Graduating Medical Students' Views on Breast Cancer in Guinea: A Cross-Sectional Study

*Ibrahima Kalil Condé[1], Kalil Cissé[2], Malick Bah[2], Mamady Keïta[2], Pétiori G. Laurence Touré[1], Saran Camara[3], Bangaly Traoré[2]

[1]Felix Houphouët Boigny University, Abidjan, Ivory Coast
[2]Gamal Abdel Nasser University, Conakry, Guinea
[3]Kofi Annan University, Guinea

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Abstract

Background: Breast cancer is the leading cause of cancer-related deaths among women, particularly in low- and middle-income countries. Future doctors who are key players in prevention and health education must be adequately trained in this pathology. This study aimed to assess the views of final-year medical students in Guinea about breast cancer.

Methodology: This descriptive cross-sectional study was conducted at a referral university hospital using a self-administered questionnaire containing items on students' knowledge, attitudes, and perceptions.

Results: Among the 400 students included, 82.7% had poor knowledge, and 75.0% supported promoting breast self-examination. Knowledge varied significantly by study level ($p < 0.001$): 75.8% of sixth-year students had poor knowledge, compared with 90.5% of seventh-year students. Finally, 8.0% believed it was the result of a curse, 4.0% directly associated it with death, and 1.0% considered it divine punishment.

Conclusion: Graduating medical students in Guinea lack essential knowledge about breast cancer. These findings emphasize the need to improve breast cancer education during medical training in Guinea.

Keywords: Breast cancer, medical students, Guinea

Introduction

Breast cancer is a major public health issue, being the most frequently diagnosed cancer in women and the primary cause of mortality linked to malignancies globally (Sung et al., 2021). In sub-Saharan Africa, it accounted for 129,400 new cases, representing 27.3% of all female cancers in 2020 (Bray et al., 2022). In Guinea, it ranks second after cervical cancer, with a standardized incidence of approximately 16 new cases per 100,000 (Ferlay et al., 2024), and remains the leading reason for oncological consultation, representing approximately 27% of all diagnosed cancers (Traoré et al., 2012). Although the age at diagnosis is relatively young in resource-limited countries (Ezeome et al., 2022; Kim et al., 2024), women are the majority affected, and incidence increases with age: over 80% of breast

cancers are diagnosed in women over 50 years (Katsura et al., 2022).

Although early diagnosis, organized screening, and therapeutic improvements have lowered breast cancer mortality in high-income nations, low- and middle-income countries (LMICs) continue to face barriers that delay detection and treatment, exacerbating death rates. This highlights the importance of implementing accessible early detection strategies in these contexts (Khanna et al., 2024; Sung et al., 2021).

Early breast cancer detection relies heavily on knowledge of the signs and symptoms of the disease, as well as the appropriate use of screening methods, such as breast self-examination, mammography, and clinical examination (Khanna et al., 2024; Qasim et al., 2020). In this setting, healthcare providers, especially physicians, are pivotal in educating patients and the broader community about health issues. For example, medical students' knowledge of public health issues, such as breast cancer, is crucial (Qasim et al., 2020). This population is of particular importance because, as health science students, they benefit from privileged access to medical information, which places them in a strategic position not only for their future clinical practice but also as vectors of information and awareness among non-medical students and the general public (Osei-Afriyie et al., 2021).

Clinical training is a fundamental component of medical education. From the clinical years onward, students are increasingly exposed to major public health challenges and prevalent diseases within the population. This training period provides a crucial opportunity to strengthen both practical skills and theoretical knowledge, particularly in the prevention, screening, and management of high-impact conditions such as breast cancer (Qasim et al., 2020).

At present, no evidence exists regarding how medical students in Guinea understand and perceive breast cancer. This lack of assessment creates an obstacle to the development of targeted, appropriate training strategies. Therefore, it seems essential to examine these dimensions in future doctors, particularly those nearing the end of their training, to identify any gaps and pinpoint areas requiring skill enhancement. Conducting such an assessment may not only improve medical education but also reinforce the healthcare system's capacity to deliver timely, effective, and patient-centered breast cancer care.

The purpose of this study was to assess graduating medical students' views on breast cancer in Guinea, including their knowledge and general beliefs.

Literature Review

Gul et al. (2020) conducted a study in Pakistan among healthcare professionals and final-year medical students. Despite a generally satisfactory level of knowledge, marked deficiencies persisted in screening practices and clinical breast examinations. These results highlight the urgent need for ongoing medical education initiatives, especially for nurses, to strengthen preventive practices and encourage

early detection. Also, Faria et al. (2021) found that higher education students showed limited knowledge about male breast cancer, despite being in advanced cycles. One-third of participants were unaware that breast cancer can also affect men, and many demonstrated limited knowledge of specific risk factors and diagnostic approaches for breast cancer. This suggests the need for comprehensive educational initiatives to address these knowledge deficits.

Similarly, Sarker et al. (2022) evaluated the effectiveness of an educational program targeting breast cancer awareness and breast self-examination among young female university students in Bangladesh. The study revealed significant improvement post-intervention, underscoring the impact of academic programs in enhancing knowledge and preventive practices. In Cameroon, Sama et al. (2017) highlighted the persistence of misconceptions and cultural beliefs that influence attitudes and perceptions toward breast cancer. In their study, 38.7% of female university students believed that breast cancer could be treated through spiritual means, revealing that even among young students in a Francophone African context, perceptions of the disease remain strongly shaped by non-biomedical views.

This study explored the overall views of graduating medical students on breast cancer in Guinea. It focuses on how students perceive the disease, approach prevention and screening, and interpret its clinical and social aspects, shaped by their education, personal experiences, and cultural context. Rather than separating knowledge, attitudes, and perceptions, the study provides a comprehensive descriptive understanding of students' perspectives. This approach highlights potential strengths and gaps that may influence future clinical practice, health education, and early detection strategies. It is descriptive in nature and does not aim to establish causal relationships.

Methodology

Research Design

This descriptive cross-sectional study was conducted from February 6 to May 6, 2018, allowing data collection at a single point in time at a university hospital in Conakry, Guinea's capital. The hospital, affiliated with a specific university, serves as a practical training site for medical students.

Sampling

The study population consisted of final-year students enrolled in the medical department. The inclusion criteria included students in their 6th and 7th year of medical school, present at the clinical placement sites at the time of data collection, and having given informed consent to participate in the study. Students who were absent during the data collection period, enrolled in other academic levels, or declined to participate have been excluded from the study.

Exhaustive sampling was used, including all eligible students present at the time of data collection, with no random selection; therefore, this approach

corresponds to a convenience sampling technique.

Data Collection

Data were collected using a self-administered questionnaire derived from two validated tools: the WHO Knowledge, Attitudes, and Practices (KAP) Survey Model and the Breast Cancer Awareness Measure (Breast-CAM). The instrument was adapted to the Guinean context following expert review in oncology and public health. It included four sections: socio-demographic data; knowledge of breast cancer (risk factors, symptoms, diagnosis, and screening); attitudes towards prevention and screening; and perceptions and socio-cultural beliefs about prognosis and curability. Through these components, the questionnaire captured the main elements of students' views on breast cancer.

A pilot test involving 20 students from a non-participating institution ensured clarity and cultural relevance, prompting minor revisions. Questionnaires were distributed in paper form at clinical placement sites, and responses were collected anonymously. Prior authorization was obtained from the department heads and supervisors, and informed consent was obtained from all participants through an attached information sheet outlining the study objectives, confidentiality, and voluntary participation.

Data Analysis

Data analysis was performed using SPSS version 21.0. Categorical data are presented as frequencies and percentages, and continuous data are reported as means with standard deviations. Knowledge was the only dimension amenable to scoring, while attitudes and perceptions were analyzed descriptively as complementary elements of students' views.

Breast cancer knowledge was assessed using a 13-item questionnaire. Each item assessed a specific aspect of breast cancer knowledge, with some questions allowing multiple correct answers and others requiring the student to choose the most appropriate answer. Each correct answer received 1 point, and each incorrect answer received 0 points. Therefore, the maximum possible score for each student was 13 points.

Knowledge levels were categorized as follows: Very good (11-13 points); Good (8-10 points); Fair (7-8 points); Poor (less than 7 points). Additionally, knowledge of specific variables was assessed based on the proportion of students who answered correctly. Good ($\geq$ 75% correct answers); Average (50-74% correct answers); Mediocre ($<$ 50% correct answers). Knowledge scores were summarized using the median and interquartile range (IQR) to better reflect the skewed distribution of responses. Besides descriptive statistics (frequencies and percentages), the relationship between overall knowledge level and participants' socio-demographic variables was analyzed using the chi-square (χ^2) test. Statistical significance was set at $p < 0.05$.

Ethical Considerations

The study was conducted in accordance with the principles of the Declaration of Helsinki. The study received approval from the university hospital administration, heads of the relevant medical faculties, and clinical internship supervisors. Student participation was entirely voluntary, and informed consent was obtained beforehand. Strict measures were implemented to protect participants' anonymity and ensure the confidentiality of all collected data.

Results

The study involved 1,050 eligible medical students, identified at internship sites during the survey based on lists provided by their respective faculties. Of these, 400 students agreed to participate, resulting in a response rate of 38.0%. The participants' socio-demographic characteristics are presented in Table 1.

Table 1

Socio-demographic Characteristics of the Medical Student Participants (N=400)

Variables	N	Percentage (%)
Age group		
Under 26 years	122	30.5
26 – 30 years	217	54.3
Over 30 years	61	15.2
Sex		
Male	245	61.2
Female	155	38.8
Year of study		
6th year	211	52.7
7th year	189	47.3

The participants' age ranged from 21 to 33 years, with a mean age of 25.9 (± 2.8) years and a median of 26.0 years (IQR = 25.0–27.0). The 26-30 age group included 217 students (54.2%). Regarding gender distribution, there were 245 males (61.2%), yielding a sex ratio of 1.5. The majority of respondents (211 students, 52.7%) were enrolled in the 6th year of medical school. Table 2 presents the students' exposure to and main sources of information on breast cancer.

Table 2

Sources and Level of Exposure to Breast Cancer Information among Medical Students (N=400).

Variables	N	Percentage (%)
Clinical oncology internship		
Yes	95	23.7
No	305	76.3
Having previously heard of breast cancer		
Yes	400	100
How long ago		
5 years	172	43.0
5 to 8 years	127	31.7
8 to 10 years	86	21.5
Over 10 years	15	3.8
Sources of information		
University	340	85.0
Media (TV, radio)	221	55.2
Internet	220	55.0
Hospital	220	55.0
Conferences	41	10.2
Colleagues	67	16.7
Awareness sessions	64	16.0

Regarding exposure to breast cancer information, 95 students (23.7%) had previously completed a clinical oncology internship. All students reported having heard about breast cancer, with 172 (43.0%) stating that they had received this information approximately five years ago. University courses were the primary source of information, cited by 340 students (85.0%). The students' knowledge regarding the specific risk factors for breast cancer is summarized in Table 3.

Table 3

Knowledge Component of Students' Views: Identification of Breast Cancer Risk Factors (N=400).

Risk Factors	N	Percentage (%)
Non-modifiable		
Family history of cancer	360	90.0
BRCA genetic mutation	233	58.2
Hyperestrogenism	179	44.7
Late menopause	132	33.0
Age > 35 years	215	53.7
Early menarche	85	21.2
Nulliparity	166	41.5
Modifiable		
Smoking	204	51.0
Use of oral contraceptives	140	35.0
Obesity	130	32.5
Sedentary lifestyle	41	10.2
Alcohol	165	41.2

Family history of cancer was the most widely recognized non-modifiable risk factor, with 360 students (90.0%) correctly identifying it. The presence of a genetic mutation (such as BRCA1/2) was cited by 233 participants (58.2%), and advanced age by 215 (53.7%). Among the modifiable risk factors, smoking was the most frequently identified factor by 204 students (51.0%). Table 4 presents students' knowledge of breast cancer warning signs, screening methods, and diagnostic tools.

Table 4

Knowledge Component of Students' Views: Signs, Screening and Diagnostic Methods of Breast Cancer (N=400).

Variables	N	Percentage (%)
Early warning signs		
Breast lump	353	88.2
Nipple discharge	210	52.5
Diagnostic methods		
Histology	306	76.5
Fine-needle aspiration cytology	161	40.2
Immunohistochemistry	51	12.7
Screening methods		
Breast self-examination	270	67.5
Clinical breast exam	22	5.5
Mammography	218	54.5
Breast ultrasound	91	22.7

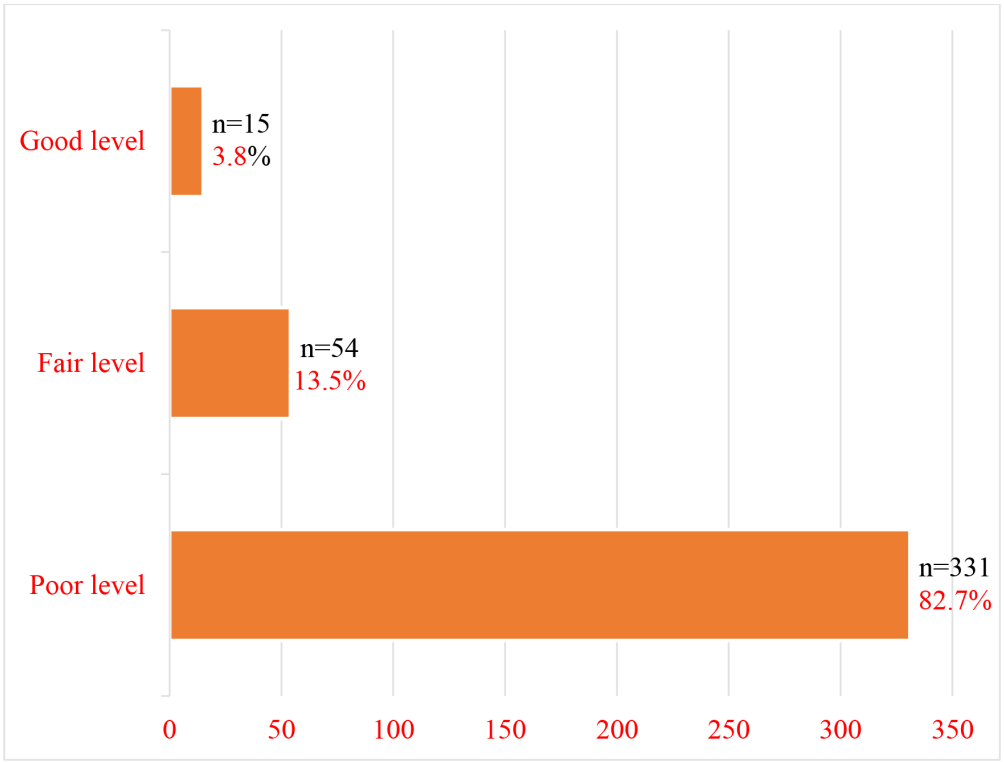
Among the symptoms suggestive of breast cancer, a breast lump was the most frequently recognized, cited by 353 students (88.2%). Regarding diagnostic tools, 306 students (76.5 %) identified histology. Immunohistochemistry was cited by only 51 respondents (12.7%). In terms of screening methods, breast self-examination was the most widely known, reported by 270 students (67.5%). Clinical breast examination was mentioned by only 22 participants (5.5%).

Regarding treatment modalities for breast cancer, 128 students (32.0%) identified surgery, and 52 (13.0%) identified radiotherapy as approaches for locoregional control of the disease. Additionally, 164 students (41.0%) believed that surgery alone could cure breast cancer, of whom 113 (69.0%) thought it was possible at an early stage and 46 (28.0%) at a localized stage. Regarding the indications for chemotherapy, only 67 students (16,7%) knew that locally advanced breast cancer could warrant chemotherapy. Eighteen students (4.5%) recognized axillary lymph node involvement as an indication, while 79 students (19.7%) mentioned the metastatic stage as a criterion for chemotherapy.

The participants' overall knowledge score had a mean of 4.9 (± 3.0) out of 13 points, with a median of 5 (IQR = 3.0–7.0). Figure 1 illustrates the distribution of overall breast cancer knowledge.

Figure 1

Distribution of the Overall Knowledge Level of Breast Cancer Among Medical Students (N=400).



As shown in Figure 1, most students exhibited a low level of knowledge regarding breast cancer, with 331 students (82.7%). The associations between the overall knowledge level and students' socio-demographic characteristics are summarized in Table 5.

Table 5

Association Between Socio-demographic Variables and Overall Knowledge Level (N=400).

Variables	Knowledge Level			N (%)	*P - value*
	Poor	**Fair**	**Good**		
	n (%)	n (%)	n (%)		
Sex					
Male	205 (83.7)	30 (12.2)	10 (4.1)	245 (61.2)	*0.605*
Female	126 (81.3)	24 (15.5)	5 (3.2)	155 (38.8)	
Study Level					
6th Year	160 (75.8)	40 (19.0)	40 (19.0)	211 (52.7)	*< 0.001*
7th Year	171 (90.5)	14 (7.4)	14 (7.4)	189 (47.3)	

There was no significant difference between men and women in the level of knowledge about breast cancer ($p = 0.605$). In contrast, a highly significant difference was observed by study level ($p < 0.001$), with seventh-year students showing a higher proportion of poor knowledge than sixth-year students.

Attitudinal components of students' views on breast cancer showed that 300 students (75.0%) had practiced or recommended breast self-examination, while 85 students (21.2%) had never done so. Concerning expected clinical behavior, 178 participants (44.5%) stated that they would systematically recommend screening or refer a patient to a specialist when faced with signs suggestive of breast cancer. Moreover, 370 students (92.5%) expressed support for the implementation of breast cancer awareness campaigns, and 153 (38.2%) reported having already participated in such initiatives. The perceptions and beliefs of medical students regarding breast cancer are summarized in Table 6.

Table 6

Perceptual Component of Students' Views: Socio-cultural Beliefs and Curability of Breast Cancer (N=400).

Perceptions	N	Percentage (%)
Breast cancer can be cured		
Yes	305	77,0
No	43	10,7
Breast cancer is a curse		
Yes	32	8,0
No	131	32,7
Breast cancer is synonymous with death		
Yes	16	4,0
No	183	45,7
Breast cancer is a divine punishment		
Yes	4	1,0
No	140	35,0

Perceptual elements of students' views showed that the majority of students, 308 (77.0%), considered breast cancer to be a curable pathology; 32 students (8.0%) thought it was a curse, 16 (4.0%) associated it directly with death, while four (1.0%) believed it was a divine punishment.

Discussion

This study represents the first attempt in Guinea to examine final-year medical students' views on breast cancer, identify existing gaps, and propose appropriate corrective measures. Although knowledge constituted the most measurable component of these views, the findings also showed that attitudes and perceptions contributed additional insights into how future physicians conceptualize breast cancer and its management.

The study sample was relatively homogeneous: all participants were in the final stage of their training, enrolled in institutions within the same university city, followed comparable curricula, and were exposed to similar clinical

environments during their internships. This homogeneity justified the absence of intergroup comparisons; therefore, the analysis relied on a descriptive cross-sectional approach to identify general trends. Despite the constraints associated with a self-administered questionnaire in this population, the study's response rate (38.0%) is consistent with similar studies conducted without personal incentives or follow-ups (Christensen et al., 2014; Meyer et al., 2022).

All respondents had heard about breast cancer, reflecting near-universal initial exposure to the topic. This finding aligns with that of Islam et al. (2022), who reported a similar level of awareness (99.4%) among students from various backgrounds. It is higher than that observed in Ghana, where fewer than three-quarters of students reported receiving information on the subject (Osei-Afriyie et al., 2021). However, the fact that most students' first exposure to breast cancer information dates back approximately five years suggests that their knowledge is not continuously updated throughout their study period. This highlights the need for sustained and progressive oncology education in the medical curriculum.

University courses were identified as the primary source of information on breast cancer, confirming the central role of formal education in acquiring medical knowledge. However, the limited use of other learning channels, such as clinical rotations, conferences, and awareness campaigns, restricts the enrichment of practical and contextual understanding. A similar trend was observed in Syria (Ismail et al., 2021), where lectures were the dominant source of information. This lack of diversity in learning experiences, combined with limited clinical exposure, as most students reported not having completed an oncology rotation, illustrates the insufficient integration of oncology into the medical curriculum. As emphasized by other authors (Amgad et al., 2012; Moncaliano et al., 2023; Rallis et al., 2022), incorporating structured clinical experiences and interactive teaching methods could better prepare future practitioners.

Our study also revealed a limited knowledge of breast cancer risk factors. While family history is generally well recognized, hormonal and lifestyle-related factors remain poorly understood. Similar observations were reported in Saudi Arabia (Miskeen & Al-Shahrani, 2023), where medical students showed good awareness of symptoms but had notable gaps in knowledge regarding risk determinants. Such deficiencies may hinder their ability to promote effective primary prevention among patients.

Most students identified a breast lump as the main warning sign, while other key manifestations, such as nipple retraction, orange peel appearance, breast deformity, and pain, were largely underrecognized. These results are consistent with the narrative review by Tomic et al. (2023), who found that while palpable masses were well recognized, other clinical signs were far less identified. Regarding screening, breast self-examination and mammography were the most frequently

cited methods, whereas ultrasound and clinical breast examination were rarely mentioned despite their relevance in low-resource settings. In contrast, an Indian study by Joy et al. (2018) reported a much higher awareness, with nearly 99% of the participants correctly identifying screening methods.

Knowledge of therapeutic options was also limited among our respondents, unlike in Pakistan (Gul et al., 2020), where students demonstrated a better understanding of available treatments. This knowledge gap is concerning, given that advances in oncology increasingly require familiarity with innovative and multidisciplinary treatment approaches.

Overall, medical students' knowledge of breast cancer was insufficient, echoing findings from Saudi Arabia (Alsareii et al., 2020; Miskeen & Al-Shahrani, 2023), Indonesia (Rezano et al., 2022) and Pakistan (Gul et al., 2020). Several factors may contribute to this situation: the limited place of oncology within the curriculum, predominance of theoretical teaching, restricted practical exposure, and limited access to modern diagnostic tools. Additionally, persistent cultural beliefs, sometimes linking cancer to curses or traditional medicine, may influence perceptions and reduce the capacity of future physicians to deliver effective public health education. No significant difference was observed between male and female students ($p = 0.605$), suggesting that the knowledge deficit is generalized. However, a highly significant difference was found according to the level of study ($p < 0.001$), with seventh-year students paradoxically showing lower knowledge levels than sixth-year students. This could be explained by waning interest in non-specialty-related subjects at the end of medical school or inadequate consolidation of previously acquired concepts, reflecting the weak integration of oncology throughout clinical training. These findings underscore the need to strengthen oncology education throughout medical training by implementing practical modules, interactive seminars, and community-based learning activities to enhance knowledge and improve future physicians' ability to promote the early detection and prevention of breast cancer.

In addition to the limited level of knowledge, attitudinal elements of students' views revealed an encouraging theoretical commitment to prevention. Most respondents expressed support for breast self-examination and early detection, and nearly half indicated that they would promptly refer patients presenting with suspicious symptoms. However, this willingness did not consistently translate into practice, as shown by low personal involvement in screening or awareness activities. In Saudi Arabia, Miskeen and Al-Shahrani (2023) reported a similar gap between declared attitudes and actual engagement. Enhanced training in public health and communication, including hands-on awareness activities, could foster more active participation in prevention initiatives.

The perceptual dimension provided a unique window into how biomedical training intersects with persistent socio-

cultural beliefs. While most correctly recognized breast cancer as a curable disease, a notable minority attributed it to traditional or spiritual causes such as curses or divine punishment. Similar perceptions have been reported in Cameroon (Sama et al., 2017) and Ethiopia (Wondmu et al., 2022). In Guinea, where spiritual interpretations of illness remain common, such beliefs may delay medical consultation in favor of traditional or religious treatments, contributing to late diagnoses and poorer outcomes.

This coexistence of biomedical knowledge and cultural beliefs illustrates the nuanced reality that even future physicians may simultaneously navigate scientific reasoning and deep-rooted cultural frameworks. This duality can influence how they counsel patients, promote screening, and engage in community education programs. Incorporating socio-cultural awareness into medical training could help students address patients' beliefs respectfully, build trust, and improve the timely detection and management of breast cancer, bridging the gap between medical knowledge and community practices.

Conclusion

Our study revealed an integrated overview of graduating medical students' views on breast cancer in Guinea, combining their knowledge, attitudes, and socio-cultural perceptions. Overall, students demonstrated limited knowledge, particularly regarding risk factors, screening methods, and treatment options. Although most students expressed positive views toward prevention and early detection, their actual engagement in screening-related practices remained limited. A minority also endorsed traditional or spiritual explanations for the disease, reflecting the continued influence of cultural beliefs on health understanding.

Strengthening oncology teaching—by reinforcing core theoretical content, improving practical exposure, and addressing socio-cultural aspects of care—would better prepare future physicians to contribute effectively to breast cancer awareness, early diagnosis, and patient-centered management.

These findings provide a useful basis for developing targeted educational interventions and for future studies comparing training approaches among health science students.

Study Limitations

This study has several limitations. First, the response rate was relatively low (38%), which may have introduced non-response bias. Students with a greater interest in oncology may have been more likely to participate, potentially affecting the representativeness of the findings, particularly regarding the assessment of knowledge, which was the primary focus of the study.

Second, although the questionnaire was validated before administration, the study relied on self-reported data. Such data may be affected by social desirability bias, leading some participants to report

what they believed to be appropriate answers rather than their actual level of knowledge or personal beliefs.

Finally, the study was conducted among final-year medical students in a single city, further limiting the generalizability of the findings to the broader student population. Nonetheless, these results provide a valuable baseline reference for understanding breast cancer awareness among Guinean medical students and underscore the importance of conducting larger multicenter studies to confirm and expand upon these findings.

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Conflicts of Interest

None

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