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Adolescent Barriers to Understanding Cancer Information: A Qualitative Study

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ABSTRACT

Cancer-related information is widely accessible to adolescents through schools, families, social media, and their surrounding environment. However, increased access to information has not necessarily translated into adequate understanding. This study aimed to explore adolescents' experiences of the barriers they encounter in accessing and understanding cancer-related information. A qualitative study with a descriptive phenomenological approach was conducted. Eighteen Grade XII students from SMK Negeri 14 Medan were purposively selected and participated in semi-structured interviews. The data were analysed manually using Colaizzi's phenomenological method. The analysis identified three main themes: (1) difficulty understanding complex and diverse cancer information; (2) difficulty filtering and prioritising large volumes of cancer information; and (3) difficulty coping with uncertainty before developing an adequate understanding of cancer. These barriers were associated with fragmented and limited information, unfamiliar medical terminology, communication that was not tailored to adolescents' level of understanding, the broad scope of cancer-related topics, challenges in prioritising information, confusion in distinguishing between symptoms, prevention, and treatment, and the perception of cancer as an inevitable death sentence. The findings suggest that cancer information for adolescents should be communicated using clear, age-appropriate language, presented progressively, tailored to their lived experiences, delivered by trusted sources, and designed with consideration for adolescents' psychological needs. These findings provide valuable insights for the development of school-based cancer education programmes and adolescent-centred nursing interventions.

Keywords: Cancer; Health literacy; Health information; Teenagers

1. Introduction

Cancer is a major global health challenge, with its incidence continuing to rise and requiring attention across all stages of life. In 2022, an estimated 20 million new cancer cases were diagnosed worldwide, and this number is projected to increase further over the coming decade (Bray et al., 2024). Although cancer is more commonly associated with adulthood, many cancer-related risk behaviours begin to develop during adolescence. During this critical developmental stage, lifestyle behaviours, including dietary habits, physical activity, tobacco exposure, and healthcare practices, become established and often persist into adulthood (Mytton et al., 2024; Parada et al., 2025). Therefore, adolescents need health information that is not only accessible but also understandable, relevant, and applicable to their daily lives. Investing in adolescent health is essential for improving the health and well-being of future generations (WHO, 2024).

Health literacy helps explain why exposure to health information does not always result in meaningful understanding. It extends beyond simply being familiar with health-related terms and encompasses the ability to access, understand, evaluate, and apply health information in everyday life (WHO, 2025; Van Boxtel et

al., 2024). In the context of cancer, health literacy includes recognising risk factors, understanding warning signs, adopting preventive behaviours, and knowing when to seek appropriate medical care. Research has shown that adolescents' levels of health literacy remain uneven and are shaped by the social, behavioural, and informational environments in which they live (Zhong et al., 2026). Other studies suggest that although many adolescents are aware of cancer, this awareness does not necessarily translate into a comprehensive understanding of cancer symptoms, risk behaviours, or appropriate help-seeking decisions (Lawrence et al., 2025a).

The ways in which adolescents access health information have changed significantly in recent years. Digital platforms and social media have become increasingly important sources of health information, enabling adolescents to seek initial information and compare it with what they learn from schools, families, and their wider social environment (Amon et al., 2025; Seo et al., 2025). However, frequent use of digital media is not always accompanied by the ability to critically evaluate the credibility and quality of information sources. Health misinformation is widespread across social media platforms and can negatively influence adolescents' understanding of diseases, including cancer (Suarez-Lledo & Alvarez-Galvez, 2021; Chandrasekaran et al., 2024; Wang & Togher, 2024). In the context of cancer, exposure to misleading information on social media may reinforce misconceptions about risk factors, treatment options, and the disease itself, thereby increasing fear and uncertainty (Loeb et al., 2024).

Several studies have highlighted a gap between general awareness of cancer and more comprehensive knowledge. Although awareness of specific types of cancer may be relatively high, adolescents' understanding of cancer causes, symptoms, prevention, and appropriate follow-up remains limited (Avinu et al., 2026). A systematic review by Lawrence et al. (2025b) likewise found that adolescents generally have low awareness of cancer symptoms and encounter barriers when deciding whether to seek medical help. In contrast, school-based educational interventions have been shown to improve adolescents' recognition of cancer risk factors and symptoms (Al-Hosni et al., 2023). These findings suggest that the key challenge lies not only in the availability of information but also in how cancer-related information is organised, communicated, and understood by adolescents.

The way health information is communicated plays a crucial role in determining whether it is effectively understood by adolescents. High-quality communication, a sense of safety and privacy, and the use of age-appropriate language are key components of adolescent-friendly health services (Dayal & Gundi, 2022). In addition, digital technologies, interactive media, and communication approaches that align with adolescents' preferences and behaviours have the potential to strengthen health literacy when thoughtfully designed (Mancone et al., 2024; Turuba et al., 2024). Emerging artificial intelligence (AI)-based tools and digital health applications also offer promising opportunities to help adolescents access more relevant, personalised, and actionable health information (Ahamed et al., 2026; Ezeigwe et al., 2025). However, technology alone cannot overcome barriers to understanding. Information that is overly technical, densely presented, or fear-inducing may remain difficult for adolescents to comprehend, even when delivered through digital platforms that they use regularly.

Most previous studies have focused on assessing adolescents' knowledge of cancer, information-seeking behaviours, or the effectiveness of cancer education interventions. Although these studies provide valuable insights, they offer limited understanding of how adolescents experience the process of receiving and making sense of cancer-related information, particularly when that information is unfamiliar, fragmented, difficult to interpret, or evokes fear before it is fully understood. This gap is especially relevant among vocational high school (SMK) students in Indonesia, who are in late adolescence and increasingly expected to make independent health decisions as they prepare to enter the workforce or pursue higher education. A preliminary study conducted at SMK Negeri 14 Medan found that adolescents were exposed to cancer-related information incidentally through classroom learning, health counselling, social media, family members, and their surrounding environment rather than through structured cancer education programmes. Within the same context, behaviours associated with an increased risk of cancer, such as smoking and frequent fast-food consumption, were also identified. These findings suggest a disconnect between exposure to cancer-related risk factors, the availability of health information, and adolescents' ability to interpret and apply that information meaningfully. The novelty of this study lies in its phenomenological exploration of how vocational high school students experience and construct meaning from cancer-related information, rather than merely measuring knowledge levels or changes in scores following educational interventions. Therefore,

this study aims to explore the barriers adolescents encounter in receiving and understanding cancer-related information.

2. Methods

2.1 Design

This study employed a qualitative design using a descriptive phenomenological approach. This approach was selected to explore and describe adolescents' lived experiences as they perceived, interpreted, and sought to understand cancer-related information, without imposing theoretical interpretations on their accounts. Semi-structured interviews provided participants with the opportunity to share their experiences in their own words and from their own perspectives. Throughout the data collection and analysis process, the researchers engaged in reflective journaling to identify and bracket their preconceptions, thereby enhancing reflexivity. Data were analysed manually following Colaizzi's phenomenological method, which involved repeated reading of the transcripts, identification of significant statements, formulation of meanings, clustering of themes, and development of an exhaustive description of the phenomenon. The study is reported in accordance with the Consolidated Criteria for Reporting Qualitative Research (COREQ) to enhance the transparency and rigour of the research process.

2.2 Setting

The study was conducted at SMK Negeri 14 Medan, Indonesia. This site was selected based on preliminary findings indicating that students had been exposed to cancer-related information through classroom learning, health counselling, social media, family members, and their surrounding environment. However, this exposure occurred incidentally rather than through a structured cancer education programme. Preliminary observations also identified behaviours associated with an increased risk of cancer, including smoking and frequent fast-food consumption. These contextual characteristics provided an appropriate setting for exploring the relationships between exposure to cancer-related information, adolescents' experiences of understanding health messages, and behaviours associated with cancer risk. The study site was not intended to be representative of all vocational high schools in Indonesia; rather, it was purposively selected to facilitate an in-depth exploration of the phenomenon within a specific contextual setting.

2.3 Participants

Participants were recruited using purposive sampling. The inclusion criteria were: (1) Grade XII students aged 17–19 years; (2) ability to communicate in Indonesian; (3) willingness to participate in an interview; and (4) prior exposure to cancer-related information and experience of attempting to understand it. Grade XII students were selected because they are in late adolescence, possess relatively well-developed reflective and verbal abilities to articulate their experiences, are increasingly independent in accessing and evaluating health information, and are preparing to transition to either higher education or the workforce. These developmental characteristics made them particularly suitable for exploring how adolescents interpret, construct meaning from, and respond to information about cancer. A total of 18 students participated in the study, comprising nine females and nine males. Participant recruitment was facilitated by the school, which assisted in identifying students who met the inclusion criteria. However, participation was entirely voluntary. All eligible students were informed of their right to decline participation or withdraw from the study at any time without penalty or adverse consequences.

2.4 Data collection

Data were collected between October and December 2022 through semi-structured, face-to-face interviews conducted in a private setting within the school. Each interview lasted approximately 45–60 minutes and was audio-recorded with participants' informed consent. The interviews were conducted by the first author, who has experience in qualitative research and was responsible for the preliminary data analysis. To enhance reflexivity, the researcher maintained reflective memos throughout the research process, documenting preconceptions, emotional responses, emerging insights, follow-up questions, and analytical decisions. The interview guide focused on participants' sources of cancer-related information, their emotional responses to receiving such information, their understanding of the information they had received, and the aspects they found most difficult to understand. Follow-up questions were used flexibly to explore where, from whom, and through which media participants obtained cancer-related information, while also clarifying responses, eliciting concrete examples, and encouraging richer descriptions of their lived experiences.

Table 1. Interview guidelines

Interview questions
1. Where, from whom, and what media did you get cancer information?
2. How do you feel when you hear cancer information?
3. What extent is the cancer information you receive understandable?
4. What part of the cancer information is the most difficult for you to understand?

2.5 Data analysis

Data analysis began concurrently with data collection and continued after all interviews had been completed. Audio recordings were transcribed verbatim and read repeatedly to achieve immersion in the data and gain a comprehensive understanding of participants' accounts. The first author conducted the initial manual analysis following Colaizzi's phenomenological method, which involved identifying significant statements, formulating meanings, clustering meanings into categories and themes, developing an exhaustive description of the phenomenon, and deriving its essential structure. The emerging codes, categories, themes, and their supporting quotations were subsequently reviewed through regular discussions with the research team until consensus was reached. Field notes, reflective memos, and a theme–quotation matrix were used to maintain an audit trail and enhance the transparency of the analytical process. Participant recruitment ceased when data saturation was achieved, as indicated by repetitive information and the absence of new themes.

2.6 Trustworthiness

The trustworthiness of the study was ensured through several strategies based on Lincoln and Guba's criteria. Credibility was enhanced through repeated reading of the interview transcripts, the use of verbatim participant quotations, and real-time confirmation of meaning at the end of each interview. During this process, the interviewer summarised the key points from the participants' responses and invited them to confirm, clarify, correct, or elaborate on their accounts. This approach served as an immediate clarification of participants' intended meanings during the interview rather than as a formal member-checking procedure involving the return of complete transcripts or findings. Source triangulation involving teachers, parents, or documentary data was not undertaken because the study focused specifically on adolescents' lived experiences of receiving and understanding cancer-related information. Dependability and confirmability were supported through the maintenance of an audit trail documenting the analytical process, including the relationships among significant statements, codes, categories, themes, and supporting quotations. Transferability was enhanced by providing a rich description of the research setting, participant characteristics, sources of exposure to cancer-related information, and sufficient illustrative quotations, enabling readers to determine the applicability of the findings to other contexts.

2.7 Ethics

Ethical approval for this study was obtained from the Medical and Health Research Ethics Committee, Faculty of Medicine, Public Health, and Nursing (FKKMK), Universitas Gadjah Mada (Approval No. KE/FK/1360/EC/2022). All participants received detailed information about the study's objectives, interview procedures, potential benefits and minimal risks, data confidentiality, and their right to decline to answer any question or withdraw from the study at any time without any adverse consequences. In accordance with the approved ethical protocol, participants aged 18–19 years provided written informed consent independently. For participants aged 17 years, written assent was obtained from the participants, together with written informed consent from their parents or legal guardians. To protect participants' privacy and confidentiality, all identifying information was removed, and participants were assigned identification codes (P1–P18) throughout the study.

3. Results

3.1 Characteristics of participants

A total of 18 adolescents completed the interview process, comprising nine females and nine males aged 17–19 years. Participants reported obtaining cancer-related information from a variety of sources, including classroom learning and health counselling at school, social media, family members, peers, and their surrounding environment. The sources and frequency of information exposure varied across participants. Some recalled only brief or fragmented explanations, whereas others had read online content or learned about

cancer through the experiences of people around them. Despite these differences, all participants had been exposed to cancer-related information and had attempted to make sense of aspects they found difficult to understand, making their experiences highly relevant to the phenomenon under investigation. Most participants demonstrated a general awareness that cancer prevention involves adopting healthy lifestyle behaviours, such as eating a balanced diet, avoiding tobacco use, maintaining personal hygiene, and engaging in regular physical activity. However, their understanding remained superficial and was not consistently linked to cancer risk factors, warning signs, early detection, or appropriate help-seeking. An overview of participants' demographic characteristics is presented in **Table 2**, while the themes and subthemes identified through the analysis are summarised in **Table 3**.

Table 2. Demographic Characteristics of Participants

No.	Participants	Gender	Age
1	P1	Women	17 years
2	P2	Women	17 years
3	P3	Women	17 years
4	P4	Women	17 years
5	P5	Women	18 years
6	P6	Male	17 years
7	P7	Male	18 years
8	P8	Male	18 years
9	P9	Male	17 years
10	P10	Women	17 years
11	P11	Male	17 years
12	P12	Women	17 years
13	P13	Women	17 years
14	P14	Women	17 years
15	P15	Male	17 years
16	P16	Male	18 years
17	P17	Male	17 years
18	P18	Male	19 years

3.2 Thematic findings

The analysis generated three overarching themes that captured adolescents' experiences of attempting to understand cancer-related information: (1) difficulty understanding complex and diverse cancer-related information; (2) difficulty filtering and prioritising extensive and complex cancer-related information; and (3) difficulty coping with uncertainty before developing an adequate understanding of cancer-related information. These themes represent interconnected aspects of adolescents' lived experiences rather than separate or isolated phenomena.

Table 3. Themes and Subthemes

Theme	Subtheme
Difficulty understanding complex and diverse cancer information	Cancer information is still minimal and unclear
	Medical terms are difficult to understand
	The language of delivery is not in line with the way teenagers communicate
Difficulty sorting through extensive and complex cancer information	Cancer material feels too broad
	Difficult to determine the most important information
	Confused between symptoms, prevention, and treatment
Difficulty coping with uncertainty before understanding cancer information	Fear of cancer
	Cancer is interpreted as a threat of death
	Prevention is still generally understood

Theme 1. Difficulty understanding complex and diverse cancer information

This theme describes participants' initial experiences of encountering cancer-related information that was fragmented, delivered inconsistently, and communicated using unfamiliar terminology. Participants perceived not only that the information they received was limited but also that it failed to provide a coherent understanding of what cancer is, why it develops, and what actions should be taken. Their experiences are reflected in three interrelated subthemes: (1) limited and fragmented cancer-related information; (2) unfamiliar medical terminology; and (3) communication that was not aligned with adolescents' everyday language.

Subtheme 1. Cancer information is still minimal and unclear

Participants obtained cancer-related information from schools, social media, family members, peers, and their wider social environment. However, these sources provided information in an incidental and fragmented manner rather than through structured and continuous educational experiences. When information was encountered only occasionally or presented too briefly, participants found it difficult to connect one explanation with another and develop a coherent understanding of the topic. Although they were familiar with the term *cancer*, they did not feel sufficiently knowledgeable to explain the disease confidently or understand its key concepts.

"There has been very little education about cancer. So far, we have rarely received detailed and comprehensive information, so our understanding of cancer remains limited and incomplete." (P1)

"The information about cancer that I have received is still unclear. Sometimes the explanations are too brief, so I don't fully understand what they mean." (P5)

"The information about cancer that I have received is still insufficient. I know a few things in general, but I have not received a more complete explanation about cancer." (P9)

Subtheme 2. Medical terms are difficult to understand

For participants, Latin terminology, scientific names for different types of cancer, and clinical vocabulary represented barriers to understanding at the lexical level. They often felt the need to remember unfamiliar terms before they could understand their meanings. As a result, the information was easily forgotten, and participants reported needing explanations in simpler, more familiar language before they could fully comprehend it.

"I have difficulty remembering the Latin terms used to explain cancer. They sound unfamiliar and are difficult for me to understand and remember." (P2)

"The scientific names used for different types of cancer are difficult for me to understand. It is much easier for me when they are explained again in simple, everyday language." (P8)

Sub-theme 3. The language of delivery is not appropriate for the way teenagers communicate

The difficulty arose not only from unfamiliar terminology but also from the way the information was organised and communicated. Participants described formal language, overly concise explanations, and a lack of examples relevant to adolescents' everyday lives as barriers to understanding the intended meaning of the information. They reported that explanations were much easier to follow when the language, examples, and scenarios reflected their daily experiences and were presented in ways that were familiar and relatable.

"I don't understand the language used by doctors, especially the medical or Latin terms. Cancer information would be much easier for me to understand if it were explained in simpler language." (P4)

"The information about cancer is difficult to understand and remember. It would be easier to remember if the explanations included examples that are relevant to teenagers." (P10)

Theme 2. Difficulty sorting through extensive and complex cancer information

After receiving cancer-related information, participants encountered a second challenge: organising information and understanding the relationships among its different components. Information about symptoms, risk factors, cancer types, diagnosis, staging, prevention, and treatment was perceived as equally important but was not presented in a logical or easily understandable sequence. As a result, participants felt overwhelmed, were uncertain about where to begin, and struggled to distinguish the purpose and relevance of each type of information.

Subtheme 1. Cancer material feels too broad

Participants described cancer as a topic encompassing a wide range of disease types, causes, symptoms, stages, and treatment options. The breadth of this information made it difficult for them to develop a coherent understanding, even when explanations were provided. Rather than building progressively towards a comprehensive understanding, information that should have complemented one another was often presented simultaneously, resulting in cognitive overload and making the material more difficult to comprehend.

> *"There are so many types of cancer and so much information about how to prevent them that it's difficult to understand everything. The different cancer types, causes, and preventive measures made it confusing." (P1)*
>
> *"The information about cancer covered many topics at once, including symptoms, the diagnostic process, disease staging, and treatment. Because all of this information was presented simultaneously, I found it difficult to understand." (P14)*
>
> *"I was confused about the factors that affect cancer treatment and how the disease is treated, so I didn't know which information I should learn first." (P6)*

Subtheme 2. Difficult to determine the most important information

When multiple topics were presented simultaneously, participants struggled to determine which information should be understood first. They had not yet developed a conceptual framework that distinguished among foundational knowledge, warning signs, preventive measures, diagnostic processes, and treatment options. Consequently, their attention shifted from one topic to another without developing an integrated understanding that could be applied in practice.

> *"The symptoms, diagnosis, stages, and treatment of cancer were all explained at the same time. There was too much information to understand at once. I became confused and found it difficult to distinguish between the symptoms, the diagnostic process, the stage of the disease, and the available treatments." (P4)*
>
> *"I was confused about the factors that increase the risk of developing cancer and how the disease is treated. I didn't have a clear understanding of the relationship between risk factors, preventive measures, and what someone should do if they are diagnosed with cancer." (P12)*

Sub-theme 3. Confused between symptoms, prevention, and treatment

Participants experienced confusion when attempting to distinguish among three categories of information that served different purposes. Information about symptoms is intended to help individuals recognise warning signs, preventive information explains how to reduce cancer risk, and treatment information relates to care after a diagnosis has been established. However, participants described these categories as frequently overlapping or being presented without clear distinctions, leaving them uncertain about which actions were appropriate at different stages of the disease or prevention process.

> *"I'm still confused about how to prevent cancer. I know that maintaining a healthy lifestyle is important, but I still don't clearly understand what specific actions can reduce the risk of developing cancer." (P3)*
>
> *"I'm still confused about the factors that can affect cancer treatment and how the disease can be managed. The information I received did not clearly explain what steps should be taken if someone is diagnosed with cancer." (P16)*

Theme 3. Facing fear and uncertainty before understanding is formed

This theme suggests that emotional responses often emerged before participants had developed a sufficient understanding of cancer. Upon hearing about cancer, participants immediately associated it with severe illness, suffering, and death. Uncertainty about cancer symptoms, preventive measures, and treatment options appeared to reinforce these fears, while participants' understanding of cancer prevention remained limited to general recommendations for maintaining a healthy lifestyle.

Subtheme 1. Fear of cancer

For many participants, the word *cancer* immediately evoked feelings of fear, apprehension, and the perception of a disease that is difficult to treat. These emotional responses were not necessarily based on personal experience but were also shaped by broader narratives encountered through family, the community, traditional media, and social media. Before discussing more specific aspects of cancer, participants consistently described it as a highly serious and life-threatening disease.

"I was scared when I first learned about cancer. Hearing the word cancer made me think of a serious disease that is difficult to treat." (P10)
"I immediately felt worried when I heard about cancer. It made me more cautious because cancer can develop without people realising it and can have serious consequences for their health." (P5)
"Cancer is a serious and life-threatening disease. It feels frightening because it can progress and put a person's life at risk." (P7)

Subtheme 2. Cancer is interpreted as a threat of death
Participants associated cancer with the possibility of death before discussing early detection or available treatment options. This interpretation suggests that, in the absence of a clear understanding of other aspects of the disease, death becomes the most salient image associated with cancer. As a result, participants perceived cancer as a condition that could affect anyone and therefore viewed it as an immediate, serious, and unavoidable threat.

"Cancer can lead to death if it is not treated properly. Therefore, it should not be ignored and needs to be treated as early as possible." (P13)
"Cancer is a disease that can affect anyone and can be life-threatening. Because of that, I consider cancer to be a very dangerous disease." (P18)

Sub-theme 3. Prevention is still generally understood
Despite expressing fear about cancer, participants demonstrated some prior knowledge of healthy lifestyle behaviours. They identified healthy eating, avoiding smoking, engaging in regular physical activity, and reducing exposure to harmful chemicals as important preventive measures. However, this knowledge remained general and was not accompanied by an understanding of how specific behaviours influence cancer risk, which warning signs require medical attention, or when and how professional healthcare should be sought.

"Cancer can be prevented by eating a healthy diet, avoiding smoking, and exercising regularly. Maintaining a healthy lifestyle helps keep the body healthy and may reduce the risk of developing cancer." (P11)
"Cancer can be prevented by eating healthy foods and reducing exposure to harmful chemicals. Paying attention to the food we eat and the substances we are exposed to in daily life, in my opinion, can help maintain good health." (P15)
"Cancer can be prevented by limiting the consumption of fast food and exercising regularly to maintain good health and reduce the risk of disease." (P17)

Overall, participants' accounts described a sequence of experiences that began with encountering unfamiliar and fragmented information, progressed to confusion in organising and interpreting that information, and ultimately culminated in fear and the perception of cancer as a life-threatening disease closely associated with death.

4. Discussion

The findings of this study suggest that adolescents' barriers to understanding cancer-related information arise when information is presented in a limited, fragmented, or unfamiliar manner. Such information provides an insufficient foundation on which adolescents can build a coherent understanding of new concepts. When information about symptoms, risk factors, diagnosis, cancer staging, prevention, and treatment is presented simultaneously without a clear organisational structure, adolescents struggle to organise, prioritise, and integrate what they have learned. In the absence of a well-developed knowledge framework, participants' understanding became dominated by the most emotionally salient interpretation of cancer, as a frightening disease closely associated with death. This strong emotional response may lead adolescents to focus primarily on threatening aspects of cancer while giving less attention to messages about prevention, early detection, and appropriate help-seeking. In contrast, information that is communicated clearly, progressively, and in ways that are relevant to adolescents' everyday experiences can reduce uncertainty and support more thoughtful processing of health information. Viewed through the lens of health literacy, these findings demonstrate that access to information alone does not necessarily enable adolescents to understand, critically evaluate, and apply health information in their daily lives (Van Boxtel et al., 2024; WHO, 2025).

Participants' accounts of limited counselling, brief explanations, and incomplete information highlight a gap between the availability of information channels and the accessibility of meaningful understanding. Although adolescents were exposed to cancer-related information through schools, families, social media,

and their wider social environment, this exposure was often incidental and fragmented rather than systematic. Consequently, the information they received did not develop into a coherent understanding of fundamental issues, such as what cancer is, which risk factors are relevant to adolescents, which warning signs require attention, and when professional medical advice should be sought. These findings suggest that access to health information should be evaluated not only by the number of available information sources but also by the continuity, clarity, coherence, and practical usefulness of the messages conveyed. The vocational school context further strengthens the significance of these findings. As adolescents approach adulthood, they increasingly make independent health-related decisions, yet participants described receiving cancer information at school in an unstructured manner. Consequently, they were required to integrate information from multiple sources that differed in credibility, completeness, and depth. Previous research has shown that adolescents are active users of digital platforms for seeking health information, but their ability to evaluate and compare information is strongly influenced by their social environment and prior experiences (Amon et al., 2025; Seo et al., 2025). These findings therefore underscore the importance of school-based cancer education as a structured reference framework that helps adolescents interpret, evaluate, and integrate information obtained from multiple sources.

Unfamiliar medical terminology created a semantic gap between professional health knowledge and adolescents' everyday understanding. Participants not only struggled to remember scientific terms but also found it difficult to connect those terms with their practical meanings. When cognitive effort is directed primarily towards recognising unfamiliar terminology, fewer cognitive resources remain available for understanding causal relationships, recognising symptoms, evaluating risks, and identifying appropriate actions. As a result, cancer-related knowledge may be reduced to a collection of memorised terms rather than a meaningful and usable understanding. These findings suggest that the use of clear, age-appropriate language is a fundamental component of effective health communication rather than merely a matter of simplifying style. Medical terminology should be introduced only when necessary and should be accompanied immediately by plain-language explanations, concrete examples, and opportunities for adolescents to confirm their understanding. Healthcare professionals and educators can encourage adolescents to explain information in their own words to identify misunderstandings and clarify any remaining gaps in comprehension. This approach is consistent with evidence highlighting the importance of high-quality communication and language appropriateness in adolescent-friendly health services (Dayal & Gundi, 2022).

Participants' requests for examples that reflected adolescents' everyday experiences suggest that comprehension depends not only on the complexity of the language used but also on the relevance of the context in which information is presented. Messages that explain cancer risks through familiar situations, such as exposure to cigarette smoke, dietary choices, physical activity, or seeking health information through social media, are more readily connected to adolescents' daily lives. This contextual relevance helps adolescents recognise that cancer is not a distant or abstract issue but one that is directly relevant to their own health and future well-being. Using age-appropriate language does not require compromising scientific accuracy. Instead, the challenge is to translate medical concepts into language that adolescents can understand without altering their meaning, while encouraging open dialogue and providing opportunities to discuss questions that may be perceived as sensitive or frightening. Non-judgemental communication, respect for privacy, and acknowledgement of adolescents' emotional concerns can foster a greater sense of psychological safety and encourage active participation in health discussions (Dayal & Gundi, 2022). Similarly, digital and interactive educational media can enhance engagement and understanding when they are designed around adolescents' learning preferences and communication habits, rather than simply transferring dense medical information onto digital platforms (Mancone et al., 2024; Turuba et al., 2024).

The breadth of cancer-related information emerged as a significant barrier because participants were exposed to numerous topics without a clear organisational framework. In their experiences, information about cancer types, causes, symptoms, stages, diagnosis, prevention, and treatment was often presented as a large body of disconnected content that seemed to require understanding all at once. The primary challenge was therefore not simply the volume of information, but the absence of a conceptual framework that explained how these different components were related. Without such a framework, adolescents with limited prior knowledge experienced greater cognitive burden and frequently felt overwhelmed when attempting to make sense of the information. These findings suggest that cancer education should be organised in a progressive and structured manner. Initial learning should focus on fundamental concepts of cancer and clearly distinguish among risk factors, warning signs, diagnosis, and prevention. Once this conceptual foundation has been established, education can expand to include preventive behaviours, appropriate

responses to potential symptoms, and an overview of available treatment options. More detailed information about specific cancer types, staging, or treatment approaches can then be introduced as adolescents develop a stronger understanding of the subject. Previous research has shown that structured educational interventions improve adolescents' recognition of cancer risk factors and warning signs (Al-Hosni et al., 2023). The present findings extend this evidence by demonstrating, from adolescents' lived experiences, why a clear and progressive educational structure is essential for meaningful understanding.

Participants' difficulty in prioritising cancer-related information suggests that they had not yet developed a sufficiently organised knowledge framework. As a result, they struggled to distinguish between information needed for maintaining health and preventing disease, information that helps recognise warning signs requiring medical attention, and information that becomes relevant only after a cancer diagnosis. Without a clear hierarchy of information, all topics appeared equally important, making it difficult for adolescents to identify an appropriate starting point for understanding cancer. This lack of prioritisation may also discourage adolescents from seeking further explanations or lead them to focus disproportionately on the most dramatic or emotionally charged aspects of cancer rather than on information that is most relevant to prevention and early detection.

Education should adopt an action-oriented approach that prioritises the knowledge and skills adolescents need to make informed health decisions. Initial educational content should focus on modifiable cancer risk factors, warning signs that require attention, how to identify trustworthy sources of health information, and appropriate help-seeking pathways. More detailed topics, such as diagnosis, cancer staging, and treatment, can then be introduced as adolescents develop a stronger conceptual understanding. This progressive sequence helps transform abstract knowledge into practical guidance for health-related decision-making. The low awareness of cancer symptoms and the barriers to help-seeking reported among adolescents by Lawrence et al. (2025a, 2025b) may, in part, reflect the way cancer information is commonly organised and presented. When educational messages are not structured around practical decision-making, adolescents may struggle to translate general knowledge into appropriate health actions.

Fear emerged as the most immediate emotional response among participants. They commonly described cancer as a serious disease that is difficult to treat and may develop without obvious symptoms. This emotional response has both adaptive and maladaptive implications. On one hand, a certain degree of concern may encourage greater health awareness and vigilance. On the other hand, when communication focuses primarily on the severity of the disease without providing clear guidance on preventive actions or available support, fear may develop into anxiety, avoidance, or the uncritical acceptance of inaccurate information. These findings suggest that effective cancer communication should balance information about risk with messages that strengthen adolescents' confidence in their ability to take appropriate action. Discussions of the seriousness of cancer should therefore be accompanied by practical information about prevention, early detection, appropriate help-seeking, and available sources of support. An emotionally supportive communication approach does not minimise the seriousness of cancer; rather, it avoids framing the disease in ways that leave adolescents feeling helpless or powerless. This is particularly important in digital environments, where sensationalised content and health misinformation can amplify fear without improving understanding (Loeb et al., 2024; Wang & Togher, 2024).

Participants' perception of cancer as a disease inevitably leading to death reflects the meanings they constructed when information about disease progression and treatment opportunities was incomplete or unbalanced. Although cancer is a serious and potentially life-threatening condition, equating it directly with death creates a deterministic view that overlooks the potential benefits of early detection, timely treatment, and advances in cancer care. Such perceptions may discourage adolescents from recognising that many cancers can be managed more effectively when identified at an early stage. These findings help explain the gap between general awareness and more comprehensive knowledge of cancer. Adolescents may recognise that cancer is a serious disease while remaining unable to identify its warning signs, understand relevant risk factors, or determine when professional medical advice should be sought (Avinu et al., 2026; Lawrence et al., 2025a). Therefore, cancer education should present a balanced and evidence-based perspective that acknowledges the seriousness of the disease while also emphasising that outcomes vary according to cancer type, stage at diagnosis, treatment response, and the benefits of early detection and timely intervention.

Participants' awareness of healthy eating, regular physical activity, and smoking avoidance provides an important foundation for cancer prevention education. However, the findings indicate that although adolescents possessed basic knowledge of these healthy behaviours, their understanding remained largely at the level of general health recommendations. The links between specific behaviours and cancer risk, as well

as knowledge of warning signs, early detection, and appropriate help-seeking pathways, were often unclear. Consequently, this general awareness had not yet developed into the ability to critically evaluate health information or make informed health-related decisions. These findings suggest that cancer education should build on adolescents' existing knowledge while helping them understand the underlying rationale, practical implications, and limitations of preventive recommendations (Van Boxtel et al., 2024; WHO, 2025). For example, messages encouraging adolescents to avoid smoking should explain the risks associated with both active and passive smoking, the health benefits of never initiating or quitting tobacco use, and practical strategies for resisting peer pressure. Similarly, recommendations about healthy eating should be translated into realistic dietary choices that adolescents can adopt at home and at school. Through this approach, cancer prevention can move beyond simple health messages and become a meaningful basis for informed decision-making and sustained healthy behaviours.

Schools can serve as an important setting for delivering consistent and developmentally appropriate cancer education. Educational programmes should introduce cancer-related concepts progressively, beginning with basic knowledge, risk factors relevant to adolescents' daily lives, common warning signs, preventive behaviours, strategies for evaluating the credibility of digital health information, and appropriate help-seeking practices. The content should be delivered using age-appropriate language, relatable examples, visual materials, case-based discussions, and interactive questioning to enhance engagement and understanding. Rather than presenting information on all types of cancer simultaneously, educational programmes should provide adolescents with a clear conceptual framework that enables them to interpret, evaluate, and integrate new cancer-related information as they encounter it.

School nurses, community nurses, and other healthcare professionals play a vital role in translating complex medical information into language that adolescents can understand while also creating a supportive and emotionally safe learning environment. Effective educational practice should begin with an assessment of adolescents' existing knowledge, beliefs, and concerns about cancer. Healthcare professionals should avoid unexplained medical terminology, present information in manageable sections, encourage adolescents to explain their understanding in their own words, and address misconceptions in a supportive and non-judgemental manner. Emotional responses should also be acknowledged and validated before introducing additional information, as adolescents who experience high levels of fear or anxiety may be less able to process complex health information effectively. Digital platforms remain an important channel for delivering cancer-related information because they are embedded in adolescents' everyday lives. However, adolescents also need to develop digital health literacy skills that enable them to evaluate the credibility of online information sources. Educational materials should therefore be concise, visually engaging, interactive, and linked to reliable official sources. Artificial intelligence–based technologies also offer considerable potential to provide personalised explanations and educational support. Nevertheless, their use should be guided by evidence-based information, transparency regarding their limitations, and recognition that they are intended to complement, not replace, consultation with qualified healthcare professionals (Ahamed et al., 2026; Ezeigwe et al., 2025). Without adequate digital health literacy, social media may function not only as a valuable source of health information but also as a source of confusion and misinformation (Suarez-Lledo & Alvarez-Galvez, 2021; Loeb et al., 2024).

Limitation

This study has several limitations. First, it was conducted in a single vocational high school, meaning that participants' experiences were shaped by the school's culture, social environment, and local context, which may differ from those of adolescents attending general secondary schools, Islamic boarding schools, or schools in rural or other geographical settings. Although purposive sampling enabled the recruitment of participants with direct experience of the phenomenon under investigation, it was not intended to produce findings that are statistically representative of the wider adolescent population. Second, the findings relied on participants' recollections and their ability to articulate past experiences, making them potentially susceptible to recall bias. In addition, conducting interviews within the school setting may have influenced participants' willingness to discuss sensitive topics, such as smoking, dietary habits, and other health-related behaviours. Third, formal member checking through the return of interview transcripts or interpreted findings was not undertaken, and data triangulation with teachers, parents, educational materials, or participants' digital media use was not performed. While focusing exclusively on adolescents' lived experiences provided rich and in-depth insights into their perspectives, it limited opportunities to verify their accounts using additional sources of information. Finally, participants' interpretations of cancer and death may have been

influenced by their cultural background, language, family experiences with cancer, and access to health services. Therefore, the transferability of these findings should be considered in relation to the similarity of the study context and participant characteristics. Future research should include adolescents from more diverse educational and geographical settings, compare experiences across different educational contexts, and evaluate school-based or digitally delivered cancer education interventions informed by the findings of this study.

5. Conclusion

Adolescents in this study experienced barriers to understanding cancer-related information as a series of interconnected experiences. Limited and fragmented information, poor organisation, and unfamiliar medical terminology made it difficult for them to establish a coherent foundation for understanding cancer. The broad scope of the information further challenged their ability to prioritise and distinguish between cancer symptoms, prevention, diagnosis, and treatment. In the absence of a well-developed knowledge framework, participants initially perceived cancer as a frightening disease closely associated with death, while prevention was understood primarily as a set of general healthy lifestyle recommendations. These findings suggest that scientifically accurate information does not necessarily become meaningful unless it is communicated in clear, age-appropriate language, presented in a logical and progressive sequence, supported by relevant examples, delivered through trusted sources, and conveyed in a psychologically supportive manner. The findings also highlight the important role of schools and nursing professionals in collaborating to develop adolescent-centred cancer education that enables young people not only to understand health information but also to critically evaluate and apply it in their everyday lives.

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