Relationship of Health Status and Healthy Behaviors with Health Literacy among Elderly in Pokhara Metropolitan, Nepal in 2023

Rima Mishra
* School of Health and Allied Sciences, Faculty of Health Sciences, Pokhara University, Nepal.
(Corresponding author):
mishrarima789@gmail.com
Ganesh Bhandari
School of Health and Allied Sciences, Faculty of Health Sciences, Pokhara University, Nepal.
Dipendra Kumar Yadav
School of Health and Allied Sciences, Faculty of Health Sciences, Pokhara University, Nepal.
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ABSTRACT

Background and Objectives: The ability to understand and apply health-related information is known as health literacy. The elderly are more sensitive to the unfavorable health consequences caused by low health literacy. The purpose of this study is to investigate the association between older health literacy and healthy behaviors and health status.

Materials and Methods: A cross-sectional study was conducted among 239 community dwelling elderly in Pokhara Metropolitan, Nepal. Multistage sampling procedure was applied. The questionnaire included Health Literacy Questionnaire (HLQ), self-reported health status and healthy behavior related questions. General linear model was used to examine the associations.

Results: The proportion of people with low literacy level across each of the domains was: (i) feeling understood and supported by healthcare providers (85.4%), (ii) having sufficient information to manage own health (94.6%), (iii) social support for health (74.1%), (iv) ability to find good health information (68.6%), and (v) understand health information well enough to know what to do (78.2%), respectively whereas overall health literacy was 74.9%. Having average health status (AOR: 0.44; 95% CI: 0.17–0.92), Prostate-specific antigen PSA test in last 2 years (AOR: 0.56; 95% CI: 0.21–0.99), OPD visit in last 3 months (AOR: 1.95; 95% CI: 1.23–3.88), medication compliance (AOR: 0.23; 95% CI: 0.17–0.43), past smoking (AOR: 1.94; 95% CI: 1.80–4.11) and performing physical activity (AOR: 0.36; 95% CI: 0.20–0.68) were found to be associated with health literacy.

Conclusion: Implementing interventions for health literacy is essential to empower elderly individuals with the knowledge and skills needed for informed decision-making about their health.

Paper Type: Research Article
Keywords: Elderly, Health Status, Health Literacy, Healthy Behavior.

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Introduction

Health literacy (HL) is a concept that emerged in the USA in the 1990s (1) and has gained significant importance in public health and health promotion (2, 3). It refers to an individual's ability to access, comprehend, and apply health-related information to maintain good health (4, 5). HL encompasses various skills, such as reading and comprehension, numeracy, and effective communication (5, 6). The World Health Organization recognizes health literacy as crucial in empowering individuals to make informed decisions about their health and the health of their families and communities. Low health literacy is associated with negative outcomes, including lack of knowledge about healthcare, poor self-management skills, reduced utilization of preventative services, and increased hospital stay rates (7-11). On the other hand, higher levels of health literacy contribute to increased life expectancy, improved productivity, and the ability to pass on health information and behaviors to future generations (1, 12).

Globally, there were 703 million older persons aged 65 or over in 2019. Over the next three decades, the global number of older persons is projected to more than double, reaching over 1.5 billion persons in 2050 (13). Around the world, nearly 40% of individuals do not possess health literacy (14). The growing population of senior citizens is a global concern (15) and their health literacy plays a vital role in accessing and utilizing healthcare services effectively. However, studies have shown that 54% of older adults in Nepal have inadequate health literacy (16). This limited knowledge about health and chronic diseases puts them at risk of preventable illnesses and negative health outcomes (17). Given the increasing number of senior citizens, understanding the relationship between health literacy, health status, and healthy behaviors becomes crucial in addressing the challenges posed by an aging population.

This study aims to understand the relationship of health status and healthy behaviors with health literacy of the elderly. By enhancing health literacy among senior citizens, access to healthcare can be improved and the burden of preventable diseases can be reduced benefiting both individuals and society as a whole (4).

Materials and Methods

Study design and site

The study was a descriptive- analytical cross-sectional study. The data was collected for only one time with the selected participants in a community setting among selected wards of Pokhara Metropolitan. It is the second-largest metropolitan city in Nepal, with a diverse population that includes both urban and rural communities. This diversity can provide valuable insights into health literacy levels among socio-economic and cultural groups. A high proportion of elderly reside here compared to other cities in Nepal. This demographic profile has made it an ideal location to study health literacy levels among this population.

Study participants

The study population was an elderly population aged ≥ 60 years residing in Pokhara Metropolitan for at least the past six months. In the first stage of the sampling, about one-third of the total wards, i.e., 11 wards were selected randomly by lottery method. From each selected ward

proportionate sampling was carried out to determine the appropriate sample size.

Sample Size and Sampling

The sample size was calculated using a two-step process.

First, (no) = (Z^2 pq)/d^2 formula was used for estimating the required sample with confidence level 95% (i.e., Z = 1.96). The allowable error (d) was considered 0.05 (5%). The proportion of self-rated health status (poor) among the elderly (p) was considered 0.1941, based on a previous study 21. Thus, the estimated size (no) was 241.

In the second step, the formula for the finite population (N=21445) (i.e., the population of ≥ 60 years in the city obtained from Pokhara Metropolis data) was used, i.e., (n) = no/(1+no/N). This gave a final sample size of 239 elderly population.

Measurement of health literacy, health status and healthy behaviors

Health Literacy

Data were collected by using the Health Literacy Questionnaire (HLQ) (18) prepared in Nepali version for each of the elderly. It was measured by using five of the nine domains of the Health Literacy Questionnaire (HLQ). The five domains were chosen based on relevance in the local context of Nepal. HLQ domains that were included in the study are:

(i) feeling understood and supported by healthcare providers (HPS): four items

(ii) having sufficient information to manage my own health (HIS): four items

(iii) social support for health (SS): five items

(iv) ability to find good health information (AE): five items and

(v) understand the health information well enough to know what to do (UHI): five items

The selection of appropriate research instruments was another critical step towards ensuring validity. In this context, the questionnaire (Cronbach's alpha, 0.88) developed by (Osborne et al., 2013) were used for measuring health literacy.

Health status

Self-rated health status is measured by a 5-point Likert scale from a scale of poor to excellent health status.

Healthy Behaviors

- Preventive care

Preventive care use is measured by asking participants if they have had prostate cancer screening in the past 2 years (for male) and whether they had mammography or pap smear tests in the past 2 years (for female).

- Medication compliance

It is measured by asking participants how often they forget to fill the prescriptions on time.

- Health care utilization

It is measured by asking four questions to the participants: (1) Had at least an outpatient visit in the previous 3 months (2) Reason for Outpatient Department OPD clinic visit (3) Whether they ever visited an emergency room (ER) in the last year and (4) Whether they were ever hospitalized in the previous year.

- Behavioral factors

World Health Organisation WHO's STEPS instrument was adopted with necessary modification based on the objectives of the research to measure behavioral factors like smoking and alcoholism.

Statistical analysis

Health literacy was measured by using five of the nine domains of the Health Literacy Questionnaire (HLQ). Participants were asked

to indicate their level of agreement or difficulty on a scale ranging from strongly disagree to strongly agree for domains 1 to 3 and from always difficult to always easy for domains 4 to 5. The overall score for each domain was calculated by summing the item scores and dividing by the number of items in that domain. To determine the "high health literacy level," cut-off points were defined based on the upper quartile, while the lower two quartiles were considered the "low health literacy level." This approach was applied to categorize all five HLQ domains, as there were no established standard cut-off values (19) whereas to calculate the overall health literacy level, standardization of the Likert scale scores was done.

Health status was measured using a five-point Likert scale of poor, fair, good, every good and excellent health status. The results were then grouped into three categories: poor, average and good health status.

Descriptive statistics were summarized as frequency and percentage. Chi-Square test was used for establishing relationship for all included five domains of HLQ, health status and healthy behaviors where all the independent variables that had $p<0.05$ were considered in general linear model.

Results

The research instrument used in sample of 239 achieved a response rate of 100% representing all retrieved interview schedule. Table 1 represents the socio-demographic characteristics of the participants. Slightly more than half (54%) of the participants were male. Majority of the participants were the followers of Hindu religion i.e. (75.3%). The highest number of the participants, 39.7% of them were of the age group 60-69 years, where median age was 72 years, minimum age was 60 years, maximum age was 93 with Standard Deviation (SD) 8.7. Majority 57.7% of the participants were from joint families. Percentage of Brahmins among other ethnic groups was highest i.e. (39.7%) and 45.6% of the elderly were illiterate. Agriculture and business were the major household employments. Married individuals represent the highest percentage i.e., (67.4%) followed by widow/widower i.e., (28.9%). The average number of family size and household income were found to be 4 and USD 308 respectively (Table 1).

Table 1. Socio-demographic characteristics of the participants

Variables		Frequency (n=239)	Percentage (%)
Age in years	60-69	95	39.7
	70-79	84	35.1
	80-89	48	20.1
	90-99	12	5.1
	Median (±SD)	72(± 8.7)	
	Min:Max	60:93	
Gender	Male	129	54
	Female	110	46
Gender	Brahmin	95	39.7
	Janajati	73	30.5
	Chhetri	45	18.8
	Dalit	24	10.1

Variables		Frequency (n=239)	Percentage (%)
	Religious minorities	2	0.9
Religion	Hindu	180	75.3
	Buddhist	45	18.8
	Christian	12	5.1
	Muslim	2	0.8
Education level	Illiterate	109	45.6
	Informal	51	21.3
	Basic	34	14.2
	Secondary	29	12.2
	Graduate	6	2.5
	Post Graduate and above	10	4.2
Marital status	Married	161	67.4
	Widow/widower	69	28.8
	Separated	4	1.7
	Single	3	1.3
	Divorced	2	0.8
Employment status	Agriculture	62	25.9
	Business	62	25.9
	Job	49	20.5
	Retired	43	18.1
	Foreign service	11	4.6
	Daily labor	6	2.5
	Unemployed	4	1.7
	Foreign labor	2	0.8
Family type	Nuclear	92	38.5
	Joint	138	57.7
	Extended	9	3.8
Family size	≤4	131	54.8
	>4	108	45.2
	Mean= 4.36, Md= 4, Min=1, Max=13, SD= 2.15		
Monthly household income in USD	≤262	115	48.1
	>262	224	51.9
	(Min:Max)	(2:1500)	
	Mean(±SD)	308.6(±261.5)	

Table 2 represents the level of health literacy among the participants. Based on HLQ multi-dimensional scale, the proportion of people with low literacy level across the scales was:

(i) HPS (85.4%), (ii) HIS (94.6%), (iii) SS (74.1%) (iv) AE (68.6%) and (v) UHI (78.2%) respectively. The mean scores for HLQ domains mean (SD) for HLQ domains is (a) HPS (2.50±0.83), (b) HIS (2.29±0.74), (c) SS (3.02±0.65), (d) AE (2.61±1.19), and (e) UHI (2.57±1.05). The overall health literacy score showed that 74.9% of the individuals had inadequate health literacy and only 25.1% had adequate health literacy.

Table 2 Health literacy levels of the participants

Variable		Frequency (n=239)	Percentage (%)
Feeling understood and supported by healthcare providers (HPS)	Low	204	85.4
	High	35	14.6
	Mean=2.50, SD=0.83		
Having sufficient information to manage my own health (HIS)	Low	226	94.6
	High	13	5.4
	Mean=2.29, SD= 0.74		
Social support for health (SS)	Low	177	74.1
	High	62	25.9
	Mean=3.02, SD=0.65		
Ability to find the good health information (AE)	Low	164	68.6
	High	75	31.4
	Mean= 2.61, SD=1.19		
Understand the health information well enough to know what to do (UHI)	Low	187	78.2
	High	52	21.8
	Mean=2.57, SD=1.05		
Overall health literacy score	Low	179	74.9
	High	60	25.1

Table 3 presents the results of a statistical analysis examining the relationship of overall health literacy level and socio-demographic variables. It suggests that age (<73 years) and being male are associated with higher odds of having adequate health literacy. The associations are statistically significant for both sex groups (AOR 0.29, 95% CI: 0.12-0.71, p=0.006) and education level (AOR 11.36, 95% CI: 3.13-41.15, p<0.001) with health literacy. Disadvantaged individuals have higher percentage i.e., (88.5%) of inadequate health literacy compared to advantaged and relatively advantaged counterparts.

Illiterate individuals are 11.36 times more likely to have inadequate health literacy compared to their literate counterparts. Participants with marital status other than being married (AOR= 0.50), non-professional household occupations (AOR=1.81) and having nuclear family (AOR= 0.88) tend to have lower health literacy levels respectively. Family size does not appear to have a significant impact on health literacy level. On the other hand, higher monthly income is associated with a higher likelihood of having inadequate health literacy.

Table 4 presents the results from a general linear model examining the association between health literacy level with health status and healthy behaviors. Individuals with average health status had a lower likelihood of having inadequate health literacy compared to those with poor health status (AOR 0.44, 95% CI: 0.17-0.92, p=0.01). Individuals who had a PSA test (AOR 0.56, 95% CI: 0.21-0.99, p=0.04) had a lower likelihood of having inadequate health literacy compared to those who did not have a PSA test. Also, the individuals who had an OPD visit had 1.95 odds of having adequate health literacy (95% CI: 1.23-3.88, p=0.05). Participants who forgot to take medications were 0.23 times likely to have adequate

health literacy at 95% CI: 0.17-0.43, p=0.01). Individuals who had a history of smoking in the past had a significantly 1.94 odds of inadequate health literacy compared to those who did not smoke in the past (95% CI: 1.80-4.11, p=0.03) and individuals who engaged in physical activity had a significantly lower likelihood of inadequate health literacy (AOR 0.36, 95% CI: 0.20-0.68, p=0.01) compared to those who did not engage in physical activity.

Table 3. Relationship of socio-demographic characteristics with overall health literacy levels of the participants

Variable	Health literacy level		UOR (95% CI)	AOR (95% CI)	p-value
	Inadequate N (%)	Adequate N (%)			
Age					
≤73	88 (67.2)	43(32.8)	0.38(0.20-0.72)	0.55(0.24-1.24)	0.14
>73	91(84.3)	17(15.7)			
Sex					
Male	80(62)	49(38)	0.18(0.08-0.37)	0.29(0.12-0.71)	0.006**
Female	99(90)	11(10)			
Ethnicity					
Advantaged	93(66.4)	47(33.6)	3.87(1.11-13.57) 1.22(0.31-4.82)	NI	0.21
R. advantaged	63(86.3)	10(13.7)			
Disadvantaged	23(88.5)	3(11.5)			
Religion					
Hindu	130(72.2)	50(27.8)	0.53(0.25-1.13)	0.77(0.28-2.14)	0.61
Non-hindu	49(83.1)	10(16.9)			
Educational level					
Literate	73(56.2)	57(43.8)	27.58(8.32-91.48)	11.36(3.13-41.15)	<0.001***
Illiterate	106(97.2)	3(2.8)			
Marital status					
Married	108(67.1)	53(32.9)	0.20(0.09-0.47)	0.50(0.18-1.38)	0.18
Others	71(91)	7(9)			
Household ES					
Non-Professionals	71(68.3)	33(31.7)	1.86(1.03-3.36)	1.81(0.86-3.83)	0.11
Professionals	108(80)	27(20)			
Family type					
Nuclear	61(66.3)	31(33.7)	0.48(0.27-0.88)	0.88(0.29-2.61)	0.81
Non-nuclear	118(80.3)	29(19.7)			
Family size					
≤4	95(72.5)	36(27.5)	0.75(0.42-1.36)	1.37(0.46-4.08)	0.57
>4	84(77.8)	24(22.2)			
Monthly income in USD					
>262	84(67.7)	40(32.3)	0.44(0.24-0.82)	0.51(0.24-1.11)	0.09
≤262	95(82.6)	20(17.4)			

NI: Not included

Table 4. Relationship of health status and health behaviors with the overall health literacy levels of the participants using general linear model

Variable	Health literacy level		UOR(95% CI)	AOR(95% CI)	p-value
	Inadequate N (%)	Adequate N (%)			
Health status					
Poor	131(79.4)	34(20.6)	0.32(0.12-0.83)	0.44(0.17-0.92)	0.01*
Average	37(68.5)	17(31.5)	0.56(0.19-1.61)	0.61(0.23-1.98)	0.19
Good	11(55)	9(45)			
PSA test					
Yes	17(47.2)	19(52.8)	0.43(0.19-0.94)	0.56(0.21-0.99)	0.04*
No	63(67.7)	30(32.3)			
Mammogram					
Yes	20(87)	3(13)	0.68(0.16-2.78)	1.13(0.34-3.12)	0.78
No	79(90.8)	8(9.2)			
OPD visit					
Yes	100(55.9)	42(70)	1.84(0.99-3.45)	1.95(1.23-3.88)	0.05*
No	79(44.1)	18(30)			
Medication compliance					
Never forgot	43(57.3)	32(42.7)	0.27(0.15-0.51)	0.23(0.17-0.43)	0.01*
Forgot	136(82.9)	28(17.1)			
Current smoking					
Yes	58(81.7)	13(18.3)	1.73(0.87-3.45)	2.20(0.92-3.67)	0.15
No	121(72)	47(28)			
Past smoking					
Yes	98(80.3)	24(19.7)	11.82(1.0-3.29)	1.94(1.80-4.11)	0.03*
No	81(69.2)	36(30.8)			
Current alcohol drinker					
Yes	44(77.2)	13(22.8)	1.69(0.37-7.72)	2.62(0.56-9.63)	0.72
No	6(66.7)	3(33.3)			
Physical activity					
Yes	97(66)	50(34)	0.24(0.11-0.49)	0.36(0.20-0.68)	0.01*
No	82(89.1)	10(10.9)			

Discussion

In this study, participants had low levels of health literacy scores for all of the five domains. More than two-third of the participants across the five domains felt less understood and supported by healthcare providers, had insufficient information to manage their own health, had limited social support for health, unable to find the good health information and had difficulty in understanding the health information well enough to know what to do. When individuals feel misunderstood or unsupported by healthcare providers, people may have decreased patient satisfaction. Limited social support for health can contribute to increased health risks. Likewise, limited information and difficulties in understanding health information can contribute to

increased healthcare costs and poor health management.

Level of health literacy

The present study revealed the proportion of people with low literacy level across the scales to be: (i) HPS (85.4%), (ii) HIS (94.6%), (iii) SS (74.1%) (iv) AE (68.6%) and (v) UHI (78.2%) respectively. The overall health literacy score showed that 74.9% of the individuals had inadequate health literacy and only 25.1% had adequate health literacy. A recently published study among the community elderly in Central China in the COVID-19 Pandemic found 84.12% (519/617) of the participants scored less than 60 points, which indicated that the overall level of HL was low (20). Overall, a higher proportion of people had low literacy in our study population when compared with studies from Iran (79.6%) (7), Ohio, Houstan (22.2%) (8), Nepal (>75%) (19) and China (21).

Likewise, a study among urban elderly East-German population in 2015 showed 4% of inadequate health literacy (22). The higher estimate of low HL could be explained by having a limited number of informed and health-literate population, structure and accessibility of healthcare systems and the complexity of health information, including medical terminology and jargon.

Association of HL and socio-demographic variables

Age showed inverse relationship and depicted the health literacy score across the age group more than 73 years to be low compared to people below 73 years. As aging is often accompanied by a natural decline in cognitive abilities, including memory, attention, and processing speed and also older adults who grew up in an era with limited access to education or had fewer opportunities for formal education may have lower baseline health literacy compared to younger generations. Similar findings were revealed by the studies where the mean functional health literacy scores across the age groups was 81.9, 75.6, 69.9, 60.8, and 48.6 for participants aged 65–69, 70–74, 75–79, 80–84, and 85 or older, respectively and mean S-TOFHLA scores declined 1.4 points (95% CI 1.3–1.5) for every year increase in age ($p<0.001$) (23) but a contrast finding was shown in population-based CARLA study among urban elderly East-German population where health literacy was found to increase among men aged under 60 years from 36.1 (SD 6.8) to 39.0 (SD 6.2) among men aged over 80 years. Likewise, in women, the health literacy score increased from 35.1 (SD 7.8) among age groups under 60 years to 37.5 (SD 8.5) among age groups over 80 years (24).

We found that being female was a determinant of lower HL level. As women in Nepalese societies have had limited access to education compared to men. In most cases, women have less autonomy and decision-making power regarding their own health resulting in lower levels of health literacy. So, promoting gender equality and empowering women can help bridge health literacy gap between genders and improve overall health outcomes. Similar findings were demonstrated in the studies conducted among urban elderly East-German population where there was a lower health literacy score among women compared with men (Diff=-1.4; 95 % CL −2.2; −0.6) (22) and in rural Nepal where being female was associated with lower HL level across three domains of HL (HIS, AE, UHI). In contrast, the study

conducted in Chicago among the elderly showed male participants compared to females (β= 0.14) had lower health literacy (25).

The results of this study revealed Brahmin and Chhetri have lower odds of having low health literacy level compared to Janajati, Dalits and religious minorities. Likewise, a cross-sectional study conducted among multi-morbid COPD people in rural Nepal resembled with our findings showing low HL was associated with being Indigenous (AOR = 2.27, 95% CI: 1.14–4.50) or Dalit (AOR = 4.84, 95% CI: 1.57–14.83) (19). Some other studies showed African American or black individuals had lower health literacy compared to white individuals (25, 26). The issue of low health literacy rates among certain marginalized groups in Nepal is a complex one influenced by multiple factors. Discrimination and social stigma based on caste, ethnicity, or religion can also impact the healthcare-seeking behavior of these communities and ethnic groups having limited access to education, healthcare services and economic opportunities can lead to lower overall health literacy rates.

Importantly, having no education was associated with low levels of HL as depicted in previous studies (21, 25, 26). Elderly individuals with no education may face challenges in seeking and accessing reliable health information and navigating healthcare systems. Moreover, it limits critical thinking skills necessary for evaluating health-related information and making informed decisions. Individuals with monthly household income of > USD 262 were found to have higher level of low HL compared to those with income < USD 262. In most cases the participants were not comfortable disclosing the income or financial status of the family. Furthermore, lower-income individuals often face more health challenges due to factors like limited access to healthcare, unhealthy living conditions, and higher rates of chronic diseases. As a result, they may be more motivated to acquire health literacy skills to manage their health conditions effectively. Higher-income individuals, who may have better overall health outcomes, may have less urgency to prioritize health literacy. While the other studies found that older adults with high-income level had high health literacy (21, 27).

Two of the studies conducted in China show people with professional job (white collars) have higher level of health literacy than non-professional (farmer or blue-collar workers or laborers) (21, 28). In our study having household occupation as employment and labor and business and trade was associated with low health literacy scores compared to agriculture. The availability and accessibility of health information can vary across different occupations. Individuals engaged in labor, business, or trade occupations might have lower levels of formal education compared to those in agriculture.

Association of health status and HL

We found that people with poor health status tend to have lower health literacy levels. As elderly with low health literacy may have limited understanding and knowledge about their health conditions, treatment options, and self-care practices. They may struggle to comprehend health-related information, such as medication instructions, health education materials, or healthcare provider

recommendations. This limited understanding can hinder their ability to manage their health effectively, leading to poorer health outcomes. Studies conducted in Hawaii (29), Ohio (8), Chicago (30) and China (21) showed similar that individuals with inadequate health literacy having worse physical function or poor health status.

Association of healthy behaviors and HL

In line with our finding, published work has shown that involvement in risky behaviors such as smoking and alcohol intake was associated with low HL (21, 25). As individuals with low health literacy may have limited knowledge and understanding of the health risks associated with smoking and excessive alcohol consumption. They may not be aware of the long-term health consequences. Also, smoking and alcohol use can be seen as coping mechanisms for stress, anxiety, and other emotional challenges. Elderly with low health literacy may not have access to or knowledge of alternative healthy coping strategies. They may turn to smoking and alcohol as a way to manage their emotions or deal with difficult situations. Similarly, a study in North Louisiana among pregnant women, higher reading levels was found to be concerned with the adverse health effects of smoking on themselves and their babies (31).

Our study revealed the use of preventive care was associated with high level of health literacy among the elderly. The studies conducted in Taiwan, East-German, Tehran and United states (22, 32-34) also showed the higher level of health literacy increased the chances of involvement in screening tests or use of preventive care services. This is because individuals with high health literacy tend to have better communication with their healthcare providers and have a better understanding of the importance of preventive care and screening tests. In addition, health literacy encompasses the ability to process and evaluate health information, as well as make informed decisions about one's health. Individuals with high health literacy have developed the critical thinking skills necessary to evaluate the benefits and risks of preventive care services.

In our study, individuals with a higher low health literacy didn't refer for more OPD visit. This is because individuals with low health literacy may struggle to understand health-related information and also the difficulty in seeking and obtaining timely and appropriate care can contribute to the need for hospitalization or emergency room visits. The results from the studies in Iran and Chicago depicted a negative association of health literacy level with outpatient visits ($P = 0.003$), hospitalization ($P = 0.01$) and ER visits ($\beta=0.35$) (25) and individuals with a higher health literacy level had referred more for checkup and screening tests while older adults with lower health literacy had referred more because of their illness and health problems (7). The findings were also similar to a study conducted among elderly Chinese where the elderly with higher health literacy scores were significantly more likely to undergo health examinations regularly and more likely to access sufficient health information from multiple sources ($p < 0.001$) (21).

Study Limitations and Strengths: The major limitation is selection bias where the individuals with severe health issues are not included in the study population due to their

poorer health status. This exclusion can lead to an underestimation of the association between health status and health literacy. The use of self-reported measures for health literacy and health status may introduce recall or reporting biases. The findings may not be generalizable to rural settings.

The findings suggest that several socio-demographic factors are associated with lower levels of health literacy and on the other hand, participants engaging in healthy behaviors and having better health status demonstrated a greater likelihood of having higher health literacy levels. This study highlights the disparities in health literacy across different groups, indicating that certain marginalized populations face greater challenges in understanding and accessing health-related information. Addressing the low health literacy rates among these population requires multifaceted approaches. Empowering these communities through education, economic opportunities, and social inclusion is crucial to improving their overall health literacy and well-being. Health literacy is a determinant to make people aware of the available services and overall understanding of health and disease. Improving health literacy levels can help individuals better understand their health, make informed decisions, engage in preventive care, practice healthy behaviors and effectively navigate the healthcare system.

Delimitations of the Study: The exclusion of certain dimensions of the HLQ is recognized as a limitation that may affect the comprehensiveness of the health literacy assessment. This decision was a deliberate delimitation made to balance the depth of exploration with practical considerations, including the cultural relevance of the selected domains and the appropriateness of the scales for Nepalese society.

Conclusions

The findings indicated that a high proportion of the elderly i.e., more than two third had low levels of health literacy across all domains. The study established a clear association between having average or poor health status and health literacy. Having age >73 years, being female, being from Janajati, Dalit and Muslim communities, non-Hindu religion, having no education, marital status, employment and having a monthly family income of more than Rs 35000 were associated with lower levels of health literacy. Participants engaged in healthy behaviors such as performing physical activity, engaging in preventive care services, adhering to medication and not engaging in smoking and alcohol intake behaviors were more likely to have higher health literacy levels, The study highlights the importance of health literacy, particularly among the elderly, in promoting better health outcomes, adherence to healthy behaviors, and overall well-being. The findings can inform targeted health education programs and inclusive policies to address disparities, empowering vulnerable groups with the skills to make informed health decisions. Community-based interventions should focus on improving access to healthcare and fostering health literacy to enhance preventive care and reduce disparities. Prioritizing health literacy among the elderly is vital for empowering them to navigate the healthcare system and adopt healthier lifestyles.

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Consent for publication: Each author consents to the publication of the manuscript in its current form.

Ethical approval and consent to participate: The ethical approval was taken from the Institutional Review Committee (IRC) of Pokhara University (PU) (Ref no.147-079/080). The study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki. Participants were fully informed regarding study objectives and written/ verbal consent was obtained before the initiation of the data collection. The participants were assured prior to the conduction of interview that they might not answer or even withdraw from the study if they find it very personal or sensitive for them to answer. No any sort of coercion was applied to participants in the research process. Confidentiality of the data were fully maintained and collected data are used only for the research purpose.

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Author contributions: RM and DKY led the conceptualization and development of the research methodology for the study. RM and GB were instrumental in data collection, performed comprehensive data analysis, and contributed significantly to drafting the initial manuscript. GB further ensured the manuscript was meticulously reviewed and formatted to align with the journal's submission guidelines. RM oversaw the overall manuscript preparation, while DKY provided critical supervision and constructive evaluation throughout the process. All authors actively participated in reviewing the manuscript and gave their final approval for publication. RM serves as the guarantor for the study.

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