

Awareness of Cancer Risk Factors and Early Warning Signs among University Students in Palestine: A Cross-Sectional Study

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Abstract

Background: Delays in detection dramatically lower survival rates for cancer, a major global public health concern. Raising public knowledge of early warning indicators and cancer risk factors is essential for prompt health-seeking behavior. Research on cancer awareness among non-health university students is still scarce in Palestine, despite an increase in cancer incidence. This study evaluated An-Najah National University undergraduate non-health students' understanding of cancer risk factors and early warning signs. **Methods:** Undergraduate students from the Faculties of Business, Communication, and Law participated in a cross-sectional quantitative study. 382 participants were recruited using proportionate stratified random selection. A structured Arabic questionnaire that has been verified in comparable settings was used to gather data. To investigate variations among demographic variables, descriptive statistics, reliability evaluation, independent t-tests, and one-way ANOVA were used. **Results:** Overall awareness was low, with 37.9% of people knowing about cancer risk factors and 34.5% knowing about early warning indicators. The highest identified risk factors were secondhand smoke (62%) and smoking (57.3%), while HPV infection (19%) and growing older (25%) were the least. Unhealing ulcers (24.5%) and difficulty swallowing (25.8%) were the least common early symptoms, while unexplained lumps (44.3%) and unexplained discomfort (40.4%) were frequently reported. Gender differences were significant only for knowledge, while knowledge and awareness were substantially correlated with academic year and family history of cancer ($p < 0.05$). **Conclusions:** An-Najah National University's non-health undergraduate students know very little about cancer risk factors and early warning indicators. To increase health literacy, stimulate early identification, and support healthier lifestyle choices, organized, evidence-based educational programs and awareness campaigns are advised. To improve cancer awareness and education among young adults in Palestine, more multinational research and national assistance are required.

Keywords: Cancer awareness- Risk factors- Early warning symptoms- University students- Palestine; Health literacy

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Introduction

Global projections estimate approximately 17 million cancer-related deaths and 26 million new cancer cases annually by 2030. About 70% of cancer-related fatalities transpire in low- and middle-income nations, frequently ascribed to insufficient awareness of cancer symptoms, delays in diagnosis, absence of diagnostic or screening initiatives, and limited access to standard therapies [1].

The majority of cancers are associated with modifiable

risk factors, such as tobacco use, excessive alcohol intake, high-fat and low-fiber diets, obesity, physical inactivity, sexually transmitted infections (STIs), and exposure to urban air pollution [2].

Lifestyle practices among young adults in Palestine significantly increase cancer chances. A 2023 survey at Palestinian institutions in the West Bank indicated that 41.2% of students smoke, 63.3% are physically sedentary,

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73.4% maintain poor diets, and 54.2% use excessive coffee. These behaviors are associated with increased risks of obesity, cardiovascular diseases, diabetes, and several types of cancer [3]. A separate study revealed that detrimental dietary habits are becoming more prevalent among Palestinian youth, especially university students. Regular intake of fast food, processed products, and sugary drinks foods lacking critical nutrients has been linked to heightened chances of several cancers, notably colorectal and stomach cancers. The deficiency of fruit, vegetable, and fiber consumption has been recognized as a significant factor in this risk [4]. Cancer manifests a diverse array of symptoms that differ based on its nature and location. Nevertheless, numerous warning symptoms are prevalent among various malignancies, such as unexplained weight loss, persistent weariness, chronic discomfort, alterations in skin, and the emergence of lumps or swellings [3]. Certain tumors exhibit more distinct characteristics. Breast cancer may manifest as nipple discharge, skin dimpling, or a palpable mass in the breast or axilla. Colorectal cancer may present as changes in bowel habits, abdominal discomfort, or rectal hemorrhage. Lung cancer is often linked to persistent cough, thoracic pain, and shortness of breath. Identifying these signs is essential for prompt diagnosis and quick intervention [5].

Al-Taie and Bakur (2024) performed a cross-sectional study entitled “Assessment of Knowledge of Cancer Risk Factors and Awareness of Early Cancer Warning Signs among University Students” to assess cancer-related knowledge and awareness among undergraduate students in Kyrenia, Northern Cyprus. The study sample comprised 150 undergraduate students from several academic areas, and data were gathered through a standardized questionnaire. The findings indicated a generally inadequate understanding of cancer risk factors among both medical and non-medical students, with significant disparities in certain domains such as alcohol consumption and processed meat intake. The study concluded by highlighting the necessity of enhancing educational programs to elevate cancer awareness among university students, emphasizing the vital significance of early detection and prevention techniques [6].

There is still little data on Palestinian university students’ knowledge of cancer risk factors and early warning indicators, despite the rising incidence of cancer and the pervasiveness of modifiable risk factors. The purpose of this study is to evaluate An-Najah National University undergraduate students’ understanding of common early warning signs and cancer risk factors. The study also looks for knowledge gaps that could impede attempts at early detection and prevention. It is anticipated that the results will guide the creation of focused educational programs and awareness campaigns to improve students’ health literacy and encourage early cancer prevention practices.

Materials and Methods

Study Design

To evaluate undergraduate students’ understanding of common early warning signs and cancer risk factors, a quantitative cross-sectional descriptive research was carried out. The purpose of this design was to assess awareness levels at a certain moment in time and investigate how they relate to particular sociodemographic traits.

Study Setting and Population

The study was conducted in the academic year 2025–2026 at An-Najah National University (ANU) in Nablus, Palestine. Undergraduate students from the Faculty of Law and the Faculty of Business and Communication made up the study population. As long as they were enrolled throughout the data collecting period, students from all academic years regardless of gender or age were qualified to take part.

Sample Size and Sampling Method

384 students were needed for the sample size, which was determined using Cochran’s method at a 95% confidence level and a 5% margin of error. To guarantee sufficient participation from every faculty member and academic year, proportionate stratified random selection was employed. Participants were chosen at random from each stratum after stratification based on academic level and faculty.

Materials

A standardized self-administered questionnaire that was modified from an earlier research by Al-Taie and Bakur (2024) was used to gather data. The three sections of the questionnaire knowledge of cancer risk factors, awareness of frequent early warning signs, and sociodemographic characteristics were translated into Arabic. “Yes,” “No,” and “I don’t know” choices were used to record responses.

Validity and Reliability

A team of specialists in public health, cancer nursing, and research methods evaluated the content and face validity. To evaluate feasibility and clarity, a pilot research with around 10% of the sample was carried out. With Cronbach’s alpha values of 0.74 for the cancer risk factors scale and 0.92 for the early warning symptoms scale, reliability analysis demonstrated satisfactory internal consistency.

Data Collection Procedure

An electronic questionnaire disseminated via university-approved internet channels was used to gather data between September and December of 2025. Prior to completing the questionnaire, electronic informed permission was sought, and participation was entirely optional. Confidentiality and anonymity were upheld during the whole investigation.

Ethical Considerations

The Faculty of Medicine and Health Sciences of An-Najah National University's Institutional Review Board granted ethical approval. Data were only utilized for study, and no personally identifiable information was gathered.

Data Analysis

The Statistical Package for the Social Sciences (SPSS) version 25 was used to analyze the data. The study variables were summarized using descriptive statistics, such as frequencies, percentages, means, and standard deviations. To investigate relationships between awareness levels and sociodemographic factors, inferential analyses were carried out. While one-way analysis of variance (ANOVA) and independent samples t-tests were employed to compare mean scores between groups, chi-square tests were utilized for categorical variables. A p-value of less than 0.05 was deemed statistically significant, and all statistical tests were two-tailed.

Results

Socio-demographic Information for the Study Sample

The study sample consisted of 384 undergraduate students from An-Najah National University. Most of the students in the sample are females (68.5%) while the male students are (31.5%), law faculty while the rest of the samples are from the business and communication faculty. Most of the students in the sample don't have family cancer history (about 64%), and the distribution of the students based on their academic year is as the following: 27.9% from the first year, 22.4% from the second year, 22.7% from the third year, and 27.1% from the fourth year or more (Table 1).

Knowledge of Cancer Risk Factors

The results in the Table 2 show that the total knowledge of cancer risk factors among undergraduate students at An-Najah National University is 37.9%.

The results show that students have 62% knowledge regarding secondhand smoke risk factor, and 57.3% knowledge regarding cigarette smoking. On the other

hand, the lowest knowledge among students was 19% related to the infection with HPV, followed by 25% regarding the advancing age risk factor.

Finally, the knowledge scores of students regarding the risk factors (first degree relative with cancer, sunburn in childhood, red or processed meat consumption, alcohol intake, low fruit and vegetable consumption, and overweight) are ranging between 32% and 40%.

Awareness of Common Early Warning Symptoms

The results in the Table 3 show that the total score of awareness of common early warning symptoms among undergraduate students at An-Najah National University is 34.5%.

The results show that students have 44.3% score of awareness regarding the symptom "unexplained lump or swelling", 40.4% regarding the symptom "unexplained pain", and 39.3% for the symptom "unexplained weight loss". The lowest awareness scores among students was regarding the un healing ulcers (24.5%) and the difficulty of swallowing (25.8%).

Awareness of common early warning symptoms of cancer among students appears is moderate for the several symptoms such as cough and hoarseness (31.3%), unexplained bleeding (33.6%), change in mole appearance (34.4%), changes in bowel and bladder habits (37%), and unexplained weight loss (39.3%).

Relationships between Awareness of Common Early Warning Symptoms and Socio-demographic Variables

The results in Table 4 show that there are statistically significant differences at the significance level of 0.05 in the awareness of common early warning symptoms among undergraduate students at An-Najah National University according to Faculty, Academic Year, and Family Cancer History.

Regarding the faculty, the results show that the total awareness for the law faculty (38.22 ± 35.88) is significantly higher than that for the business and communication faculty (30.53 ± 34.82).

Regarding the academic year, the results of Tukey pairwise comparisons tests in the Table 4 show that students from the second academic year (38.76 ± 39.71)

Table 1. Socio-demographic Information (N=384)

Variable	Category	N	%
Gender	Female	263	68.50
	Male	121	31.50
Age		19.66 ± 1.4	
Faculty	Law	198	51.60
	Business and communication	186	48.40
Academy Year	First	107	27.90
	Second	86	22.40
	Third	87	22.70
	Fourth or more	104	27.10
Family Cancer History	No	246	64.10
	Yes	138	35.90

Table 2. Knowledge of Cancer Risk Factors among Undergraduate Students at An-Najah National University (N=384).

Risk Factors Items	Answers		
	No	Yes	Don't know
	N (%)	N (%)	N (%)
Cigarette smoking	151 (39.3)	220 (57.3)	13 (3.4)
Secondhand smoke	104 (27.1)	238 (62)	42 (10.9)
Drinking more than one alcohol unit daily	201 (52.3)	147 (38.3)	36 (9.4)
Eating less than 5 servings of fruits and vegetables daily	194 (50.5)	141 (36.7)	49 (12.8)
Eating red or processed meat once daily or more	176 (45.8)	152 (39.6)	56 (14.6)
Overweight	167 (43.5)	137 (35.7)	80 (20.8)
Sunburn more than once in childhood	180 (46.9)	129 (33.6)	75 (19.5)
Advancing age	238 (62)	96 (25)	50 (13)
Having a first degree relative with cancer	228 (59.4)	123 (32)	33 (8.6)
Infection with HPV	195 (50.8)	73 (19)	116 (30.2)
Total	1834 (47.8)	1456 (37.9)	550 (14.3)

Table 3. Awareness of Common early Warning Symptoms among Undergraduate Students at An-Najah National University (N=384).

Early Warning Symptoms Items	Answers		
	No	Yes	Don't know
	N (%)	N (%)	N (%)
Unexplained lump orb swelling	191 (49.7)	170 (44.3)	23 (6)
Unexplained pain	192 (50)	155 (40.4)	37 (9.6)
Unexplained bleeding	200 (52.1)	129 (33.6)	55 (14.3)
Cough and hoarseness	211 (54.9)	120 (31.3)	53 (13.8)
Changes in bowl and bladder habits	186 (48.4)	142 (37)	56 (14.6)
Difficulty swallowing	223 (58.1)	99 (25.8)	62 (16.1)
Change mole appearance	202 (52.6)	132 (34.4)	50 (13)
Un healing ulcers	212 (55.2)	94 (24.5)	78 (20.3)
Unexplained weight loss	180 (46.9)	151 (39.3)	53 (13.8)
Total	1797 (52)	1192 (34.5)	467 (13.5)

and the third academic year (44.06 ± 36.28) have means of awareness significantly higher than that for the first academic year (23.88 ± 28.09) and the p-value of the test is 0.001.

Finally, regarding the family cancer history, the results show that the total awareness for students who have family cancer history (51.53 ± 37.08) is significantly higher than that for students who don't have family cancer history (24.93 ± 30.82).

Relationships between Awareness of Common Early Warning Symptoms and Socio-demographic Variables

The results in Table 5 show that there are statistically significant differences at the significance level of 0.05 in the awareness of common early warning symptoms among undergraduate students at An-Najah National University according to Faculty, Academic Year, and Family Cancer History.

Regarding the faculty, the results show that the total awareness for the law faculty (38.22 ± 35.88) is significantly higher than that for the business and communication faculty (30.53 ± 34.82).

Regarding the academic year, the results of Tukey pairwise comparisons tests in the Table 5 show that students from the second academic year (38.76 ± 39.71) and the third academic year (44.06 ± 36.28) have means of awareness significantly higher than that for the first academic year (23.88 ± 28.09).

Finally, regarding the family cancer history, the results show that the total awareness for students who have family cancer history (51.53 ± 37.08) is significantly higher than that for students who don't have family cancer history (24.93 ± 30.82).

Discussion

The present study aimed to assess the level of knowledge regarding cancer risk factors and awareness of common early warning symptoms among non-health undergraduate students at An-Najah National University. The findings revealed a generally low level of cancer literacy among the study population, reflecting substantial gaps in both preventive knowledge and symptom recognition. This limited awareness represents

Table 4. Relationships between Awareness of Common Early Warning Symptoms and Socio-demographic Variables

Variable	Category	Total awareness		F/T(P-value)
		N	Mean ± S.D	
Gender	Female	263	32.66 ± 33.68	-1.493 (0.136)
	Male	121	38.48 ± 39.13	
Faculty	Law	198	38.22 ± 35.88	2.129 (0.034)**
	Business and communication	186	30.53 ± 34.82	
Academic Year	First	107	23.88 ± 28.09	5.925 (0.001)**
	Second	86	38.76 ± 39.71	
	Third	87	44.06 ± 36.28	
	Fourth or more	104	33.87 ± 35.69	
Family Cancer History	No	246	24.93 ± 30.82	-7.532 (0.000)**
	Yes	138	51.53 ± 37.08	

* The results are based on the independent samples T-test or the one way ANOVA test. ** The test is significant at the 0.05 level.

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Gender	Female	263	32.66 ± 33.68	-1.493 (0.136)
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	Business and communication	186	30.53 ± 34.82	
Academic Year	First	107	23.88 ± 28.09	5.925 (0.001)**
	Second	86	38.76 ± 39.71	
	Third	87	44.06 ± 36.28	
	Fourth or more	104	33.87 ± 35.69	
Family Cancer History	No	246	24.93 ± 30.82	-7.532 (0.000)**
	Yes	138	51.53 ± 37.08	

The results are based on the independent samples T-test or the one way ANOVA test. ** The test is significant at the 0.05 level.

a significant public health concern, as insufficient cancer knowledge is closely associated with delayed health-seeking behaviors and late-stage diagnosis. Similar patterns of inadequate cancer awareness among young adults have been documented in both regional and international studies, emphasizing the global relevance of this issue [7].

Overall knowledge of cancer risk factors was found to be limited. While students demonstrated relatively higher recognition of tobacco-related risks, awareness of other scientifically established risk factors including obesity, dietary habits, alcohol consumption, advancing age, and HPV infection was markedly inadequate. This selective awareness suggests that students' understanding is heavily influenced by public health messaging that predominantly emphasizes smoking, while neglecting other critical lifestyle and biological contributors to cancer development [6].

Notably, the exceptionally low recognition of HPV infection as a cancer risk factor represents a critical public health concern. HPV is a well-established etiological factor for cervical and other anogenital cancers, and inadequate awareness may hinder preventive strategies such as vaccination and early screening. Cultural

sensitivity surrounding sexually transmitted infections, particularly in conservative societies, may limit open discussion and education about HPV-related risks [1].

Awareness of early warning symptoms of cancer was also found to be suboptimal. Students were more likely to recognize visible or commonly publicized symptoms such as unexplained lumps, pain, and weight loss, whereas awareness of subtler yet clinically significant symptoms such as non-healing ulcers and difficulty swallowing was notably low. Poor recognition of early symptoms may contribute to diagnostic delays and poorer cancer outcomes [7].

The study further identified significant associations between cancer knowledge and sociodemographic variables. Higher knowledge and awareness levels were observed among students in advanced academic years and those with a family history of cancer, suggesting that academic exposure and personal experience play an important role in shaping health literacy. However, reliance on incidental learning may perpetuate disparities in awareness among students [8].

Collectively, these findings emphasize that cancer-related knowledge among non-health university students remains fragmented and insufficient. Given the role of

young adults as future community leaders and influencers, enhancing cancer literacy at the university level represents a valuable opportunity for early prevention and broader community impact. Structured, evidence-based educational interventions may contribute to improved early detection and public health outcomes [1].

Recommendations

Based on the study findings, it is recommended that universities integrate basic cancer education into general curricula for non-health students. Targeted awareness campaigns should focus on poorly recognized risk factors and early warning symptoms using culturally appropriate methods. Collaboration between universities and health authorities is encouraged to implement workshops, seminars, and digital awareness initiatives. Future research should involve multiple universities to enhance generalizability and evaluate the effectiveness of educational interventions over time.

Limitations

This study has several limitations that should be acknowledged. First, the cross-sectional design precludes the establishment of causal relationships between awareness levels and sociodemographic variables. Second, data were collected from a single university, which may limit the generalizability of the findings to other Palestinian institutions. Additionally, reliance on self-reported data may have introduced recall or social desirability bias. Despite these limitations, the study provides valuable baseline data on cancer awareness among non-health university students.

In conclusion, the findings of this study indicate that non-health undergraduate students at An-Najah National University possess insufficient knowledge of cancer risk factors and limited awareness of early warning symptoms. While awareness of smoking-related risks was relatively higher, understanding of other critical lifestyle, biological, and infection-related factors remained poor. Similarly, recognition of subtle yet important cancer symptoms was inadequate. These results highlight a significant gap in cancer literacy among young adults, which may contribute to delayed health-seeking behaviors and late-stage diagnosis. Addressing this gap through structured, university-based educational interventions is essential to promote early detection, preventive behaviors, and informed decision-making, ultimately contributing to improved public health outcomes in Palestine.

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Conflict of Interest

The authors declare no conflict of interest.

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