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Original Research

Knowledge of Cancer Warning Signs among Outpatient Visitors at Koshi Hospital, Morang, Nepal

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ABSTRACT:

Background & Objectives: Cancer remains a major global health burden, disproportionately affecting low- and middle-income countries like Nepal due to weak healthcare systems and limited awareness, often resulting in diagnosis at advanced stages. This study aimed to assess the knowledge about cancer warning signs among visitors attending the outpatient department of Koshi Hospital, Morang, Nepal.

Materials and Methods: A descriptive cross-sectional study was conducted among 385 adult outpatient visitors at Koshi Hospital between March and June 2025 using convenience sampling, after ethical clearance from the Institutional Review Committee of Purbanchal University School of Health Sciences. Data were collected via face-to-face interviews using a pretested questionnaire on sociodemographic characteristics and knowledge about nine cancer warning signs, analyzed in SPSS 28 software using independent t-tests, one-way ANOVA, and Welch's ANOVA.

Results: The mean age was 33.95 ± 12.39 years, and 212 (55.1%) were female. Knowledge was highest for a breast lump (303, 78.7%) and non-healing sore (295, 76.6%), while less than half of participants recognized unexplained weight loss (192, 49.9%), indigestion or difficulty in swallowing (182, 47.3%), and bowel and bladder changes (169, 43.9%) as warning signs. Knowledge scores were significantly higher among females ($p = 0.007$), participants with higher education ($p = 0.001$), students ($p = 0.007$), those earning Nepali rupees 21,000–40,000 monthly ($p = 0.030$) and those with a family history of cancer ($p = 0.004$).

Conclusions: Most participants recognized the visible warning signs of cancer. Knowledge was significantly associated with sex, education, occupation, income, and family history. Targeted health education programs, particularly for men, less-educated individuals, and lower-income groups, are needed to improve early recognition of these warning signs.

Keywords: Cancer; Knowledge; Nepal; Warning signs

INTRODUCTION

Cancer is still one of the biggest public health problems in the world today. According to recent GLOBOCAN data, about 20 million new cancer cases and 9.7 million cancer deaths occurred worldwide in 2022. This number is expected to grow to more than 35 million new cases annually by 2050 [1]. This increase is expected to be driven by population growth, ageing, and ongoing exposure to risk factors like smoking, obesity, and air pollution [1]. Low- and middle-income countries like Nepal are at higher risk because they often have weak healthcare systems and low awareness about cancer, and most cases are diagnosed only at advanced stages [2].

In Nepal, the most common cancers are lung, cervical, stomach, breast, and head and neck cancers [3]. A study analyzed hospital cancer registry data of five major hospitals in Nepal between 2018 and 2020 and found that breast cancer was the most common cancer at Koshi Hospital, Morang, accounting for 20.4% of all cancer cases there [4]. Recognizing the early warning signs of cancer is very important because early detection is associated with better treatment outcomes, reduced morbidity, and improved survival rates. However, many people in Nepal still do not know enough about the warning signs of cancers, especially those who have non-healthcare occupations and those who are less educated [5,6]. Because of this gap, the present study was carried out to assess the knowledge about cancer warning signs among visitors attending the outpatient department of Koshi Hospital, Morang, Nepal.

MATERIALS AND METHODS

This descriptive cross-sectional study was conducted among visitors attending the general outpatient departments of Koshi Hospital, Biratnagar, Morang, Nepal, a government tertiary care hospital, over a four-month period from March to June 2025. Ethical clearance was obtained from the Institutional Review Committee of Purbanchal University School of Health Sciences (PUSHS-IRC-Ref. 53-081/82). The required sample size was determined using the formula $n = Z^2 \times p \times q / e^2$, based on a 95% confidence level ($Z = 1.96$), by assuming an adequate knowledge prevalence of participants was 50% ($p = 0.5$) and a 5% margin of error ($e = 0.05$), which yielded a minimum sample of 385 participants. Participants were enrolled using a convenience sampling approach. Adult

visitors or patients aged 18 years or older, with no upper age limit, who provided consent to participate were included. Healthcare workers, individuals already diagnosed with cancer, and those too unwell or unwilling to participate were excluded. During outpatient sessions, the principal investigator approached visitors who were waiting for their turn to see a doctor and invited them to take part in the study without disrupting their scheduled checkup. A total of 407 visitors were invited to participate in this study. Of these, seven declined to participate, four were healthcare workers in a primary hospital setting, and 11 were excluded due to limited time before their doctor's consultation, yielding a final analytic sample of 385 participants (response rate: 94.59%). Those who agreed were taken to a separate room, where the purpose and importance of the study were explained before they signed or illiterate participants provided a thumbprint on the informed consent form. Interviews were then carried out face-to-face in Nepali by trained research assistants. For participants who could not read or write, questions were read aloud, and their responses were recorded by the interviewer. Data were collected using a self-prepared structured questionnaire developed by the research team after a thorough review of relevant literature. Its content was reviewed by experts in oncology and public health, and the tool was refined based on their feedback. Before the main study, it was pretested on 30 visitors to assess its clarity, practicality, and ease of understanding. Those who took part in the pretest were excluded from the final analysis. To preserve its intended meaning, the questionnaire was translated into Nepali and then back-translated into English by independent bilingual experts. The final version captured participants'

sociodemographic details, their sources of cancer-related information, and their knowledge about nine recognized warning signs of cancer. Each knowledge item had three response options: "Yes," "No," and "I Don't Know." A "Yes" response was scored as 1, while "No" or "I Don't Know" was scored as 0, producing a total knowledge score ranging from 0 to 9 [7,8,9]. Internal consistency of the 9-item binary knowledge scale was assessed using the Kuder-Richardson formula 20 (KR-20) based on pretest data, yielding a value of 0.85, which indicates good reliability. The collected data were analyzed using SPSS version 28, with findings expressed as means, standard deviations, frequencies, and percentages. Normality of the knowledge score distribution was assessed through skewness and kurtosis values and visual inspection of Q-Q plots and box plots. The association between sociodemographic characteristics and mean knowledge scores regarding cancer warning signs was determined using an independent samples t-test and one-way ANOVA. Homogeneity of variance was assessed using Levene's test for each comparison. Where the assumption was met, standard t-test or ANOVA results with Tukey's HSD post-hoc analysis were reported, and where the assumption was violated, Welch's t-test or ANOVA with Games-Howell post-hoc analysis was applied. Effect sizes (Cohen's *d* for t-tests; eta-squared for ANOVA) and 95% confidence intervals were calculated for all key comparisons. Statistical significance was set at $p < 0.05$.

RESULTS

The 385 enrolled participants had a mean age of 33.95 ± 12.39 years. The majority of them, 161 (41.8%), were between 18 and 28 years old. There were 173 males (44.9%) and 212

Table 1. Sociodemographic characteristics of participants (n=385)		
Characteristic	Frequency (n)	Percentage (%)
Age group (years)		
18-28	161	41.8
29-38	103	26.8
39-48	49	12.7
49-59	72	18.7
Sex		
Male	173	44.9
Female	212	55.1
Marital status		
Married	292	75.8
Unmarried	93	24.2
Educational status		
Illiterate	101	26.2
Basic education	42	10.9
Secondary	105	27.3
Bachelor	98	25.5
Master	39	10.1
Occupation		
Farmer	84	21.8
Student	43	11.2
Service	68	17.7
Business	42	10.9
Housewife	148	38.4
Monthly income (NPR)		
<20,000	61	15.8
21,000-40,000	125	32.5
>41,000	199	51.7
Source of information (multiple response)		
Internet	256	66.5
Television	156	40.5
Radio	135	35.1
Others	95	24.7
Family history of cancer		
Yes	14	3.6
No	371	96.4
Attend awareness program		
Yes	45	11.7
No	340	88.3
Tobacco use		
Current user	126	32.7
Past user	35	9.1
No user	224	58.2
Alcohol use		
Current user	56	14.5
Past user	97	25.2
No user	232	60.3

females (55.1%). Regarding marital status, 292 (75.8%) were married. One hundred five (27.3%) participants had completed a secondary level of education. Among the participants, 148 (38.4%) were housewives, and 199 (51.7%) earned more than NPR 41,000 per month. The internet was the main source of information about cancer warning signs, used by 256 participants (66.5%). Only 14 participants (3.6%) had a family member who had been diagnosed with cancer. Most participants, 340 (88.3%), had never attended a cancer awareness program before. Tobacco user participants were 126 (32.7%), and alcohol users were 56 (14.5%) as shown in Table 1.

As shown in Figure 1, out of 385 participants, most people knew the common warning signs

of cancer, including a lump in the breast (303, 78.7%), a sore that does not heal (295, 76.6%), unusual bleeding (265, 68.8%), a change in a mole or wart (234, 60.8%), unexplained persistent pain (205, 53.2%), and a long-lasting cough or hoarse voice (198, 51.4%). More than half of the participants did not know that unexplained weight loss (193, 50.1%), difficulty in digestion or swallowing (203, 52.7%), and changes in bowel or bladder habits (216, 56.1%) were also warning signs of cancer.

Several sociodemographic factors were significantly associated with participants' knowledge about cancer warning signs. Females showed better knowledge than males (5.64 vs. 4.91, $p = 0.007$). Education level was also significantly associated with

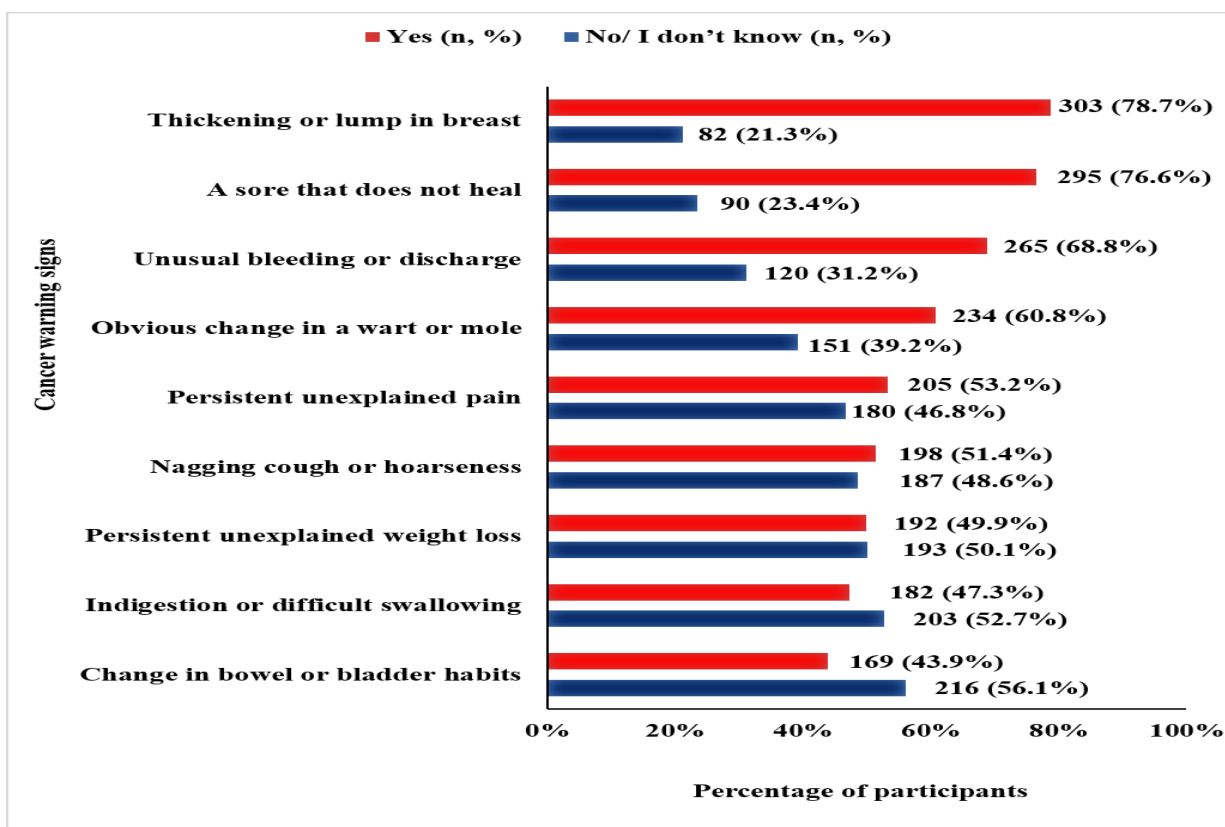


Figure 1. Knowledge about nine cancer warning signs among participants (n=385)

Table 3. Association between sociodemographic variables and knowledge about cancer warning signs (n=385)

Variables	Category	Mean $\pm$ SD	P-Value	Effect size (95% CI)
Age	18-28	5.48 $\pm$ 2.707	0.134 ^a	$\eta^2 = 0.013$ (0.000, 0.037)
	29-38	5.08 $\pm$ 2.700		
	39-48	5.82 $\pm$ 2.138		
	49-59	4.90 $\pm$ 2.738		
Sex	Male	4.91 $\pm$ 2.655	0.007	d = -0.277 (-0.479, -0.075)
	Female	5.64 $\pm$ 2.612		
Marital Status	Married	5.30 $\pm$ 2.603	0.955	d = -0.007 (-0.240, 0.227)
	Unmarried	5.32 $\pm$ 2.817		
Educational status	Illiterate	4.77 $\pm$ 2.569	<0.001 ^b	$\eta^2 = 0.051$ (0.011, 0.091)
	Basic education	4.87 $\pm$ 2.523		
	Secondary	5.40 $\pm$ 2.838		
	Bachelor	6.26 $\pm$ 2.488		
	Master	5.41 $\pm$ 2.863		
Occupation	Farmer	4.73 $\pm$ 2.851	0.007 ^b	$\eta^2 = 0.037$ (0.003, 0.072)
	Student	6.49 $\pm$ 2.404		
	Service	4.97 $\pm$ 2.431		
	Business	5.33 $\pm$ 2.675		
	Housewife	5.45 $\pm$ 2.604		
Family monthly income (NPR)	$\leq$ 20,000	4.97 $\pm$ 2.436	0.039 ^a	$\eta^2 = 0.017$ (0.000, 0.048)
	21,000-40,000	6.03 $\pm$ 2.744		
	$\geq$ 41,000	5.30 $\pm$ 2.723		
Family history of cancer	Yes	7.29 $\pm$ 1.326	<0.001	d = 0.780 (0.244, 1.316)
	No	5.23 $\pm$ 2.662		
Attended awareness program	Yes	5.87 $\pm$ 2.616	0.134	d = 0.238 (-0.073, 0.550)
	No	5.24 $\pm$ 2.653		
Tobacco use	Current user	5.22 $\pm$ 2.803	0.770	$\eta^2 = 0.001$ (0.000, 0.013)
	Past user	5.11 $\pm$ 2.687		
	No user	5.39 $\pm$ 2.569		
Alcohol use	Current user	5.32 $\pm$ 2.615	0.947	$\eta^2 = 0.001$ (0.000, 0.004)
	Past user	5.38 $\pm$ 2.706		
	No user	5.28 $\pm$ 2.650		

SD = standard deviation; d = Cohen's d; η^2 = eta-squared.

For two-category variables (sex, marital status, family history of cancer, attended awareness program), an independent-samples t-test was used, and effect size was reported as Cohen's d. A positive d indicates the first-listed category scored higher, while a negative d indicates the second-listed category scored higher.

For variables with more than two categories, one-way ANOVA (or Welch's ANOVA) was used, and effect size is reported as eta-squared (η^2).

^a Welch's ANOVA (equal variances not assumed, Levene's test $p < .05$) was applied for age and family monthly income. For family monthly income, the overall test was significant, and Games-Howell post-hoc analysis showed participants earning NPR 21,000–40,000 scored significantly higher than those earning $\leq$ 20,000 ($p = 0.030$). For age, the overall test was non-significant ($p = 0.134$); no post-hoc comparisons were performed.

^b One-way ANOVA (equal variances assumed) was applied for educational status, occupation, tobacco use, and alcohol use. Tukey HSD post-hoc analysis showed that, for educational status, bachelor's degree holders scored significantly higher than illiterate participants ($p < 0.001$) and those with basic education ($p = 0.002$); for occupation, students scored significantly higher than farmers ($p = 0.003$) and service holders ($p = 0.026$). Tobacco use and alcohol use were both non-significant overall; no post-hoc comparisons were performed.

bachelor's degree had the highest scores (6.26) and significantly higher than illiterate participants ($p= 0.001$) and those with only basic education ($p= 0.002$). Students scored higher (6.49) than farmers ($p= 0.003$) and service holders ($p= 0.026$). Similarly, participants earning Nepali rupees (NPR) 21,000–40,000 per month scored higher than those earning below NPR 20,000 ($p= 0.030$). Knowledge scores were significantly greater among participants who reported a family history of cancer than among those who did not (7.29 vs. 5.23, $p< 0.001$). Age, marital status, attendance at an awareness program, and tobacco or alcohol use showed no significant association with knowledge about cancer warning signs (Table 3).

DISCUSSION

This study found a clear gradient in the knowledge about cancer warning signs. Visible signs such as a lump in the breast (78.7%), a sore that does not heal (76.6%), unusual bleeding (68.8%), and a change in a mole or wart (60.8%) were much better recognized than internal symptoms like unexplained weight loss (49.9%), indigestion or difficulty swallowing (47.3%), and changes in bowel or bladder habits (43.9%). The high recognition of a breast lump likely reflects the frequent emphasis on breast and cervical cancer screening in public health campaigns across Nepal, making this sign more familiar to the general public. In contrast, internal symptoms were the least recognized, possibly because they are often mistaken for common gastrointestinal conditions and may not immediately raise concern about cancer. Poor recognition of these warning signs has been associated with delays in seeking medical care and diagnosis at more advanced and less treatable stages of the disease. A similar

gradient pattern was observed in a hospital-based study in Riyadh, Saudi Arabia, where, apart from a lump, less than half of participants recognized signs such as weight loss, unusual bleeding, and bowel changes [10]. In contrast, a community-based study from Biratnagar, in the same district as the present study, found that most respondents could not recognize the majority of cancer warning signs, with only 55.3% identifying an unexplained lump or swelling [11], and similar low knowledge was reported in other community-based studies from Nepal and India [12,13]. This difference between hospital-based and community-based findings may reflect greater contact with the healthcare system and more exposure to health-related information among hospital outpatients compared with the general community people.

Sex was significantly associated with knowledge of cancer warning signs, with females scoring higher than males. This finding is consistent with the foundational UK Cancer Awareness Measure (CAM) population survey [8]. This sex-based pattern likely reflects women's greater contact with health services, including cervical and breast health screening as well as education delivered by community health volunteers, such as SWAYAM SEVIKA'S and AAMA SAMUHA'S, which might provide more cancer-related information.

Educational status was significantly associated with knowledge, with bachelor's degree holders scoring significantly higher than illiterate or basic-education participants. This aligns with previous studies [14,15,16], where higher education was similarly linked to greater knowledge about cancer warning signs and risk factors, suggesting that the

education-knowledge relationship is a consistent determinant of cancer literacy rather than a setting-specific finding. Furthermore, occupation and income were also significantly associated with knowledge scores. Students scored higher than farmers, and participants earning NPR 21,000–40,000 per month scored higher than those earning below NPR 20,000, consistent with a study from Newfoundland and Labrador, Canada, which found that higher income was linked to better cancer awareness [16]. Overall, these findings suggest that people with higher education and stable income tend to have better knowledge of cancer warning signs, while those with lower income and less stable occupations may have limited access to health information, education, and media, which reduces their knowledge. Similarly, participants who had a family member diagnosed with cancer had significantly higher knowledge scores (7.29 vs. 5.23, $p = 0.004$), consistent with a Canadian study [16], as people with a family member with cancer may be more actively seeking information about the disease or may have greater exposure to clinical discussions about cancer symptoms. However, as this is a cross-sectional study, causality cannot be established, and only 14 (3.6%) participants in our sample had a family history of cancer, and this comparison should be interpreted with caution.

In our study, age, marital status, prior attendance at a cancer awareness program, and tobacco or alcohol use were not significantly associated with knowledge scores. This contrasts with the UK CAM survey, which found lower awareness among younger respondents [8], and an Ethiopian study, which found lower awareness among adults aged 60 and above [15]. The absence of

an age effect in our study may be because most participants were working-age adults (68.6% were ≤ 38 years old) visiting a hospital, which is a narrower age group compared to general population surveys. In such a setting, awareness may be more influenced by education and occupation than by age. Similarly, tobacco and alcohol use showed no significant association, possibly because cancer warning sign knowledge is more dependent on general health literacy and education than on personal health behaviours. Additionally, with only 11.7% of participants having ever participated in a cancer awareness program, attendance at such programs did not produce a statistically significant improvement in overall knowledge scores. This may suggest that existing cancer awareness programs in this region have limited reach, are held infrequently, or may not deliver information in a way that is easy to understand and remember. This highlights the need for better-designed, clear, culturally relevant, more interactive, and more widely accessible cancer education programs in the community.

The internet was the most commonly reported source of cancer-related information (66.5%), followed by television (40.5%) and radio (35.1%), suggesting that digital platforms were widely used for health information in this semi-urban setting. This pattern points to social media, health websites, and mobile health platforms as potential channels for cancer awareness campaigns, though this cross-sectional design cannot confirm their actual reach or effectiveness. Television and radio were also commonly reported sources and may be particularly relevant for populations with limited literacy or internet access.

The study findings consistently point to a recognition gap, wherein physically visible symptoms are far more familiar to participants than those that are internal or not immediately apparent. This has important implications for health education in this region. Awareness programs should place greater emphasis on less obvious warning signs, such as persistent indigestion, unexplained weight loss, and changes in bowel or bladder habits. These programs should also be specifically targeted toward men, less-educated individuals, and lower-income group people, who showed the lowest levels of awareness in our study.

Despite these findings, this study has some limitations. Since participants were recruited from a hospital outpatient setting using convenience sampling, the findings may not represent the wider general population and may overestimate awareness compared to community-based studies, as seen in the nearby Biratnagar community study [11]. This was a cross-sectional study; we cannot determine cause and effect. Knowledge was self-reported, which may have introduced recall bias and social desirability bias. Some participants may have given answers they thought were expected rather than their true level of awareness. A small sample size and single-center study may limit the generalization of the results. Only 11.7% of participants had previously attended a cancer awareness program, so this comparison is based on a relatively small subgroup and should be interpreted with caution.

CONCLUSIONS

In this hospital-based sample, most participants recognized the visible warning signs of cancer, but awareness of internal symptoms such as unexplained weight loss,

indigestion or difficulty swallowing, and changes in bowel or bladder habits remained low. Sex, education, occupation, income, and family history of cancer were the key factors associated with knowledge of cancer warning signs. These findings highlight the need for cancer literacy through hospital-based counseling, community-based cancer awareness programs, and digital platforms that specifically emphasize the less obvious warning signs of cancer, particularly among men, less-educated individuals, and lower-income groups, to promote earlier recognition and timely help-seeking behavior.

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