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Sociological Investigation of the Level of Cancer Awareness Among Male College Students in Tehsil Dargai, Khyber Pakhtunkhwa

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Abstract: *Cancer awareness among adolescents is crucial for early detection and prevention, yet limited research exists on this topic in Pakistan. This study presents a sociological investigation into the level of cancer awareness among male college students in Tehsil Dargai, Khyber Pakhtunkhwa. Using a descriptive research design, data were collected from 300 students across six colleges via structured questionnaires assessing knowledge of cancer types, risk factors, warning signs, and screening practices. Results revealed significant gaps in awareness, especially regarding less commonly known symptoms and preventive behaviours. The study also evaluated the effectiveness of an educational intervention, which substantially improved students' understanding. The findings highlight the need for integrating culturally sensitive cancer education into college curricula and community programs. By framing cancer awareness as a social phenomenon influenced by education, culture, and behaviour, this research contributes valuable insights to medical sociology and public health efforts in Pakistan.*

Keywords: Cancer Awareness, Warning Signs, Risk Factors, Early Detection, Cancer Prevention, Educational Intervention, Adolescents, College Students, Medical Sociology

Introduction

Adolescence is a period of significant change, during which individuals undergo physical, cognitive, emotional, and moral development, often resulting in risk-taking behaviours. Many lifelong habits are formed during this time, which can have long-term implications on health (Freeman et al., 2000). One of the critical health concerns affecting adolescents globally is cancer. This disease encompasses a wide range of illnesses where cells in affected organs or tissues become abnormal and spread to other parts of the body, potentially leading to death (Lawrence et al., 2025).

Cancer has become the second leading cause of death worldwide, after cardiovascular diseases. Approximately 10 million people are diagnosed with cancer each year, and more than 6 million die from it annually (Bray et al., 2024). Among adolescents, leukaemia is the most common cancer, accounting for 30% of all childhood cancer cases. For females, malignant melanoma is the most prevalent, while testicular cancer is the most common in males (American Cancer Society, 2023). A significant issue faced by adolescents is the delay in cancer diagnosis, often due to a lack of awareness about cancer's warning signs and symptoms, which can contribute to late-stage detection (Goyal et al., 2004; Fern et al., 2011; Walter et al., 2012; Macleod et al., 2009).

Several factors contribute to an individual's risk of developing cancer over their lifetime. These include genetic predispositions, family history, exposure to carcinogens such as tobacco smoke, and environmental factors like UV radiation (National Cancer Institute, 2015). While some risk factors are non-modifiable, such as skin type and genetic makeup, others can be mitigated through education and community awareness. Despite the scientific evidence, many individuals remain uninformed about the relationship between cancer and lifestyle choices, such as smoking, diet, and physical activity. For

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example, smoking is one of the most common health risk behaviours, particularly among youth, with its prevalence increasing among adolescent females in recent years (Lawrence et al., 2025).

Explaining cancer risk factors to young people is very important, since their risk increases as they grow older. Promptly noticing cancer symptoms can help patients with some types of cancer live longer and have favourable results (Tørring et al., 2011; Neal, 2009). Increasing awareness among people in the community is an important way to help people find cancer early (World Health Organization, 2025). Delayed doctor visits are one of the reasons people are diagnosed with cancer at a late stage (Walter et al., 2012; Andersen & Cacioppo, 1995). People often assume it is not cancer, simply because they do not know enough about the symptoms (Macleod et al., 2009).

Studies prove that many college students, often those taking medical programmes, have little to no knowledge of cancer. As an example, research done in Angola indicated that students, no matter what field they were studying, often failed to recognise changes in the nipple as the first sign of breast cancer (Sambanje & Mafuvadze, 2012). Both girls and boys lack an understanding of risk factors related to different cancers when they are adolescents. Likewise, adolescents might not know all the harmful effects of smoking, since it is such a common risk behaviour among this group (Lawrence et al., 2025).

The causes of cancer can be many. In some cases, cancer happens because of genetic mutations, in others because of the environment, and in yet others from both factors together. As people get older, their probability of developing cancer grows, and cancer rates can differ widely by population and region (Coleman et al., 2008). Being aware of cancer and the things that increase the risk of getting it encourages people to take actions that may prevent cancer and help find it early, which reduces both the cancer rate and the number of deaths (Shankar et al., 2017). Educating adolescents about cancer prevention and early detection may help them live healthier and check their health more often.

Researchers like Daraz, Nawab, and Mulk (2023) said in their study that education can strongly support women's health empowerment in rural communities in Pakistan. Learning gives women the tools they need to choose what is best for themselves and the people in their care. A rise in women's education means they are more likely to ask for expert healthcare, plan their families according to their needs, give up harmful cultural traditions, and keep their children healthier and safer, which leads to fewer children dying, healthier mothers and longer lives, plus a healthier community. On the other hand, lack of education and access to health care facilities can lead to traditional healing, as investigated by Ahmad, Nawab, and Ali (2023). Diseases are healed by aged women who are assumed to have healing powers because they possess spirits, and with their help, cure the diseased persons. However, cancer is a deadly disease and cannot be healed if it gets worse with such psychological techniques.

This research points out the need for higher awareness of cancer among adolescents, predominantly the age group 17 to 23, in Pakistan. Researchers want to determine the level of knowledge college students have about cancer and how to prevent it. It also studies how well various methods teach students about cancer, its risks, and finding it early. Interventions like these are necessary to help students understand why it is important to be aware of cancer and to act in ways that lower their cancer risk.

Review of Literature

Kim and Kim (2015) found that mothers do not have enough knowledge or preparedness to prevent cervical cancer in their adolescent daughters. Mothers should be urged and taught to help their daughters learn how to prevent cervical cancer. Programmes should give young women, along with their mothers, information about cervical cancer prevention to help raise awareness and act against the disease.

Uğurlu et al. (2016) surveyed personal health students on their sun-protection behaviours and how much they knew about skin cancer. Students whose friends or family members had been diagnosed with skin cancer were more likely to consider themselves at increased risk of skin cancer. Even though they were aware, women reported sunbathing more often and getting sunburns during the last year. Surprisingly, students in health-related majors showed the same attitudes and behaviours as everyone

else. According to the study, students need to understand how to protect themselves against skin cancer, but many continue with unsafe behaviours.

Wu et al. (2013) explored a collaborative initiative between Bachelor of Science in Nursing (BSN) students and local public schools in Michigan aimed at raising awareness of colorectal cancer (CRC) screening among underserved populations. The project, which involved health education for middle and high school students, reached about 1,800 students and their families. This initiative provided nursing students with unique leadership experiences while enhancing their theoretical knowledge and clinical skills in public health nursing. The study emphasises the importance of interdisciplinary collaboration in cancer education and underscores the role of peer education.

Noreen et al. (2015) highlighted that breast cancer is the leading cause of morbidity and mortality globally, with a particularly significant impact in developing countries like Pakistan. The study found a general lack of public awareness about breast cancer, leading to late diagnosis and poor treatment outcomes. In Southern Punjab, Pakistan, where the education rate is lower compared to the northern regions, the study emphasised the need for college students, especially those in medical programs, to develop a strong understanding of the disease. The study used a cross-sectional survey to assess breast cancer awareness among 566 college students and found that less than 35% of students were aware of the early warning signs of breast cancer. This study advocates for the implementation of awareness campaigns and educational programs to improve breast cancer knowledge among students.

Liu et al. (2014) conducted a study to investigate breast care knowledge and behaviours in college students. It was found that second-year students scored higher on knowledge and practices of breast care than first-year students. There is a significant correlation between having breast care knowledge and practicing better habits. This means that higher awareness of breast care is linked to improved practices. Access to health facilities, along with breast self-examination guidance and media, played an excellent role in building students' knowledge and behaviours.

The study by Carlson and Gonzalez (2014) asked adolescents in Costa Rica to share if they knew what cervical cancer was, how it is preventable, and what could indicate it. It was discovered that 30.8% of students did not know about cervical cancer, and only 33.9% of people knew that HPV is linked to cervical cancer. Because of the research, adults should focus on helping teens learn how to avoid cervical cancer and make sure helpful information is easy to find.

The study by Al-Amoudi et al. (2015) checked how well male students in high school in Jeddah, Saudi Arabia, were familiar with breast cancer. Students recognised the importance of catching breast cancer at an early stage, but they lacked knowledge about what leads to it. This study calls for male adolescents to learn about breast cancer, receive support when needed, and ensure regular check-ups are carried out for those affected.

Ilyas, Nawab, Mulk, and Jan (2023) find that social media plays a key role in shaping the lives of adolescents living in Khyber Pakhtunkhwa. People can create their content, find out more about education, and connect with others across the world through sites like Facebook and TikTok. Adolescents can help a lot by using technology to broadcast cancer information. The possible uses of these platforms for health are much better, and learning can be more efficient.

Visiting an inflatable colon during a colorectal cancer (CRC) campaign was found to significantly boost knowledge and awareness about the disease among all participants. However, the most significant gains were noticed among males and Hispanics, according to Sanchez et al. (2014). The Importance of interactive and engaging educational resources is emphasised in this study for boosting awareness of cancer and encouraging healthy screening.

Kurtuncu et al. (2014) looked at how aware students in health sciences and sociology were of cancer. Most students knew that smoking could cause cancer, but not as many realised that cancer itself cannot be spread between people. It was noted in the study that health science students more clearly understood the factors leading to cancer and effective prevention, making immersive cancer education necessary in every discipline.

Barros et al. (2014) prepared a cancer prevention awareness programme for secondary science teachers to function as mediators of important knowledge about cancer prevention. The research proved that when educators were allowed to lead cancer prevention campaigns at their schools, students and nearby residents learned a lot more about the disease.

Dhendup and Tshering (2014) investigated cervical cancer awareness and screening behaviours among graduates. Their study revealed that a significant proportion of respondents lacked knowledge about the necessity of cervical cancer screening and had not undergone the Pap test, with 94% of participants never having had the test. The study indicated that factors such as age, marital status, and physician recommendations were strongly associated with the likelihood of undergoing cervical cancer screening.

Ramaswamy et al. (2014) showed that postgraduate students knew well that tobacco use is a leading oral cancer risk factor. However, the report showed that a number of health professionals did not understand the signs of oral cancer and how to manage it. It points out that ongoing education sessions and workshops on oral cancer should be provided to help health workers.

According to Hoque et al. (2014), the research investigated how much students knew about cervical cancer and how many were being screened. Many students saw HPV as something to be worried about, but very few had undergone a Pap test, because the test made them anxious. Experts revealed that more efforts are needed to get people to have cervical cancer screenings, and that offering education can help remove the barriers to screening.

Sometimes, social movements can positively impact the health of rural communities. As Nawab et.al (2023) investigated, the Mazdoor Kissan Party's movement in North-Hashtnagar, Charsadda, not only empowered them to challenge social, political, and economic oppression but also led to significant improvements in their health and well-being. Peasants gained better access to health care and family planning, which contributed to healthier communities. So, it is essential for the rural adolescents first to get rid of the economic oppression imposed by feudal lords and their allied forces; only then can they uplift themselves socially and have the time and knowledge to understand their health better.

The literature reviewed underscores the critical importance of cancer education at the adolescent level, particularly in terms of awareness about risk factors, early detection, and preventive behaviours. Despite varying levels of knowledge across different studies and regions, there is a consistent need for comprehensive educational interventions that can improve cancer awareness and lead to healthier behaviours, ultimately reducing the incidence and mortality rates associated with cancer.

Research Methodology

The study employed a descriptive research design, utilising a survey method to collect data from the participants. This approach was chosen to provide a comprehensive understanding of cancer awareness among college students in Tehsil Dargai, District Malakand. The target population for this study consisted of all male students (totalling 560) from both public and private colleges in District Malakand. The colleges included in the study were:

Table 1

Distribution of Surveyed Students by College in Tehsil Dargai, District Malakand

S. No.	College Name	Number of Students
1.	Allama Iqbal Model School and College, Sakhakot	45
2.	Hira School and College, Dargai	90
3.	Govt. Post Graduate College, Dargai	150
4.	FIMS School and College Dargai	115
5.	Buoy Model School and College, Sakhakot	130
6.	Malakand Public School and College, Dargai	30

A random sample of 300 students was selected from the six colleges, representing a diverse group of male students aged 18 to 22 years. This sample size was chosen to ensure a comprehensive analysis of cancer awareness across different educational institutions within Tehsil Dargai. Data was collected using a structured questionnaire, which consisted of 33 items organised into five sections:

1. Socio-Demographic Information: This section collected basic demographic data, including age, marital status, and educational background.
2. Awareness of Cancer Types: This section assessed students' knowledge about different types of cancer.
3. Awareness of Cancer Warning Signs: This section focused on assessing students' awareness of common warning signs of cancer.
4. Awareness of Cancer Risk Factors: This section examined students' understanding of various cancer risk factors.
5. Awareness of Common Cancer Tests and Age Guidelines: This section gathered information about students' knowledge regarding cancer screening tests and the appropriate age for testing.

The aims of the study were explained to the college principals to make sure they gave their official support and involvement. Everyone attending the class answered questions from the questionnaire. The students were informed of the goal of the study and told that their answers would remain confidential and would be used only in the research. In order to keep their information private, students were asked to finish the survey without putting their names on it. Participants were told about the study's goals and why it was significant, and they were assured their data would not be revealed. The survey took place in class, with students getting about 30 to 45 minutes to complete the questionnaire on their own. Feedback was gathered as soon as people finished, which helped achieve a good response rate.

A pilot study was conducted with 10% of the total students (30 students) to test the appropriateness and clarity of the survey instruments. Based on the feedback and results from the pilot study, necessary adjustments were made to improve the clarity and accuracy of the questions. The pilot study also ensured that the survey tools were appropriate for the larger study sample. These 30 students were excluded from the final study sample to maintain the integrity of the data.

Data collected through the questionnaires were analysed using IBM SPSS Statistics 30. The primary statistical method used for data analysis was Chi-square testing, which allowed for the evaluation of relationships between socio-demographic variables and cancer awareness among the students.

In the data analysis section, researchers analyse the data collected from male college students in District Malakand regarding their awareness of cancer signs, risk factors, and screening. This section integrates relevant findings from the literature to provide a more comprehensive understanding of cancer awareness among students.

Table 2

Demographic Data of the Studied Cases (Table 1)

S. No.	Subject	Response in Number and Percentage
1.	Gender	Male=300 (100%)
2.	Age	17-19 = 271 (90.3%)20-21 = 29 (9.6%)
3.	Marital Status	Single = 292 (97.3%) Married = 7 (2.3%) Divorced = 1 (0.3%)
4.	Educational Class Level	1st Year: Medical = 169 (56.3%) Engineering = 32 (10.6%)2nd Year: Medical = 76 (25.3%) Engineering = 23 (7.6%)
5.	Family/Friends with Cancer	I am = 7 (2.3%) Father/Mother = 11 (3.6%) Sibling = 3 (1%) Family member = 16 (5.3%) Friend = 21 (7%) No one = 245 (81.6%)
6.	Indicators and Signs of Cancer	Wrong answer = 133 (44.3%) Right answer = 167 (55.6%)

Table 2 Summary: The majority of respondents were male (100%) and in the 17-19 age group (90.3%), reflecting a youthful demographic similar to that observed in other studies, which show a younger

population with limited awareness of cancer (Noreen et al., 2015). Notably, 55.6% of respondents correctly identified cancer signs, a percentage higher than reported in the literature, where awareness among younger populations has often been found to be inadequate (Basch et al., 2017).

Awareness of Cancer Types and Risk Factors (Table 3, Table 4)

Table 3

Awareness of Warning Signs of Cancer

S. No.	Subject	Response in Number and Percentage
1.	Liable Risk Age for Cancer	20-29 = 56 (18.6%)30-39 = 43 (14.3%)40-49 = 71 (23.6%)50-59 = 69 (23%)
2.	Most Common Cancer Types in Females	Blood = 209 (69.6%) Breast = 34 (11.3%) Cervical = 17 (5.6%) Lung = 21 (7%)
3.	Most Common Cancer Types in Males	Prostate = 107 (35.6%) Bladder = 103 (34.3%) Colorectal = 64 (21.3%) Lung = 17 (5.6%)

Table 3 Summary: The data shows significant awareness of blood cancer in females (69.6%) and prostate cancer in males (35.6%), consistent with the findings of studies that identified breast and prostate cancers as common knowledge areas (Noreen et al., 2015; Liu et al., 2014). However, only 11.3% of students identified breast cancer as a standard type among women, indicating a gap in knowledge about gender-specific cancers. This aligns with previous research, which highlights gaps in awareness of less common cancers among younger populations (Wu et al., 2013).

Table 4

Awareness of Risk Factors for Cancer

S. No.	Subject	Response in Number and Percentage
1.	Cigarette Smoking	Strongly Agree = 55 (18.33%) Agree = 79 (26.33%) Neutral = 46 (15.33%) Strongly Disagree = 101 (33.66%)
2.	Passive Smoking	Strongly Agree = 31 (10.33%) Agree = 22 (7.33%) Strongly Disagree = 178 (59.33%)
3.	Alcohol	Strongly Agree = 159 (53%) Agree = 66 (22%) Neutral = 23 (7.66%)
4.	Low Fruit Consumption	Strongly Agree = 13 (4.3%) Agree = 24 (8%) Neutral = 193 (64.33%)
5.	Weight Gain	Strongly Agree = 44 (14.66%) Agree = 61 (20.33%) Neutral = 77 (25.66%)

Table 4 Summary: Awareness of common cancer risk factors, such as smoking (53%) and alcohol consumption (53%), was higher than awareness of dietary risk factors. However, awareness of low fruit consumption as a cancer risk factor was particularly low (4.3%), which is consistent with findings from Al-Maqrashi et al. (2017), who suggested that lifestyle-related risks are often underappreciated, especially among younger students.

Perception of Cancer Signs

Table 5

Perception of Factors That Increase the Risk of Cancer

S. No.	Subject	Response in Number and Percentage
1.	Cyst presence is a Sign of Cancer	Agree = 34 (11.33%) Disagree = 77 (25.66%) Neutral = 189 (63%)
2.	Complaining of Unknown Pain as a Sign of Cancer	Agree = 67 (22.33%) Disagree = 119 (39.66%) Neutral = 114 (38%)

S. No.	Subject	Response in Number and Percentage
3.	Bleeding as a Sign of Cancer	Agree = 49 (16.33%) Disagree = 171 (57%) Neutral = 80 (26.66%)
4.	Cough/Sore Throat as a Sign of Cancer	Agree = 89 (29.66%) Disagree = 47 (15.66%) Neutral = 164 (54.66%)
5.	Weight Loss as a Sign of Cancer	Agree = 115 (38.33%) Disagree = 29 (9.66%) Neutral = 156 (52%)

Table 5 Summary: The perception of cancer signs varied, with 38.33% identifying weight loss as a potential sign of cancer, which aligns with the findings of Goyal et al. (2004), who noted that weight loss is a commonly recognised sign. However, cyst presence as a sign of cancer was poorly recognised (11.33%), reflecting a gap in knowledge about less common cancer symptoms (Carlson & Gonzalez, 2014). The high percentage of uncertainty (63%) regarding cysts, pain, and bleeding as cancer signs points to a need for further education on less obvious cancer symptoms (Sambanje & Mafuvadze, 2012).

Awareness of Cancer Screening and Testing

Table 6

Awareness of Cancer Tests and Common Ages for Screening

S. No.	Subject	Response in Number and Percentage
1.	Tests Available for Cervical Cancer	Agree = 203 (67.66%) Disagree = 46 (15.33%) Neutral = 51 (17%)
2.	Common Age for Cervical Cancer Test	Below 30 = 91 (30%)30-50 = 45 (15%) Above 50 = 99 (33%)
3.	Tests Available for Stomach Cancer	Agree = 87 (29%) Disagree = 112 (37.33%) Neutral = 101 (33.66%)

Table 6: Summary: While 67.66% of students were aware of cervical cancer tests, awareness of the correct age for screening was low, with only 30% recognising the appropriate age for cervical cancer testing. This finding supports research that indicates a lack of awareness about cancer screenings among students, especially for those without direct exposure to health education (Basch et al., 2017).

Chi-Square Test Results and Analysis: Educational Class Level and Cancer Awareness (Chi-Square Results)

Table 7

Educational Class Level *versus* Perception of Cysts as a Cancer Sign

Cyst Presence as a Sign of Cancer	Agree	Disagree	Neutral	Total
1st Year: Medical	34	77	58	169
1st Year: Engineering	0	0	32	32
2nd Year: Medical	0	0	76	76
2nd Year: Engineering	0	0	23	23
Total	34	77	189	300

Chi-Square Test Result: Pearson Chi-Square = 136.574, $p < 0.001$

This significant result indicates that first-year medical students demonstrated a better understanding of cysts as a sign of cancer, which is consistent with previous research highlighting the role of academic background in shaping cancer awareness (Tørring et al., 2011).

Results from the analysis reveal that pre-engineering students do not understand cancer as much as pre-medical students. The test findings indicate that having training in medical fields is a key factor in forming cancer knowledge. The data from this study agree with past research, which has suggested that

greater cancer education should be provided in schools for students in all academic areas (Walter et al., 2012).

Targeted educational campaigns focusing on early cancer signs, risk factors, and screening could help bridge this knowledge gap, ultimately aiding in the early detection and prevention of cancer. The integration of cancer education into school curricula for non-medical students may lead to greater awareness and proactive health-seeking behaviours in the long term.

Findings

The research involved 300 participants, most around the ages of 17 to 19 (90.3%), most single (97.3%), mainly taking medical courses (81.6%), and a minority following engineering. Some participants (18.4%) said they had learned about cancer through family or social experiences.

Almost two-thirds (55.6%) of those surveyed were able to identify early signs of cancer. There were, however, many important gaps and misunderstandings. For example, not many participants were sure if having a cyst indicates cancer, and numerous participants thought that unexplained pain and bleeding are signs of cancer. Because of this, it would be helpful to improve the way educational material mentions common cancer symptoms.

Only a small percentage (32.8%) of people thought of cancer as a risk for the 18-39 age group, while people aged 40-59 were seen by the highest percentage (46.6%) as likely to have cancer. Females were much more aware of blood cancer (69.6%) than were males (35.6%), and on the other hand, males had a higher recognition of prostate cancer (35.6%). They suggest that people understand some gender-related cancers, yet recognising various other types of cancer is important.

Study participants thought smoking was a major cancer risk, with 44.66% mentioning it, and 75% believed alcohol was also risky. Lesser-known risks were linked to diet, like not having enough fruits, and to sunburn when young. It shows that we now recognise many types of traditional risk factors, yet we have limited information on the role of nutrition and environmental conditions.

People knew some information about cancer screening, although it was not clear. About three-fifths knew about cervical cancer testing, and a lot believed early screening was between 20 and 29 years old. Gastric cancer screening was not widely recognised, as just 29% knew tests were offered. Because of this gap, sharing detailed information about screening should be a priority for young adults.

According to the statistics, education level played a significant role in cancer symptom and risk awareness ($p < 0.001$ for various indicators). Medical students demonstrated that they know cysts and bleeding can also have other meanings besides cancer, while engineering students were more likely to say they were not sure. In addition, medical students were better at knowing the most common kinds of cancer and their proper screening ages. It means that learning activities in the classroom can affect students' knowledge of cancer, so educational programmes should be adjusted to students' previous education.

The research shows that cancer awareness is average for male university students, and medical students tend to know more, probably because they learn about it in their studies. There are still many incorrect beliefs about symptoms and risk factors, which might delay finding problems and getting screened on time. Because awareness of screening varies, it is even more important to increase educational efforts for the public.

They confirm that planned health education programmes are essential for filling in general and particular knowledge gaps. Cancer education could be incorporated into the standard curriculum, and useful information could be spread through the campus's health initiatives to inform students more fully. Also, involving peer education and online resources could help students from various subjects.

Conclusion

The results emphasise how critical it is to raise cancer awareness among college students in many different disciplines. Since cancer is a significant health challenge worldwide, we should develop educational programmes to fill in the knowledge gaps noted in this study. It is clear from the findings that some

students are aware of the basic risks from smoking and drinking alcohol, but many are not familiar with other warning signs of cancer or things they can do to lessen their risk. The study also suggests that those with medical or scientific training are better informed about cancer than those in other fields. It demonstrates why we need to integrate cancer education into other kinds of educational programmes so that students in different fields learn about cancer.

The research points out that technology is becoming more vital in health education. Online resources, mobile software, and SMS programmes can be very beneficial when used in addition to normal cancer education. With these techniques, organisations can contact a wider range of people, particularly young adults who mostly use the internet to learn about things. Family and community approaches can greatly increase the impact and reach of campaigns to prevent cancer. When we bring activities to students' families and communities, they can gain support for cancer awareness, choose healthier habits, and get help if they have any medical concerns.

Because cancer is gathering momentum and affects life and health systems for a long time, it is very important to improve cancer education programmes that respond to the diverse requirements of students. The study sets a foundation for the design of interventions that specifically benefit students who do not specialise in cancer, helping them learn more about it and find it sooner. It is important for cancer prevention strategies to inform students about risk factors and symptoms and to deal with any challenges that stop them from using health services.

In short, programmes aimed at undergraduates that use simple and accessible media play a key role in reducing the rising threat of cancer. The findings of this study highlight what college students understand about cancer. Its findings are important for cancer prevention and health education activities. The use of initiatives developed with inclusivity, accessibility, and interaction in mind will help raise cancer awareness and make it less likely for young adults to receive a diagnosis late. For this reason, it is necessary for policymakers, educators, and health specialists to unite and create strategies supporting active and concerned students.

Recommendations

1. Design and Implement Tailored Interventions for Adolescents

It is important to help adolescent students by developing and using actions that meet their needs and preferences. More public awareness should be created about cancer, the things that increase risk, warning signals, and how to prevent it. Learning programmes should be planned and tested together with schools, healthcare organisations, and people from the community. To reach more people, education providers should use online systems, mobile apps, and SMS. Furthermore, including young people in programmes at school and in the community encourages them to take action to promote their health.

2. Incorporation of Cancer Awareness in College Curricula

Cancer education should be integrated at the college level, mainly through health education courses. When cancer prevention, early detection, and health promotion are taught as part of the curriculum, students will better appreciate what cancer means for them. Talking about different cancers gives students the understanding and tools needed to notice early cancer symptoms. It would be beneficial in other disciplines, since students there are less likely to encounter much health education. Making cancer education a standard subject can build a generation that is knowledgeable about health and able to look after their health and make positive lifestyle choices.

3. Promotion of Public Health Campaigns Targeting Young Adults

Public health messages should be aimed at young adults, since they are critical years for forming habits that will shape someone's health over time. Such campaigns ought to explain that leading a healthy life by giving up tobacco, eating well, staying active, and shielding your skin from the sun can reduce your chances of developing cancer. Efforts should be made to involve young people using multiple online programmes, such as social media. Adopting health awareness early can decrease the chance of people's habits causing potential cancer problems later in life.

4. Enhancing Cancer Screening Awareness

Besides teaching about cancer risk, we also need to remind people to attend regular screenings and detect cancer as early as possible, especially for those diseases that are more treatable at an early stage. All educational programmes that mention cancer should highlight why cancer screening matters and the reasons why students need to seek medical advice when needed. Teaching students to arrange regular screenings can help lower the impact of cancer.

5. Collaboration Between Healthcare Providers and Educational Institutions

It is recommended that healthcare providers collaborate with educational institutions to organise various workshops, seminars, and awareness programmes on preventing and finding cancer. Students in these events can get to know healthcare professionals, ask anything they want, and join discussions on cancer and its prevention. When students team up, they can gain hands-on knowledge about cancers and be encouraged to make better health choices.

Research Limitations

Certain limitations need to be kept in mind when analysing the outcomes of this study. As the study consisted only of male students from public and private colleges in District Malakand, it may not be easy to generalise the results to other populations, especially to female students. Not having female students in the study leaves gaps in learning about their cancer prevention knowledge. Further studies need to consider both men and women to understand more about their cancer awareness. An additional constraint is that the research is set up as a cross-sectional study. The one-time data collected does not let us analyse changes in cancer awareness and habits over time. Checking cancer awareness and students' behaviours during different levels of education could tell us about the ways they learn and develop over time. What is more, students reported the results themselves, so they might have given answers that made them appear better than they were. Using techniques that evaluate activity objectively or using additional data should be part of future research to check self-reported information.

Future Research Directions in Cancer Awareness

Future research could focus on extending the sample to include male as well as female students, which would better represent the situation of cancer awareness in both genders. Representing a sample that provides for more regions and a mix of city and country dwellers would increase the general use of the findings. Studies that track changes over time could be used to explore how people's knowledge and actions on cancer matter. Researchers can find out how health interventions might affect students over the years by monitoring their understanding and actions throughout school. Studies should also examine how specific educational programmes affect how much people know about cancer. A possibility is to research how well mobile and online cancer awareness programmes improve students' understanding and actions. More needs to be done in terms of analysing the role of family and local programmes in reinforcing cancer prevention learning among young people. It is beneficial to look closely at specific types of cancer, such as breast or skin cancer, to understand awareness in more detail and set up campaigns aimed at them, as they are cancers that can be prevented in many cases.

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