32.68± 5.09	78(31.8)	157(64.1)	10(4.1)	Moderate

OHL Domain	Items	Mean ± SD	High n (%)	Moderate n (%)	Low n (%)	Interpretation
Decision-Making and Application	11	42.44± 5.68	44(18.0)	193(78.8)	8(3.3)	Moderate
Media Literacy	4	15.08± 2.33	41(16.7)	202(82.4)	2(0.8)	High
Self- Management	4	15.72± 2.15	41(16.7)	184(75.1)	20(8.2)	Moderate

The OHL of VHV's was assessed across six domains. Overall, the VHV's demonstrated a high level of OHL, with a mean score of 161.93 (SD = 21.53), and 78.0% of participants scoring within the Moderate literacy range.

Access to Health Information was categorized as having a moderate level of literacy (mean = 11.09, SD = 1.71). While a substantial proportion of VHV's reported high access to specific information concerning work-related illnesses (55.5%), occupational health resources (59.7%), and personal safety (65.7%), the lower scores on other items within this domain resulted in the moderate overall categorization.

In contrast, Reading and Comprehension exhibited a high level of literacy (mean = 52.37, SD = 7.47), with 53.3% of participants scoring in the high range. The VHV's generally showed good understanding of various health-related materials. Nevertheless, the proportion with high literacy was comparatively lower for items related to symbols and guidelines for using chemicals and machinery safely (54.7%) comprehending safety manuals for chemicals (49.0%) and machinery (45.3%).

Similarly, Decision-Making and Application was also at a high level (mean = 32.68, SD = 5.09), with 64.1% scoring Moderate. While a notable percentage reported high ability communicate with individuals knowledgeable in occupational health. (63.3%) and I have at least 1 health professional who can provide health advice. (73.1%),

Communication Skills was found to be at a Moderate level (mean = 42.44, SD = 5.68), with 78.8% of VHV's scoring a Moderate. A considerable percentage consistently reported engaging in positive safety behaviors, such as always using personal safety equipment (62.4%) and prioritizing their overall health (80.8%).

Media literacy was also at a high level. (mean = 15.08, SD = 2.33), with 82.4% of participants scoring in the high range. The majority of VHV's reported being proficient in accessing OR having the skills to access or find the health information I need from various sources (59.6% high) and verifying the accuracy of new health information (73.9% high).

Finally, Self-Management demonstrated a high level of literacy (mean = 17.41, SD = 2.95), with 68.6% scoring high. While a notable percentage reported high Most VHV's reported feeling knowledgeable in managing their health when ill (64.1%) and knowing appropriate resources to contact (73.1%). and follow occupational health manuals, documents with reliable information. (71.0%)

Table 3. Distribution of OHL levels by Item

Domain	Items	High n (%)	Moderate n (%)	Low n (%)	Mean ± SD	Interpretation
Access to Health Information	3	36 (14.7)	207 (84.5)	2 (0.8)	11.09 ± 1.71	Moderate
I can access information about my work-related illnesses.		136 (55.5)	109 (44.5)	0 (0.0)	3.64± 0.62	Moderate

Domain	Items	High n (%)	Moderate n (%)	Low n (%)	Mean ± SD	Interpretation
I can access occupational health information from various sources.		146 (59.6)	97 (39.6)	2 (0.8)	3.67 ± 0.64	High
I can access personal safety and health information related to my work.		161 (65.7)	84 (34.3)	0 (0.0)	3.78 ± 0.65	High
Reading and Comprehension	12	130 (53.06)	112 (45.71)	3 (1.22)	52.37 ± 7.47	High
I understand the benefits of using personal protective equipment.		145 (60.0)	95 (38.8)	3 (1.2)	3.69 ± 0.66	High
I understand the doctor's explanation about work-related illnesses.		168 (68.6)	72 (29.4)	5 (2.0)	3.80 ± 0.68	High
I understand the health professional's explanation about work hazards.		160 (65.3)	83 (33.9)	2 (0.8)	3.76 ± 0.65	High
I understand the symbols and guidelines for using chemicals and machinery safely.		134 (54.7)	99 (40.4)	12 (4.9)	3.60 ± 0.73	Moderate
I understand the safety instructions/recommendations and guidelines.		170 (69.4)	69 (28.2)	6 (2.4)	3.80 ± 0.68	High
I understand the meaning and content of various announcements.		153 (62.45)	87 (35.51)	5 (2.04)	3.72 ± 0.69	High
I avoid things that may increase the risk of work-related accidents.		199 (81.2)	46 (18.8)	0 (0.0)	3.96 ± 0.57	High
I understand the recommendations written by health professionals.		161 (65.7)	81 (33.1)	3 (1.2)	3.77 ± 0.67	High
I understand information about things that can cause harm in my workplace.		181 (73.9)	61 (24.9)	3 (1.2)	3.86 ± 0.64	High
I understand how to use personal protective equipment during work.		171 (69.8)	72 (29.4)	2 (0.8)	3.82 ± 0.65	High
It is easy to read the instructions/recommendations and safety manual for using chemicals.		120 (49.0)	125 (51.0)	0 (0.0)	3.59 ± 0.66	Moderate
It is easy for me to read the instructions/recommendations and safety manual for using machinery.		111 (45.3)	131 (53.5)	3 (1.2)	3.53 ± 0.67	Moderate

Domain	Items	High n (%)	Moderate n (%)	Low n (%)	Mean ± SD	Interpretation
Decision-Making and Application	9	78 (31.8)	157 (64.1)	10 (4.1)	32.68± 5.09	Moderate
I can discuss and exchange knowledge... with healthcare providers.		142 (58.0)	100 (40.8)	3 (1.2)	3.65± 0.05	Moderate
I can easily communicate with individuals knowledgeable in occupational health.		155 (63.27)	82 (33.47)	8 (3.26)	3.71± 0.70	High
I can assess the accuracy of occupational health advice received from colleagues.		129 (52.7)	113 (46.1)	3 (1.2)	3.60± 0.65	Moderate
I can assess the accuracy of occupational health information received from friends.		133 (54.3)	107 (43.7)	5 (2.0)	3.62± 0.69	Moderate
I have at least 1 health professional who can provide health advice.		179 (73.1)	60 (24.5)	6 (2.4)	3.85 ± 0.68	High
I can convey health information to others in a way that they accept and understand.		119 (48.57)	117 (47.76)	9 (3.67)	3.53± 0.70	Moderate
I can assess the accuracy of occupational health information received from health experts.		115 (46.9)	123 (50.2)	7 (2.9)	3.51± 0.67	Moderate
I can easily communicate with individuals knowledgeable in occupational health.		120 (49.0)	108 (44.1)	17 (6.9)	3.50± 0.73	Moderate
I can ask questions about my health concerns from healthcare providers.		146 (59.6)	95 (38.8)	4 (1.6)	3.70± 0.69	High
Communication Skills	11	44 (17.95)	193 (78.78)	8 (3.27)	42.44± 5.68	Moderate
I always use personal safety equipment.		153 (62.45)	90 (36.74)	2 (0.81)	3.73± 0.66	High
I always take care of my health in all activities.		208(84.9)	37(15.1)	0(0.0)	4.00±0 .55	High
When the doctor prescribes medication, I will take it until completed.		207 (84.5)	38 (15.5)	0 (0.0)	4.00± 0.56	High
I always get health check-ups, even without symptoms.		172 (70.2)	73 (29.8)	0 (0.0)	3.84± 0.64	High

Domain	Items	High n (%)	Moderate n (%)	Low n (%)	Mean ± SD	Interpretation
Media Literacy	If my colleagues have work-related illnesses, I will see a doctor.	137 (55.9)	95 (38.8)	13 (5.3)	3.63± 0.76	Moderate
	I regularly use personal protective equipment as recommended.	165 (67.35)	78 (31.84)	2 (0.81)	3.81± 0.67	High
	I always compare my health check-up results from this year with the previous year.	185 (75.5)	60 (24.5)	0 (0.0)	3.90± 0.62	High
	I strictly plan or prepare before my annual health check-up.	179 (73.1)	66 (26.9)	0 (0.0)	3.88± 0.63	High
	I participate in health promotion programs at the workplace.	156 (63.7)	84 (34.3)	5 (2.0)	3.75± 0.70	High
	If I notice symptoms of a work-related illness, I know where to go and who to see.	188 (76.7)	57 (23.3)	0 (0.0)	3.91± 0.61	High
	If I have questions about my illness, I will ask a doctor or health professional.	201 (82.05)	42 (17.14)	2 (0.81)	3.98± 0.61	High
	Media Literacy	41 (16.74)	202 (82.45)	2 (0.81)	15.08± 2.33	High
	Before following manuals or documents, I compare information from more than 1 source.	136(55.5)	107(43.7)	2(0.8)	3.66± 0.68	Moderate
	I have the skills to access or find the health information I need from various sources.	146 (59.6)	94 (38.4)	5 (2.0)	3.70± 0.70	High
Self-Management	When new health information comes out... I check its accuracy before believing or sharing.	181 (73.9)	62 (25.3)	2 (0.8)	3.87± 0.64	High
	I will follow occupational health manuals, documents with reliable information.	174 (71.0)	71 (29.0)	0 (0.0)	3.86± 0.65	High
	Self-Management	41 (16.74)	202 (82.45)	2 (0.81)	15.72± 2.33	High
	I have enough knowledge to manage my own health when I am sick.	175 (71.4)	70 (28.6)	0 (0.0)	3.84± 0.62	High
	I plan who to contact and where to go when I am sick.	188 (76.73)	70 (28.57)	0 (0.0)	3.93± 0.62	High

Domain	Items	High n (%)	Moderate n (%)	Low n (%)	Mean ± SD	Interpretation
I regularly observe physical and mental changes to better manage my health.		213 (86.9)	32 (13.1)	0 (0.0)	4.04± 0.54	High
I immediately inform relevant authorities if abnormalities occur in my living environment.		188 (76.7)	53 (21.6)	4 (1.6)	3.91± 0.65	High

3.3 Work-related safety behaviors of VHV's

The work-related safety behaviors among VHV's in this study present a mixed picture.. While the overall mean score for work-related safety behaviors was high at 24.37 (SD = 2.27), with 73.9% of VHV's categorized in the high behavior level, concerns arise when examining specific domains. 'Work Practices as Village Health Volunteers' had a moderate mean score of 8.96 (SD = 1.53), with 48.6% of VHV's exhibiting moderate adherence. More critically, the 'Use of Personal Protective Equipment (PPE)' also registered at a moderate level, with a mean of 8.10 (SD = 0.89) and a striking 82.9% of VHV's falling into the moderate usage category, indicating a near absence of consistently high PPE adoption. In contrast, 'Leadership and Environmental Promotion' demonstrated a high mean score of 7.79 (SD = 1.42), with 83.7% of VHV's showing moderate engagement in these proactive safety behaviors.

Table 4. Levels of work-related safety behavior among VHV's

Domain	Items	Mean	SD	High n (%)	Moderate n (%)	Low n (%)	Interpretation
Work-related safety behavior	15	24.37	2.27	181(73.9)	62(25.3)	2(0.8)	High
Work practices as VHV's	6	8.96	1.53	89(36.3)	119(48.6)	37(15.1)	Moderate
Use of personal protective equipment	5	8.10	0.89	203(82.9)	39(15.9)	3(0.2)	High
Leadership and environmental promotion	4	7.79	1.42	205(83.7)	34(13.9)	6(2.4)	High

3.4 Factors influencing work-related safety behaviors of VHV's

The multiple linear regression analysis revealed that several factors significantly predicted work-related safety behaviors among the VHV's. After controlling for other variables, monthly income (B = 0.000, p = 0.046), and specific domains of occupational health literacy significantly influenced safety behaviors. Specifically, access to media literacy showed a significant negative association with work-related safety behavior (B = -0.242, p = 0.008), suggesting that higher perceived access to health information was associated with lower reported safety behaviors. Conversely, the occupational health literacy domains of decision-making and application (B = 0.152, p = 0.000) showed significant positive associations with work-related safety behavior. This indicates that higher levels of literacy in these areas were associated with greater reported safety behaviors. The model explained a substantial 6.5% of the variance in work-related safety behavior ($R^2 = 0.065$), and the overall model was statistically significant (F = 4.019, p < 0.001). These findings highlight the complex interplay of economic factors, experience, and specific aspects of health literacy in predicting how safely VHV's behave in their work.

Table 5. Regression analysis of factors predicting VHV's work-related safety behavior

Variable	B	Std. Error	Beta	t	p-value
Constant	23.406	1.0311		22.710	0.000
Monthly Income (THB) (Mean = 3,710, SD = 2,897.798 Baht)	0.000	0.000	-0.128	-2.000	0.046
OHL					
- Decision-making and application	0.152	0.041	0.334	3.692	0.000
- Media literacy	-0.240	0.089	-0.242	-2.697	0.008
R-square = 0.065, F = 4.019, p < 0.001					

4. Conclusion

The findings of this study provide valuable insights into the factors influencing work-related safety behaviors among VHV's. The regression model demonstrated limited explanatory power ($R^2 = 0.065$), suggesting that although socio-economic factors, professional experience, and specific domains of occupational health literacy are significant predictors, other unmeasured factors may also play an important role. These findings are consistent with the World Health Organization (2013), which emphasizes the importance of health literacy in shaping health-related behaviors.

The positive impact of monthly income on safety behaviors suggests a potential link between financial stability and the ability or motivation to prioritize safety in their work (Škerlić & Erčulj, 2021; Ryu & Fan, 2023). This could manifest in various ways, such as enabling the purchase of necessary safety equipment or reducing the pressure to engage in potentially risky activities due to economic constraints. Similarly, the positive association between years of experience as VHV's and safety behaviors highlights the role of practical, on-the-job learning. Experienced VHV's likely develop a better understanding of the specific risks associated with their duties and the most effective ways to mitigate them (Saisanan Na Ayudhaya et al., 2023).

A salient and somewhat unexpected inverse correlation has been observed between perceived accessibility of health-related information and self-reported adherence to work-related safety protocols among VHV's. This suggests that VHV's who perceive a higher degree of access to health information resources may, paradoxically, exhibit a lower propensity for engaging in recommended safety behaviors. Several potential etiological factors, supported by research in related domains, may underlie this phenomenon. Firstly, information **overload**, resulting from an abundance of undifferentiated health information, could attenuate attention and cognitive resources available for processing and implementing specific safety guidelines (Sbaffi et al., 2020; Arnold et al., 2023). Secondly, the **ecological validity** of the accessed information may be limited; if the information lacks specificity or direct relevance to the occupational hazards encountered by VHV's, its impact on safety behavior is likely to be attenuated (research on the effectiveness of tailored health communication (Yang & Van Stee, 2019). Furthermore, a potential **inflation of perceived knowledge**, possibly mediated by the availability heuristic associated with easily accessible information, could lead to an underestimation of actual risks and a consequent reduction in precautionary behaviors (Efendić, 2021). Further investigation employing qualitative methodologies is warranted to elucidate the nuanced mechanisms driving this counterintuitive association.

Conversely, this study demonstrated significant positive associations between the occupational health literacy domains of decision-making and application and media literacy with work-related safety behaviors (Maimahad et al., 2022; Sealim et al., 2023). This finding underscores the pivotal role of cognitive skills in fostering safer practices among VHV's (Alyafei & Easton-Carr, 2024). VHV's who are better equipped to critically evaluate health-related information from various media and apply their

knowledge to make informed decisions are more likely to translate this literacy into tangible safety behaviors in their work (Paakkari & Okan 2020). These positive correlations suggest that empowering VHV with the cognitive tools necessary to navigate and utilize health information effectively is a crucial strategy for promoting a safer working environment. The demographic profile of the VHV, predominantly female (88.6%) with an average age of 51.18 years and significant experience (mean of 13.16 years), provides important context for interpreting these findings. The reliance on medical personnel as the primary source of safety information (76.3%) suggests a potential avenue for targeted safety training and information dissemination. The moderate levels of overall OHL, particularly in self-management, reading and comprehension, decision-making and application, and media literacy, as well as the moderate levels of safety behaviors in work practices and PPE use, highlight specific areas where interventions could be most beneficial.

The strong predictive power of the regression model, while insightful, should be considered within the context of the study's cross-sectional design, which limits the ability to establish causality (Savitz & Wellenius, 2023). Nevertheless, these findings provide a robust foundation for developing targeted interventions aimed at enhancing work-related safety behaviors among VHV in Ubon Ratchathani Province (Stormacq et al., 2020; Walters et al., 2020).

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