
KNOWLEDGE OF BREAST CANCER RISK FACTORS AND FEMALE TEACHERS' ATTITUDE TOWARDS BREAST SELF-EXAMINATION IN PUBLIC SECONDARY SCHOOLS IN AKWA IBOM NORTH-WEST SENATORIAL DISTRICT

***Olivia Onyeka Ekwutosi, Ukeme Eno Eyo, Joeseeph Edem Aniefiok**

Department of Human Kinetics and Health Education, Faculty of Education, University of Uyo, Nigeria.

Article Received: 16 July 2026

Article Revised: 05 August 2026

Published on: 25 August 2026

***Corresponding Author: Olivia Onyeka Ekwutosi**

Department of Human Kinetics and Health Education, Faculty of Education, University of Uyo, Nigeria.

DOI: <https://doi-doi.org/101555/ijrpa.6669>

ABSTRACT

This study examined knowledge of selected breast cancer risk factors and female teachers' attitude towards breast self-examination in public secondary schools in Akwa Ibom North-West Senatorial District. Specifically, the study examined the extent of influence of knowledge of genetic mutation, breast density and obesity on female teachers' attitude towards breast self-examination. A descriptive survey design was adopted. The study had a sample of 159 female teachers selected from public secondary schools in the study area. Data were collected using the *Knowledge of Risk Factor of Breast Cancer Questionnaire* and the *Teachers' Attitude Towards Breast Self-Examination Questionnaire*. The instruments were face-validated by experts and a reliability coefficient of .89 was obtained using Cronbach's alpha. Simple linear regression was used to answer the research questions and test the null hypotheses at the .05 level of significance. The findings showed that knowledge of genetic mutation had a very high influence on female teachers' attitude towards breast self-examination, while knowledge of breast density and obesity had high influence. The three null hypotheses were rejected, indicating significant influences of genetic mutation, breast density and obesity on female teachers' attitude towards breast self-examination. The study concluded that adequate knowledge of breast cancer risk factors is important in promoting favourable attitudes towards breast self-examination among female teachers.

KEYWORDS: Breast Cancer, Genetic Mutation, Breast Density, Obesity, Breast Self-Examination, Female Teachers.

1. INTRODUCTION

Breast cancer remains an important health concern among women, making knowledge of its risk factors and early detection practices essential. The main research work identifies several factors associated with breast cancer, including genetic mutation, breast density, obesity, alcohol intake and reproductive factors. These factors may differ in their nature and the extent to which they contribute to breast cancer development. Some risk factors are inherited or biological, while others are associated with lifestyle and reproductive characteristics. Adequate knowledge of these factors may help women understand their susceptibility to breast cancer. It may also encourage them to adopt appropriate preventive and early detection practices. The study further notes that women's attitudes towards breast self-examination may be influenced by their knowledge and awareness. Financial circumstances, family background and other social factors may also affect their health-related decisions. It is therefore important to strengthen women's understanding of breast cancer risk factors. Such knowledge may contribute to improved breast health awareness and more favourable attitudes towards preventive practices.

Breast self-examination provides women with an opportunity to become familiar with the normal appearance and feel of their breasts and to identify unusual changes. Regular self-examination may help women become more conscious of their breast health and encourage them to pay attention to changes in the breast. It may also encourage women to seek appropriate medical attention when they notice suspicious abnormalities. However, the practice may be affected by several personal, social and cultural factors. Negative attitudes towards breast self-examination may discourage women from practising it regularly. Inadequate awareness of breast cancer and its risk factors may similarly reduce women's interest in preventive practices. Cultural and religious beliefs may influence how women perceive breast examination and breast-related health problems. Misconceptions about breast cancer may also create fear and discourage women from seeking appropriate information. These challenges make adequate breast cancer education particularly important among women. Improving awareness may therefore promote more positive attitudes towards breast self-examination and breast health.

Genetic mutation is one of the risk factors considered in the study because certain inherited mutations may increase the likelihood of developing breast cancer. The research work

explains that mutation involves a change in the nucleotide sequence and that some inherited mutations affect breast cancer susceptibility. In particular, mutations affecting the BRCA1 and BRCA2 genes may increase the likelihood of developing breast cancer (Fackenthal & Olopade, 2022).

These genes are involved in maintaining the normal functioning and stability of genetic material within cells. When harmful mutations occur, the protective functions of these genes may be affected. The work further reports that inherited BRCA1 and BRCA2 mutations are associated with increased breast cancer risk. Additional mutations may also affect the normal copy of these genes and contribute to cancer development (Birch et al., 2021). Knowledge of genetic mutation may therefore help women understand that breast cancer can have an inherited component. Such awareness may encourage women to pay greater attention to breast health and preventive practices. For female teachers, adequate knowledge of genetic mutation may contribute to a more informed attitude towards breast self-examination.

Breast density is another factor examined in the study and refers to the amount of fibroglandular tissue in the breast relative to fatty tissue. The proportion of dense and fatty tissue differs among women and may have implications for breast cancer risk. The main work explains that dense breast tissue can make cancer more difficult to detect through mammography.

This is because both dense breast tissue and many breast cancers may appear white on mammographic images (Sprague, 2022). Consequently, dense tissue may make the identification of some abnormalities more difficult during screening. The work also reports that women with extremely dense breasts may have a higher risk of developing breast cancer. This risk may be greater than that observed among women with predominantly fatty breasts (Sadoh et al., 2021; Al-Hosni et al., 2021). Awareness of breast density may therefore help women understand an important aspect of their breast cancer risk. It may also encourage greater attention to changes in the breast and appropriate breast health practices. Among female teachers, such knowledge may contribute to a more favourable attitude towards breast self-examination.

Obesity is also recognised as an important breast cancer risk factor and is associated with excess body weight and related lifestyle characteristics. The main research work discusses the relationship between excess body weight, high calorie intake and cancer development. It particularly reports that obesity after menopause is associated with increased breast cancer risk (Renehan, 2020). Excess body weight may therefore represent an important consideration in breast cancer prevention and health education. The work further cites

evidence linking excess body weight with several cancers, including postmenopausal breast cancer.

This evidence is reported by the International Agency for Research on Cancer (IARC, 2021). Awareness of obesity as a breast cancer risk factor may help women understand the importance of maintaining healthy lifestyles. However, knowledge alone may not automatically result in healthier behaviour or preventive practices. Personal circumstances, attitudes and access to appropriate health information may also influence women's decisions. Adequate knowledge of obesity as a risk factor may nevertheless strengthen women's awareness and attitude towards breast self-examination.

Knowledge of these risk factors may contribute to women's understanding of their vulnerability to breast cancer and influence their attitude towards preventive practices. Awareness of genetic, biological and lifestyle-related risk factors may help women appreciate the importance of protecting their breast health. Previous studies cited in the main work have examined breast cancer knowledge, breast self-examination and related risk factors among women. These studies provide evidence that knowledge and awareness are important components of breast health behaviour. For instance, Fondjo et al. (2021) examined knowledge, attitudes and practice of breast self-examination among female secondary and tertiary school students in Ghana. The study reported differences in knowledge and practice between the two groups. This suggests that differences in educational exposure and health information may influence breast cancer knowledge and preventive practices. Female teachers are also an important group because they may benefit personally from improved breast cancer knowledge. They may also transfer appropriate health information to students and other members of their communities. Consequently, examining knowledge of breast cancer risk factors in relation to female teachers' attitude towards breast self-examination is important.

2. STATEMENT OF THE PROBLEM

Breast cancer remains an important health challenge among women, yet inadequate knowledge of its risk factors may limit effective prevention and early detection. Despite the availability of breast cancer information and health facilities, some women may still demonstrate poor attitudes towards breast self-examination. The main research work indicates that some female teachers do not examine their breasts regularly, even when information and health facilities are available. This situation is concerning because delayed attention to unusual breast changes may reduce opportunities for early identification and

appropriate medical evaluation. Ignorance of breast cancer risk factors, misconceptions about the disease, and cultural and religious beliefs may further discourage women from practising breast self-examination. In addition, inadequate government-sponsored awareness programmes may limit access to reliable and sustained breast cancer information. These challenges suggest that the availability of health facilities alone may not be sufficient where women lack adequate knowledge and favourable attitudes towards preventive practices. It therefore becomes necessary to examine the extent to which knowledge of breast cancer risk factors is associated with female teachers' attitudes towards breast self-examination.

Female teachers constitute an important group for breast cancer education because they are adult women who may themselves be exposed to different breast cancer risk factors. Beyond their personal health, teachers interact regularly with students and may serve as important channels for transmitting relevant health information within schools and communities. However, where their own knowledge of breast cancer risk factors is inadequate, their ability to develop favourable preventive attitudes and communicate appropriate information may be limited. The problem is therefore not simply the availability of breast cancer information, but whether adequate knowledge of specific risk factors is reflected in women's attitudes towards breast self-examination. This concern is particularly important in public secondary schools in Akwa Ibom North-West Senatorial District, where context-specific evidence on female teachers may be limited. The researcher therefore considered it necessary to investigate the influence of knowledge of breast cancer risk factors on female teachers' attitude towards breast self-examination.

3. RESEARCH OBJECTIVES

The main objective was to examine knowledge of selected breast cancer risk factors and female teachers' attitude towards breast self-examination in public secondary schools in Akwa Ibom North-West Senatorial District. Specifically, the study sought to:

- i. determine the extent of influence of knowledge of genetic mutation on female teachers' attitude towards breast self-examination in Akwa Ibom North-West Senatorial District;
- ii. examine the extent of influence of knowledge of breast density on female teachers' attitude towards breast self-examination in Akwa Ibom North-West Senatorial District; and
- iii. investigate the extent of influence of knowledge of obesity on female teachers' attitude towards breast self-examination in Akwa Ibom North-West Senatorial District.

4. RESEARCH QUESTIONS

- i. What is the extent of influence of knowledge of genetic mutation on female teachers' attitude towards breast self-examination in Akwa Ibom North-West Senatorial District?
- ii. To what extent does knowledge of breast density influence female teachers' attitude towards breast self-examination in Akwa Ibom North-West Senatorial District?
- iii. What is the extent of influence of knowledge of obesity on female teachers' attitude towards breast self-examination in Akwa Ibom North-West Senatorial District?

5. RESEARCH HYPOTHESES

The following null hypotheses were tested at the .05 level of significance:

H₀₁: There is no significant influence of knowledge of genetic mutation on female teachers' attitude towards breast self-examination in Akwa Ibom North-West Senatorial District.

H₀₂: There is no significant influence of knowledge of breast density on female teachers' attitude towards breast self-examination in Akwa Ibom North-West Senatorial District.

H₀₃: There is no significant influence of knowledge of obesity on female teachers' attitude towards breast self-examination in Akwa Ibom North-West Senatorial District.

6. THEORETICAL FRAMEWORK

6.1 Somatic Mutation Theory of Carcinogenesis

The Somatic Mutation Theory of Carcinogenesis was attributed in the main work to Soto and Sonnenschein (1950). The theory explains cancer development primarily from the perspective of genetic alterations that occur within somatic cells. According to this view, cancer may develop when normal cells accumulate mutations that interfere with the mechanisms responsible for regulating cell growth, division and survival. As these genetic changes accumulate, cells may gradually lose their normal characteristics and acquire the ability to multiply uncontrollably, resulting in malignant transformation. The theory therefore places genetic mutation at the centre of carcinogenesis and provides an explanation of how alterations in cellular genetic material can contribute to the development of cancer. It also recognises that carcinogenesis may involve a combination of genetic, cellular and environmental processes rather than a single mutation occurring in isolation. In the context of breast cancer, inherited or acquired mutations in genes such as BRCA1 and BRCA2 may increase susceptibility to abnormal cellular development. The theory is therefore relevant to the present study because knowledge of genetic mutation as a breast cancer risk factor may

help female teachers understand their vulnerability to the disease and appreciate the importance of breast health practices, including breast self-examination.

6.2 Stem Cell Division Theory

The Stem Cell Division Theory was attributed in the main work to Eiger and Wendkos (2009). The theory proposes that cancer may originate from normal stem cells as a result of damage accumulated during repeated processes of cell division. Stem cells possess the capacity for self-renewal and differentiation, and repeated division provides opportunities for cellular damage or genetic abnormalities to accumulate. According to the theory, when sufficient damage occurs, some stem cells may acquire abnormal characteristics and develop into cancer stem cells capable of initiating and sustaining tumour formation. The theory therefore emphasises the importance of repeated cell division, DNA damage and exposure to carcinogenic factors in the development of cancer. It provides a biological explanation for how normal cells may gradually acquire characteristics associated with uncontrolled growth and tumour formation. In breast cancer, this perspective helps explain how continuous cellular activity combined with genetic or environmental damage may contribute to malignant transformation. The theory is relevant to the present study because it provides a basis for understanding why knowledge of breast cancer risk factors is important to women. Awareness of factors capable of contributing to cellular damage may strengthen women's perception of breast cancer risk and encourage greater attention to preventive and early-detection practices such as breast self-examination.

6.3 Theory of Breast Cancer

The Theory of Breast Cancer was attributed in the main work to Thomas Beatson (1878) and emerged from Beatson's investigation of the relationship between ovarian activity and breast development. His work contributed significantly to the understanding of the relationship between ovarian function and changes in breast tissue. The theory provides a biological explanation for the role of hormonal influences in the development and progression of breast cancer. In particular, it draws attention to the influence of ovarian hormones on breast tissue and helps explain why reproductive and hormonal characteristics may be associated with differences in breast cancer risk. Factors such as age at menarche, age at first pregnancy, parity and age at menopause may influence a woman's lifetime exposure to reproductive hormones and, consequently, her breast cancer risk. The theory is therefore particularly relevant to the present study because reproductive factors constitute one of the breast cancer risk-factor dimensions examined among female teachers. Understanding the connection between reproductive history and breast cancer may help women develop a clearer perception

of their personal risk. Such awareness may in turn encourage greater attention to breast health and promote a favourable attitude towards breast self-examination as a preventive and early-detection practice.

7. METHODOLOGY

The study adopted a descriptive survey research design. The study used questionnaires to collect information concerning knowledge of breast cancer risk factors and female teachers' attitude towards breast self-examination. The study was conducted in Akwa Ibom North-West Senatorial District. The original research was delimited to 159 respondents and five breast cancer risk factors: genetic mutation, breast density, obesity, alcohol intake and reproductive factors. For this article, only the first three risk factors were retained. The instruments used were the Knowledge of Risk Factor of Breast Cancer Questionnaire and the Teachers' Attitude Towards Breast Self-Examination Questionnaire. The instruments were subjected to face validation by four experts. A trial test involving 20 female secondary school teachers who were not part of the study was conducted, and Cronbach's alpha yielded a reliability coefficient of .89. The researcher and two research assistants administered the questionnaires to the respondents after obtaining permission from the selected schools. Respondents were informed about the study, assured of confidentiality and allowed freedom to participate or withdraw. Simple linear regression was used to answer the research questions and test the hypotheses at the .05 level of significance. A p-value less than or equal to .05 constituted grounds for rejecting the null hypothesis, while a p-value greater than .05 resulted in its retention.

8. RESULTS

Research Question One

What is the extent of influence of knowledge of genetic mutation on female teachers' attitude towards breast self-examination in Akwa Ibom North-West Senatorial District?

Table 1: Regression Analysis of Knowledge of Genetic Mutation and Female Teachers' Attitude Towards Breast Self-Examination.

Model	R	R ²	Adjusted R ²	Std. Error of the Estimate
1	.865	.749	.747	.28382

Source: Field Work (2022).

The result in Table 1 shows $R = .865$ and $R^2 = .749$. Thus, knowledge of genetic mutation accounted for 74.9% of the variation in female teachers' attitude towards breast self-examination. The original study classified this as a very high extent of influence.

Research Question Two

To what extent does knowledge of breast density influence female teachers' attitude towards breast self-examination in Akwa Ibom North-West Senatorial District?

Table 2: Regression Analysis of Knowledge of Breast Density and Female Teachers' Attitude Towards Breast Self-Examination.

Model	R	R ²	Adjusted R ²	Std. Error of the Estimate
1	.767	.588	.585	.363

Source: Field Work (2022).

Table 2 shows $R = .767$ and $R^2 = .588$, indicating that knowledge of breast density accounted for 58.8% of the variation in female teachers' attitude towards breast self-examination. The original study interpreted this as a high extent of influence.

Research Question Three

What is the extent of influence of knowledge of obesity on female teachers' attitude towards breast self-examination in Akwa Ibom North-West Senatorial District?

Table 3: Regression Analysis of Knowledge of Obesity and Female Teachers' Attitude Towards Breast Self-Examination.

Model	R	R ²	Adjusted R ²	Std. Error of the Estimate
1	.742	.551	.548	.380

Source: Field Work (2022).

The result shows $R = .742$ and $R^2 = .551$. Thus, knowledge of obesity accounted for 55.1% of the variation in female teachers' attitude towards breast self-examination. The original study classified this as a high extent of influence.

9. TEST OF HYPOTHESES

Hypothesis One

H_{01} : There is no significant influence of knowledge of genetic mutation on female teachers' attitude towards breast self-examination in Akwa Ibom North-West Senatorial District.

Table 4: Regression Analysis of Knowledge of Genetic Mutation and Female Teachers' Attitude Towards Breast Self-Examination

Model	Sum of Squares	df	Mean Square	F	p	Decision
Regression	35.771	1	35.771	444.02	.024	Reject H ₀
Residual	13.004	157	.081			
Total	47.776	158				

Source: Field Work (2022).

The regression result produced $F = 444.02$, $p = .024$. Since the p-value is less than .05, the null hypothesis was rejected. Therefore, knowledge of genetic mutation had a statistically significant influence on female teachers' attitude towards breast self-examination. The original work reported that genetic mutation accounted for approximately 74.9% of the explained variation in attitude.

Hypothesis Two

H₀₂: There is no significant influence of knowledge of breast density on female teachers' attitude towards breast self-examination in Akwa Ibom North-West Senatorial District.

Table 5: Regression Analysis of Knowledge of Breast Density and Female Teachers' Attitude Towards Breast Self-Examination

Model	Sum of Squares	df	Mean Square	F	p	Decision
Regression	28.099	1	28.099	212.77	.028	Reject H ₀
Residual	19.676	157	.132			
Total	47.775	158				

Source: Field Work (2022).

The result produced $F = 212.77$, $p = .028$. Since .028 is less than .05, the null hypothesis was rejected. Therefore, knowledge of breast density significantly influenced female teachers' attitude towards breast self-examination.

Hypothesis Three

H₀₃: There is no significant influence of knowledge of obesity on female teachers' attitude towards breast self-examination in Akwa Ibom North-West Senatorial District.

Table 6: Regression Analysis of Knowledge of Obesity and Female Teachers' Attitude Towards Breast Self-Examination.

Model	Sum of Squares	df	Mean Square	F	p	Decision
Regression	26.311	1	26.311	182.64	.018	Reject H_0
Residual	21.464	157	.144			
Total	47.776	158				

Source: Field Work (2022).

The result shows $F = 182.64$, $p = .018$. Since the p-value is less than .05, the null hypothesis was rejected. Thus, knowledge of obesity significantly influenced female teachers' attitude towards breast self-examination.

10. FINDINGS OF THE STUDY

The study found that:

- i. Knowledge of genetic mutation had a very high extent of influence on female teachers' attitude towards breast self-examination.
- ii. Knowledge of breast density had a high extent of influence on female teachers' attitude towards breast self-examination.
- iii. Knowledge of obesity had a high extent of influence on female teachers' attitude towards breast self-examination.
- iv. Knowledge of genetic mutation, breast density and obesity each had a statistically significant influence on female teachers' attitude towards breast self-examination at the .05 level.

11. DISCUSSION OF FINDINGS

Knowledge of Genetic Mutation and Female Teachers' Attitude Towards Breast Self-Examination

The finding revealed a very high influence of knowledge of genetic mutation on female teachers' attitude towards breast self-examination. The regression analysis produced $R = .865$ and $R^2 = .749$, while the hypothesis test yielded $F = 444.02$, $p = .024$. This indicates that knowledge of genetic mutation was strongly associated with female teachers' attitude towards breast self-examination. The finding agrees with the evidence reported in the main work. The Division of Cancer Prevention and Control (2022) indicated that women with harmful BRCA1 and BRCA2 variants have substantially greater lifetime risks of breast cancer than women in the general population. Birch et al. (2021) further explained the role of inherited BRCA mutations and the occurrence of subsequent mutations affecting the normal copy of

the gene. Seidinger et al. (2020) also discussed mutations resulting from alterations such as deletions, insertions and nucleotide exchanges. The finding is also consistent with Fondjo et al. (2021), whose study examined knowledge, attitudes and practice of breast self-examination among female secondary and tertiary school students.

Knowledge of Breast Density and Female Teachers' Attitude Towards Breast Self-Examination

The finding showed that knowledge of breast density had a high influence on female teachers' attitude towards breast self-examination. The analysis produced $R = .767$ and $R^2 = .588$, while the corresponding hypothesis test produced $F = 212.77$, $p = .028$. The finding is consistent with Sadoh et al. (2021) and Al-Hosni et al. (2021), who, as cited in the main work, reported that extremely dense breasts are associated with increased breast cancer risk and may make the detection of abnormalities more difficult. The finding also agrees with Heale and Twycross (2021), whose work is cited in the main study in relation to the importance of knowledge and screening. The main work emphasises that knowledge of screening can assist women in understanding breast density and taking appropriate preventive measures.

Knowledge of Obesity and Female Teachers' Attitude Towards Breast Self-Examination

The study found that knowledge of obesity had a high influence on female teachers' attitude towards breast self-examination. The regression analysis yielded $R = .742$ and $R^2 = .551$, while the hypothesis test produced $F = 182.64$, $p = .018$. The finding agrees with the literature reviewed in the main study. Renehan (2020) reported an association between obesity and breast cancer risk, particularly among postmenopausal women. The main work also cites Dematawewa and Berger (2021) and Beral (2020) in discussing the relationship between high-fat intake, weight gain and breast cancer risk. Further support comes from IARC (2021), which the main study cited as providing evidence linking excess body weight with increased risk of several cancers, including postmenopausal breast cancer. The finding is therefore consistent with the position that knowledge of obesity as a breast cancer risk factor may be important in promoting awareness and favourable breast-health attitudes.

12. CONCLUSION

Based on the findings, the study concludes that knowledge of selected breast cancer risk factors is associated with female teachers' attitude towards breast self-examination in public secondary schools in Akwa Ibom North-West Senatorial District. Knowledge of genetic

mutation had a very high influence, while knowledge of breast density and obesity had high influences. The three factors also produced statistically significant relationships with female teachers' attitude towards breast self-examination. The findings therefore suggest that strengthening female teachers' knowledge of breast cancer risk factors may contribute to more favourable attitudes towards breast self-examination.

13. RECOMMENDATIONS

- i. Government and relevant health agencies should strengthen breast cancer education programmes for female teachers, with particular attention to hereditary and genetic risk factors.
- ii. Health educators should provide female teachers with adequate information on breast density and its implications for breast cancer risk and detection.
- iii. Regular health education programmes should emphasise obesity, healthy lifestyle practices and their relationship with breast cancer.
- iv. Schools and relevant health agencies should incorporate practical breast health education into programmes targeted at female teachers.
- v. Nurses and other healthcare professionals should intensify breast cancer awareness campaigns among female teachers and encourage appropriate breast health practices.

REFERENCES

1. Al-Hosni, K., Chan, M. F., & Al-Azri, M. (2021). The effectiveness of interventional cancer education programs for school students aged 8–19 years: A systematic review. *Journal of Cancer Education*, 36(2), 229–239.
2. Beatson, G. T. (1896). On the treatment of inoperable cases of carcinoma of the mamma: Suggestions for a new method of treatment, with illustrative cases. *The Lancet*, 148(3802), 104–107.
3. Beral, Y. (2020). A comparative assessment of knowledge of breast cancer risk factors, signs, prevention strategies and attitude towards breast self-examination among women in urban and rural communities of Sokoto State, Nigeria. *PhD Dissertation, University of Jos, Nigeria*.
4. Birch, J. M., Alston, R. D., McNally, R. J., Evans, D. G., Kelsey, A. M., Harris, M., & Eden, O. B. (2021). Relative frequency and morphology of cancers in carriers of germline TP53 mutations. *Oncogene*, 20, 4621–4628.

5. Dematawewa, C. M. B., & Berger, P. J. (2021). Genetic and phenotypic parameters for 305-day yield, fertility and survival in Holsteins. *Journal of Dairy Science*, 81, 2700–2709.
6. Division of Cancer Prevention and Control. (2022). *Centers for Disease Control and Prevention*.
7. Fackenthal, J. D., & Olopade, O. I. (2022). Breast cancer risk associated with BRCA1 and BRCA2 in diverse populations. *Nature Reviews Cancer*, 7, 937–948.
8. Fondjo, L. A., Owusu-Afriyie, O., Sakyi, S. A., Wiafe, A. A., Amankwaa, B., & Acheampong, E. (2021). Comparative assessment of knowledge, attitudes, and practice of breast self-examination among female secondary and tertiary school students in Ghana. *International Journal of Breast Cancer*, 45(67), 750–2047.
9. Heale, R., & Twycross, A. (2021). Validity and reliability in quantitative studies. *Evidence-Based Nursing*, 18(3), 66–77.
10. International Agency for Research on Cancer. (2021). *Monographs on the evaluation of carcinogenic risk of chemicals to humans: Some hormones, postmenopausal hormone therapy, and hormonal contraception*. IARC.
11. Navabi-Rigi, S., Khojasteh, F., & Bandani, F. (2021). Breast cancer and breast self-examination: Acknowledgement and attitude based on Health Belief Model in literature and engineering colleges of Sistan Balochestn University female students. *Iran Journal of Breast Discourse*, 5(1), 65–73.
12. Ogunkayode, J. A., & Ajuwon, A. (2021). Knowledge, attitude, and practice of breast self-examination among female secondary school students in Ibadan, Nigeria. *Archives of Basic and Applied Medicine*, 9(1), 5–11.
13. Renehan, A. G. (2020). Body-mass index and incidence of cancer: A systematic review and meta-analysis of prospective observational studies. *The Lancet*, 371(9612), 569–578.
14. Sadoh, A. E., Osime, C., Nwaneri, D. U., Ogboghodo, B. C., Eregie, C. O., & Oviawe, O. (2021). Improving knowledge about breast cancer and breast self-examination in female Nigerian adolescents using peer education: A pre-post interventional study. *BMC Women's Health*, 21(1), 1–9.
15. Seidinger, A. L., Mastellaro, M. J., Paschoal, G., Fortes, F., Godoy-Assumpção, J., & Aparecida, I. (2020). Causes of the highly prevalent TP53 R337H mutation with pediatric choroid plexus carcinoma and osteosarcoma in southeast Brazil. *Cancer*, 117, 2228–2235.

16. Sonnenschein, C., & Soto, A. M. (2000). Somatic mutation theory of carcinogenesis: Why it should be dropped and replaced. *Molecular Carcinogenesis*, 29(4), 205–211.
17. World Cancer Research Fund International/American Institute for Cancer Research. (2021). *Continuous update project report: Diet, nutrition, physical activity and prostate cancer*.
18. World Health Organization. (2022). *Indicators for assessing health facility practices that affect breast cancer patients*. Geneva.