

Assessment of Breast Cancer Prevention Practices among Women Attending Primary Health Care in Abha City, Aseer Region, Saudi Arabia

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Abstract

Cancer is a leading cause of death worldwide, with breast cancer being the most common (2.26 million new cases and 685,000 deaths). In Saudi Arabia, breast cancer ranked the first among females in 2014, accounting for 15.9% of all cancers reported among Saudi nationals and 28.7% of all cancers reported among females of all ages. Early detection of breast cancer could decrease the risks, have a better prognosis, and have better outcomes/more successful treatments. Prevalence of breast cancer reached more than 25% of all diagnosed cancer in the kingdom among women. **Aim:** This study aims to assess the knowledge and performance of women attending primary care centers about breast self-examination and mammogram screening for prevention and early detection of breast cancer in Abha city primary healthcare centers, Kingdom of Saudi Arabia. **Research Method:** cross sectional design was conducted by using questionnaire, which was distributed to primary care center nurses. The collected data was statistically analyzed using the Statistical Package for Social Sciences, version 25. **Results:** The study found that partic-

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Participants had poor awareness and knowledge about breast self-examination, risk factors for breast cancer, and trends and practices in early diagnosis of breast cancer. **Conclusion and Recommendations:** It recommends increasing awareness campaigns and providing educational programs to improve knowledge and practices.

Keywords

Assessment, Breast Cancer, Prevention Practices, Women Attending, Health Care Centers, Abha City

1. Introduction

Cancer is a leading cause of death worldwide, accounting for nearly 10 million deaths in 2020, with breast cancer being the most common (2.26 million new cases and 685,000 deaths) [1]. Generally, the breast cancer rate is higher in developed than developing countries. This difference may be due to relatively low awareness, screening practices, and diagnoses in developing countries. Nevertheless, the rates are increasing rapidly in many developing countries [2]. Breast cancer remains the leading cause of death among Saudi women. It has a significant impact on the health of women worldwide, and the Saudi Arabia is no exception [3].

In Saudi Arabia breast cancer ranked first among females in 2014. It accounted for 15.9% of all cancers reported among Saudi nationals and for 28.7% of all cancers reported among females of all.

Early detection of breast cancer could decrease the risks, is more likely to have a better prognosis, and a better outcomes/more successful treatments. On the other hand, a delayed diagnosis of breast cancer, and consequently worse prognosis, have been attributed to lack of awareness toward breast cancer risks or presence of barriers limiting women to utilize healthcare services. The prevalence of breast cancer reached more than 25% of all diagnosed cancer in the kingdom among women [4].

Lack of knowledge toward breast cancer risks and low utilization of mammogram are reported among women in Saudi Arabia. Therefore, the role of primary healthcare centers regarding practices to prevent breast cancer is crucial. Health education about breast cancer prevention could decrease the burden of breast cancer risks [5]. What might be achieved through implementation of strategies for primary prevention? These strategies include increasing the awareness of women about breast cancer major risk factors, such as, adherence of healthy lifestyle habits, lower their weight, breastfeeding, to be physically active, and preventing alcohol consumption [6].

Moreover, women aged 50 years should start biennial mammograms and to continue till the age of 74 years. Selective screening is to be applied for younger women aged 40 - 49 years based on individual factors. There is need of protec-

tion motivational theory among the female to diagnose the breast cancer at early stage. As there is lack of knowledge about the BSE among the primary healthcare therefore it is needed to educate and train them that they motivate the female to assess themselves which help in the cancer prevention [7].

Breast cancer self-examination is commonly done among the patients who have the history of breast cancer in the family. Primary healthcare that has good knowledge about the breast cancer and it prevalent, practice the self-examination more frequently than the nurses who do not have knowledge about the breast cancer [8]. The self-examination regarding the breast cancer is one of the costs friendly as there is no need of equipment or tools to assess the breast cancer. Breast cancer self-assessment is painless, safe, and easy to assess regularly to identify any lymph in the breast at the early stage of diseases [9]. Moreover, the education is also the factor associated with the breast cancer self-examination among the females. As nursing staff reported that female with the enough educational background easily learn the self-examination as compare to the female with the no education [10].

Up to our knowledge no study was conducted regarding knowledge and performance of women attending primary care centers about breast self-examination and mammogram screening for prevention and early detection of breast cancer in Abha city primary healthcare centers. So, this study purpose is to assess knowledge and performance of women attending primary care centers about breast self-examination and mammogram screening for prevention and early detection of breast cancer in Abha city primary healthcare centers, Kingdom of Saudi Arabia.

1.1. Problem Statement

In Saudi Arabia, breast cancer is the leading cause of death among women [11]. Its incidence is increasing rapidly in many developing countries [12]. Therefore, its prevention and early detection are associated with decreased risks, better prognosis, and more successful treatments [13].

Moreover, female who are homemakers do not have enough information and knowledge about the breast cancer self-examination that's why cancer is common among the female in the world. Mortality rate is also high among the female with the breast cancer as late diagnosed of the cancer lead toward the death. Therefore, it is needed to develop the awareness as well as training program for the female who are homemakers as well as those who doesn't have enough education or knowledge about the BSE.

We are unaware of any studies on the trends and practices of women visiting primary care institutions about mammogram screening and breast self-examination for prevention and early detection of breast cancer. Therefore, the objective of this study is to assess the knowledge and behavior of female primary care center patients in Abha City, Kingdom of Saudi Arabia, regarding breast self-examination and mammography screening for breast cancer prevention and early detection.

1.2. Background of Study

Breast cancer is the most prevalent type, accounting for 2.26 million new cases and 685,000 fatalities globally from cancer, breast cancer was the most common type of cancer among women in Saudi Arabia in 2014, making up 15.9% of all cancer cases reported [14]. Early identification of breast cancer may result in lower risks, a better prognosis, and more effective results and therapies.

Primary healthcare facilities are vital for preventing breast cancer because women in Saudi Arabia are reported to lack awareness and use mammograms seldom [15]. By raising women's understanding of the primary risk factors for breast cancer, for example, health education about breast cancer prevention might reduce the burden of breast cancer risks [16]. Mammograms for women should begin at age 50 and continue every two years until they are 74. For younger women between the ages of 40 and 49, selective screening will be used depending on individual criteria. Patients with a family history of breast cancer frequently perform breast cancer self-examinations, and primary care providers who are knowledgeable about breast cancer and its prevalence perform breast cancer self-examinations more frequently than nurses who lack this information. To detect any breast lymph at the early stages of diseases, routine assessment is painless, safe, and simple [17].

As far as we are aware, no research has been done on the trends and practices of women visiting primary care facilities about breast self-examination and mammography screening for prevention and early detection of breast cancer. Therefore, the goal of this study is to evaluate the knowledge and performance of female primary health care patients regarding breast self-examination and mammography screening for breast cancer prevention and early detection in Abha City, Kingdom of Saudi Arabia.

1.3. Purpose of Study

General Objective: This study aims to assess knowledge and performance of women attending primary care centers about breast self-examination and mammogram screening for prevention and early detection of breast cancer.

Specific Objectives:

- To assess awareness of women attending primary care centers in Abha City, Aseer Region, KSA about breast self-examination.
- To explore trends and practices of women attending primary care centers in Abha City, Aseer Region, KSA about mammogram screening.
- To explore the correlation between knowledge, trends and practices of women attending primary care centers in Abha City, Aseer Region, KSA about mammogram screening.

1.4. Research Questions

- What is the awareness prevalence of women attending primary care centers in Abha City, Aseer Region, KSA about breast self-examination?

- What are the trends and practices of women attending primary care centers in Abha City, Aseer Region, KSA about mammogram screening?
- What is the correlation between knowledge, trends and practices of women attending primary care centers in Abha City, Aseer Region, KSA about mammogram screening?

1.5. Definition or Concepts of Terms

- **Mammogram screening:** Breast X-rays are used to look for breast cancer in the absence of symptoms or indicators [18].
- **Breast self-examination:** By feeling for lumps or other changes, a person can examine their own breasts. Self-examinations of the breasts can teach a person how they typically feel and appear and help them recognize when changes take place [19].
- **Primary health care centers:** A community-wide health-care system known as primary healthcare focuses on solving human problems as early as possible along the continuum from health promotion and disease prevention to treatment, rehabilitative services, and pain management, and as practically as is possible from where people live and work. It strives to guarantee their own equitable distribution, as well as the best possible health outcomes [20].
- **Risk factors:** Characteristics or circumstances that increase the likelihood of experiencing a negative event or developing a specific problem or illness. In diverse contexts, such as health, finances, and safety [21].
- **Level of awareness:** Refers to the extent to which individuals or a group is aware, informed, or knowledgeable about a specific topic, issue, or situation [22].
- **Prevention practices:**

Prevention practices are measures, actions, or strategies taken to prevent or mitigate the occurrence, impact, or spread of problems, hazards, diseases, or other undesirable events.

1.6. Significance to Nursing

It will help healthcare institutions to develop the training programs among the female primary healthcare to spread the knowledge about the self-examination about the breast cancer prevention. While nursing education and training would be improved by using certain steps accordingly.

1.7. Summary

Breast Cancer is leading health taking disease. As this disease having roots in around the globe. That's why assessment and prevention of breast cancer is most valuable and interesting topic in the literature. This section presented the statement of problem and background about breast cancer self-examination and mammogram screening. The next section will represent the framework of research and previous studies related to breast cancer self-examination and

mammogram screening.

2. Literature Review

In this part, reference will be made to represent previous studies related to breast cancer self-examination and mammogram screening. As from each corner of the world, many of the research literature are available. For this, we focused on general to specific approach, as we focused first on international, local and national studies. To search out, we use Google scholar and Google search engine by using targeted variables.

2.1. Conceptual Model, Theory, or Framework

The “Health Belief” Model will be applied to this study. This model has been identified as one of the approaches used to assess individual’s anxieties and fear about their health, their ability to follow healthcare advice and how they relate with health professionals within the healthcare facility. Two important components have been identified to affect persons’ choice of a recommended health behavior in the model, *i.e.*, knowledge and belief about susceptibility to breast cancer and its severity. However, availability, affordability, and accessibility to health services as well as clients’ attitude can be possible barriers that may impede prevention of breast cancer and early detection services. It is expected that an increased understanding of the benefit of early detection and availability of essential resources, in the context of a favorable environment may increase screening rates, leading to early detection of breast cancer. The study also drew from the diffusion of innovation “behavioral theory”, which provides the grounds to adopt methods for the quick dissemination and uptake of new programs in breast cancer prevention and early detection into communities through patients, families, and micro-communities [23] (Figure 1).

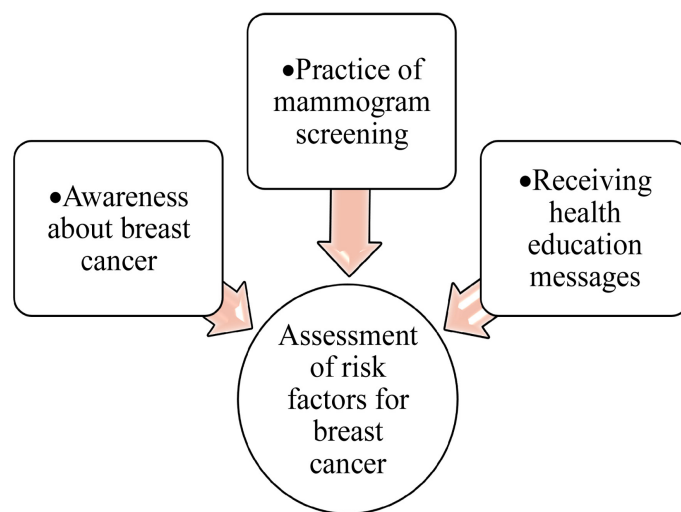


Figure 1. The impact of assessment of risk factors for breast cancer on awareness, practices, and health education programs as outcome variables.

2.2. Evaluation of Evidence

[24] conducted a cross sectional study among women in Riyadh, Saudi Arabia to assess their awareness of breast cancer risks and mammogram screening. It was reported that most of the participants (68%) knew about the warning signs of breast cancer (bleeding or nipple discharge). Approximately 75.8% had a good knowledge about breast cancer risk factors, but 24.4% had a poor knowledge level. Almost 60.9% knew about BSE and mammography utilization are the methods for early detection of breast cancer.

[25] carried out a cross sectional study among college women to assess their awareness of breast cancer preventive methods and risk reduction. The study results showed that most women knew about the risk factors of breast cancer obesity (72%), menopausal hormone therapy (68%), childbearing after age 35 (63%), and alcohol consumption (52%).

Qualitative research was carried out to examine the breast cancer self-examination among the Ghana female's healthcare. The themes suggested that there is lack of screening tools for BSE, there is lack of training among the female healthcare providers, there is lack of awareness among the population and women negative attitude toward the self-examination. The research suggested that breast cancer is prevalent among the female due to lack of resources by using it to control the cancer among them. It also suggested that training or awareness session given by the nursing staff may increase the BSE and decrease the risk of breast cancer.

Nursing staff approximating less than 10% execute the assessment for breast cancer self-examination among the female patient cause of lack of knowledge as well as training as the research suggested that nurses without the minimum education about the assessing the breast cancer, more likely to increase risk of cancer among the patients [26].

Moreover the breast cancer is not only prevalent in the female but the men as well as the lack of self-awareness and understanding regarding breast cancer and its symptoms. Breast cancer's early detection help in getting it worse among the female. The early stage of breast cancer diagnosed if the patients are habitual of self-assessment regarding it. The self-assessment is commonly practices among the female who have family history of breast cancer or any kind of cancer [27].

The self-examination regarding the breast cancer is one of the costs friendly as there is no need of equipment or tools to assess the breast cancer. Breast cancer self-assessment is painless, safe and easy to assess regularly to identify any lymph in the breast at the early stage of diseases. Breast cancer self-examination minimize the risk of cancer [28].

Furthermore, a cross sectional study was carried out by [29] to examine the female breast cancer cares. The result suggested that female who does not have information and insight about the breast cancer, they find the lymph but wait to increase in its size and when it increases in size they indulge in the denial phase as it is not the cancerous lymph which pushes them toward the cancer.

Also, the breast cancer self-examination among the students is also important factor to prevent it at early stage. Research was conducted to see the students' awareness about the BSE which was quite negative but after the training about the BSE, it was found that they were able to self-evaluate about the breast cancer. The training and awareness about the breast cancer decrease the prevalence chances among the patients as well as increase the knowledge about the BSE [30].

A previous study was conducted in Saudi Arabia among women to assess their awareness of breast cancer, risk factors and its reduction/prevention. In adequate awareness was reported among women concerning breast cancer warning signs, risk factors, and breast self-efficiency to reduce the breast cancer risks which were associated with their marital status, occupational status, and the educational level. Likewise, the younger female is more aware of breast cancer and they frequently assess themselves as there are multiple factors associated with the breast cancer, most important factor is genetic factor associated with the breast cancer. As the research suggested that there is gap of knowledge about the breast cancer self-examination among the older females. As it is observed that breast cancer is prevalent among the older female than the younger one.

In the KSA, female is reluctant to use the tools such as mammography as they consider it painful due to which they avoid the examination of breast cancer therefore there is increase in the cancer. The self-examination is easy for them to evaluate themselves at the early stage of any lymph which prevents the further cancer among them. The mammography is reported as costly to examine daily, weekly or monthly basis. As compared to it self-examination is effective and time consuming.

As a study of [31] showed there is positive attitude toward the breast cancer self-examination among the female in KSA. The study was carried out to see the attitude and awareness of female about the breast cancer. The result suggested that after the awareness program giving by the nursing staff among the female had positive impact on their attitude toward the BSE. Mass media has an important role in spreading the breast cancer self-examination awareness programs and public service messages and also its prevention among the young female.

2.3. Summary

The second section dealt with previous studies and literature related to breast cancer self-examination and mammogram screening. In the third section, the method of conducting the study and the administration used for the study will be discussed in detail.

3. Methodology

Introduction

This section discusses the study design, data gathering procedure, and sample selection including inclusion and exclusion criteria, study instrument and statis-

tical treatment of data.

3.1. Identification of Design

Cross-sectional study design, which serves assessing the prevalence or magnitude of a research point of interest, e.g., disease, knowledge, or practice among participants. A cross-sectional study has the advantage of enabling researchers to compare a wide range of factors.

3.2. Target Group or Aggregate

The target group of this research was the women attending primary care centers at Abha City. The women in the target group were selected using a convenience sampling method. Convenience sampling is a non-probability sampling technique in which participants are selected on the basis of their availability and willingness to participate. In this case, women who were attending primary care centres in Abha city and met the inclusion criteria were selected. The required study sample was determined based on the inclusion and exclusion criteria from a totally 384 women attending primary care centers by using Open-Epi program at a confidence level at 95%, margin of error 5%, response distribution 50%.

3.3. Inclusion Criteria

- Willing to participate in the study.
- Women (aged >17 years), who attend the study settings.
- Those who do not have breast cancer.

3.4. Exclusion Criteria

- Those with confirmed diagnosis of breast cancer.
- Those who are not willing to participate.

4. Methodology

The study was conducted at Primary health care centers, Abha City, Aseer Region, Saudi Arabia.

4.1. Plan and Implementation Process

Data were collected in 3 months. Before starting the study, written permission was obtained from Institution Review Board Standing Committee at Hail University (H-2023-024). Then, with the approval of the Migration and Refugee Board, of the Provincial Directorate of Health in Aseer Province, data collection permission was obtained. While from the participants, written consent was obtained by briefly stating the purpose of the study. By signing an informed consent form, the participant will be able to participate in the study. The questionnaire was distributed through a Google form, where this was done in cooperation with nurses in health centers and in cooperation with managers in health centers to facilitate the task in the presence of the researcher, where the re-

searcher collected data, set coding, and stored all data in the password-protected drive. Further data analysis was carried out according to the research requirements.

4.2. Study Instrument

A study questionnaire was developed in a simple Arabic language. It was adapted from those used by similar studies. The study questionnaire comprises the following parts:

1) Personal characteristics (8 questions): Age, having regular menses, marital status, absolute breastfeeding practices, educational status, employment status, average monthly family income, and residence.

2) Awareness about breast cancer (6 questions): Having heard about breast cancer, sources of information about breast cancer, knowing a woman that has been diagnosed of breast cancer, screening methods, risk factors, and symptoms of breast cancer.

3) Assessment of risk factors for breast cancer (14 questions): Age at menarche, age at marriage, age at first pregnancy, number of pregnancies and abortions, number of children, use of hormonal contraceptives, family history of cancer breast, practice of physical activity, and smoking status.

4) Trends and screening practices for breast cancer (12 questions): Age at start of BSE, being vulnerable to breast cancer, benefits of early diagnosis of breast cancer, advising others to perform BSE, what has been done for early diagnosis of breast cancer, intention to perform BSE in the future, sources of advice to perform BSE, frequency of performing BSE, how to perform BSE, and reasons for not performing BSE.

5) Practice of mammogram screening.

6) Receiving health education messages related to breast cancer prevention during their visits to the primary health care centers.

4.3. Scoring and Grading of Responses

A score was assigned for each positive awareness item, good practice response and a performed screening practice, and a score of (0) was assigned for each negative awareness item. The total scores for awareness, trends, risks and practice will be summed up, then the percent total score of each was calculated by dividing $(\text{total score} \times 100) / (\text{maximum score})$.

Participants' grades of awareness toward breast cancer were decided as follows: (33).

- Poor awareness: <15%;
- Moderate awareness: 15% - 25%;
- Good awareness: >25%.

Participants' trends and practices regarding early diagnosis of breast cancer was decided as follows:

- Poor: <25%;
- Good: $\geq 25\%$;

Risk factors for breast cancer will be decided as follows:

- Less risk factor: <15%;
- Moderate risk factor: 15% - 25%;
- High Risk factor awareness: >25%.

4.4. Validity and Reliability

In order to ensure the validity and reliability of the questionnaire, several steps were taken. First, the questionnaire was modified from questionnaires previously used in similar studies conducted. This adaptation process included reviewing previous questionnaires and modifying and adding questions to align with the objectives of the current study. In addition, the questionnaire was translated into simple Arabic to ensure comprehensibility and suitability for the target population. The translation process included input from bilingual experts to ensure accurate translation and cultural appropriateness.

The validity of the questionnaire was evaluated by conducting a pilot test on a small sample of women attending primary care centers in the city of Abha. This pilot test helped identify any ambiguity or difficulties in understanding the questions and allowed for the necessary modifications to be made.

Regarding content validity, the questionnaire was reviewed by experts in the field of breast cancer prevention. The questionnaire was evaluated to ensure that it adequately covers aspects relevant to breast cancer prevention and that the questions are clear and appropriate for the target population. Internal consistency, which measures the extent to which questions in the questionnaire relate to each other, was assessed through measures such as Cronbach's alpha, where a high Cronbach's alpha indicates that the questions in the questionnaire are measuring the same underlying construct.

4.5. Ethical Consideration

Furthermore, the purpose of the study was explained to the participants, and it was stressed that the information is confidential and that participation in the study is voluntary.

4.6. Summary

In the third section, the method of conducting the study, the tool used in the study, in addition to the study criteria and data extraction, data management, plan and implementation process, and everything related to the method, were discussed, and this was summarized in detail, as this explains everything that has been done.

5. Project Outcomes

The fourth section would include a description of the results of the study and answering the study questions. The results would be presented in tables and comments on the results.

Table 1 shows the Sociodemographic characteristics, there were (384) participants participated in our study, regarding to the Age, most of our participants from the age (28 - 38 years) (34.6%). Moreover, (54.4%) had regular menstrual cycle and (53.1%) were married. Only (25.8%) had Practice exclusive breastfeeding of your children for at least 6 months to all children. (26.8%) from our

Table 1. Frequencies and percentages regarding socio demographic characteristics.

| | N | % |
|--|-----|------|
| Age | | |
| 17 - 27 | 71 | 18.5 |
| 28 - 38 | 133 | 34.6 |
| 39 - 49 | 62 | 16.1 |
| 50 - 60 | 50 | 13.0 |
| more than 60 | 68 | 17.7 |
| Is the menstrual cycle regular? | | |
| Yes | 209 | 54.4 |
| No | 175 | 45.6 |
| Familial status | | |
| Single | 156 | 40.6 |
| Married | 204 | 53.1 |
| Divorced | 18 | 4.7 |
| Widowed | 6 | 1.6 |
| Practice exclusive breastfeeding of your children for at least 6 months | | |
| Yes to all children | 99 | 25.8 |
| No to all children | 198 | 51.6 |
| Yes for some children | 87 | 22.7 |
| Educational level | | |
| Illiteracy | 64 | 16.7 |
| Primary | 121 | 31.5 |
| Middle | 51 | 13.3 |
| Secondary | 45 | 11.7 |
| Collegiate | 103 | 26.8 |
| Job status | | |
| Work | 193 | 50.3 |
| Not Work | 191 | 49.7 |
| Average monthly household income (SR) | | |
| Less than 10,000 | 111 | 28.9 |
| 10,000 - 20,000 | 182 | 47.4 |
| More than 20,000 | 91 | 23.7 |
| Living | | |
| City | 180 | 46.9 |
| Village | 204 | 53.1 |

participants had Collegiate degree. There were (50.3%) were worked and (49.7%) not work. Regarding to the average monthly household income (SR), (47.4%) from our participants (10,000 - 20,000), and most of them lived in the village (53.1%).

Table 2 shows that (88.5%) had poor awareness about breast self-examination, and (11.5%) had moderate awareness about breast self-examination.

Table 3 shows that there were (68.5%) from our participants had less risk factors regarding the breast cancer, (24.5%) and (1.0%) had moderate and high risk factors regarding breast cancer respectively.

Table 4 shows that more than half of the study participants heard about breast cancer. In addition, the main source of knowledge is social media and books. However, the least source of knowledge is health care professionals. Likewise, 48.7% of the study participants have not met anyone diagnosed with breast cancer. Based on the provided results, it seems that the main methods to detect breast cancer are breast self-examination as 43% of participants replied. Moreover, 44% of the study participants have no prior knowledge about any methods could be used to detect breast cancer. The results of the study revealed that study participants believed that the major risk factors of developing breast cancer are hereditary (28.6%) and medicines (26.8%). However, they believed unhealthy lifestyle is the less common risk factors reported among the study participants. When the study participants asked about the symptoms of breast cancer, the results appeared that 37.5% of them believed sensation of a lump in breast cancer and presence of nipple secretion (35.4%) are the main symptoms compared to 1.3% of participants thought inward turning of the nipple.

Table 5 indicates that study participations believed female when she reached puberty before aged 15 years increases the risk of breast cancer as 67.8% of the sample outlines. In addition, other risk factors were noticed is age of marriage. For instance, they thought females when got married before aged 24 years increases the risk of breast cancer. In addition, half of the study sample believed

Table 2. Knowledge about breast self-examination among women.

| | N | % | |
|-----------|--------------------|-----|-------|
| Knowledge | Poor awareness | 340 | 88.5 |
| | Moderate awareness | 44 | 11.5 |
| | Good awareness | 0 | 0.0 |
| | Total | 384 | 100.0 |

Table 3. Risk rates about breast cancer among women.

| | N | % |
|-----------------------|-----|------|
| Less risk factors | 263 | 68.5 |
| Moderate risk factors | 94 | 24.5 |
| High risk factors | 27 | 7.0 |

Table 4. The study respondents on knowledge scale of breast cancer.

| Knowledge Scale | Frequency | Percent |
|--|-----------|---------|
| Have you heard about breast cancer? | | |
| Yes | 209 | 54.4 |
| No | 175 | 45.6 |
| If yes, what are your sources of information about breast cancer? | | |
| Books | 91 | 23.7 |
| Social media | 148 | 38.5 |
| Internet | 77 | 20.1 |
| Friends and relatives | 21 | 5.5 |
| Teachers | 27 | 7.0 |
| Doctors and nurses | 20 | 5.2 |
| Have you met or known a patient with breast cancer? | | |
| yes | 187 | 48.7 |
| no | 197 | 51.3 |
| What are the methods of early detection of breast cancer that you know? | | |
| I don't know any method | 169 | 44.0 |
| Breast self-examination | 165 | 43.0 |
| Clinical examination of the breast | 23 | 6.0 |
| Radiological examination for the breast (mammogram) | 27 | 7.0 |
| What are the risk factors for women developing breast cancer that you know of? | | |
| Hereditary | 110 | 28.6 |
| Medicines | 103 | 26.8 |
| Exposure to radiation | 28 | 7.3 |
| old age | 19 | 4.9 |
| Unhealthy lifestyle | 11 | 2.9 |
| Childlessness | 13 | 3.4 |
| Puberty at an early age | 14 | 3.6 |
| Menopause at a late age | 14 | 3.6 |
| Obesity | 27 | 7.0 |
| Infection of family members with breast cancer | 43 | 11.2 |
| Other causes | 2 | 0.5 |
| What are the symptoms of breast cancer that you know? | | |
| Sensation of a lump in the breast | 144 | 37.5 |
| Presence of nipple secretions | 136 | 35.4 |
| Nipple swelling | 21 | 5.5 |
| Ulceration of the breast | 30 | 7.8 |
| Inward turning of the nipple | 6 | 1.6 |
| Breast pain | 5 | 1.3 |
| Redness of the breast | 9 | 2.3 |
| Itching in the nipple | 16 | 4.2 |
| Having an armpit contract | 8 | 2.1 |
| Others | 9 | 2.3 |

Table 5. The study respondents on risk factor of breast cancer.

| Risk Factor | Frequency | Percent |
|---|-----------|---------|
| How old were you when you reached puberty? | | |
| 9 - 12 | 151 | 39.3 |
| 12 - 15 | 148 | 38.5 |
| 15 - 18 | 38 | 9.9 |
| 15 - 21 | 47 | 12.2 |
| How old were you when you got married? | | |
| 16 - 20 | 150 | 39.1 |
| 20 - 24 | 141 | 36.7 |
| 24 - 28 | 27 | 7.0 |
| 28 - 32 | 28 | 7.3 |
| More than 32 | 38 | 9.9 |
| How old were you when you got pregnant for the first time? | | |
| 16 - 20 | 148 | 38.5 |
| 20 - 24 | 138 | 35.9 |
| 24 - 28 | 19 | 4.9 |
| 28 - 32 | 34 | 8.9 |
| More than 32 | 45 | 11.7 |
| Number of pregnancies | | |
| 0 | 172 | 44.8 |
| 1 - 3 | 163 | 42.4 |
| 4 - 6 | 22 | 5.7 |
| More than 6 | 27 | 7.0 |
| The number of abortions | | |
| 0 | 175 | 45.6 |
| 1 - 3 | 148 | 38.5 |
| 4 - 6 | 40 | 10.4 |
| More than 6 | 21 | 5.5 |
| Number of children | | |
| 0 | 179 | 46.6 |
| 1 - 3 | 135 | 35.2 |
| 4 - 6 | 41 | 10.7 |
| More than 6 | 29 | 7.6 |
| Have you used pills or injections to prevent pregnancy? | | |
| Yes | 192 | 50.0 |
| No | 192 | 50.0 |
| If the answer to the previous question is yes, how long did you use contraceptives? | | |
| 1 year | 163 | 42.4 |
| 2 years | 152 | 39.6 |
| 3 years | 31 | 8.1 |
| More than 3 years | 38 | 9.9 |
| Has anyone in your family had breast cancer? | | |
| Yes | 204 | 53.1 |
| No | 180 | 46.9 |

Continued

| | | |
|--|-----|------|
| If the answer to the previous question is yes, what is the degree of her kinship to you? | | |
| Sister | 126 | 32.8 |
| Mother | 129 | 33.6 |
| Grandmother | 23 | 6.0 |
| Aunt | 77 | 20.1 |
| Other | 29 | 7.6 |
| Do you do any physical activities to maintain your weight? | | |
| Yes | 202 | 52.6 |
| No | 182 | 47.4 |
| If the answer to the previous question is yes, what are these activities? | | |
| Walking | 170 | 44.3 |
| Jogging | 156 | 40.6 |
| Sports | 21 | 5.5 |
| Other | 37 | 9.6 |
| How often do you do this physical activity? | | |
| Every day | 146 | 38.0 |
| Once a week | 133 | 34.6 |
| Once a month | 44 | 11.5 |
| Irregular | 61 | 15.9 |
| Do you smoke? | | |
| Yes | 162 | 42.2 |
| No | 183 | 47.7 |

using pills or injection could increase the risk of breast cancer. More than half of the study sample highlights positive family history increases the risk for breast cancer. This risk is accelerated when first-degree family relative diagnosed with breast cancer, as described in **Table 5**.

Table 6 shows that (61.7%) had poor practice and trends in the early diagnosis of breast cancer, and (33.9%) and (4.4%) had moderate and good practice respectively in the early diagnosis of breast cancer.

Table 7 shows the One-Sample Statistics according to the knowledge about breast self-examination, risk factors about breast cancer, trends and practices in early diagnosing of breast cancer, the highest mean was regarding the trends and practice (0.43). There was a positive significant statistical relationship regarding the knowledge about breast self-examination, risk factors about breast cancer, trends and practices in early diagnosing of breast cancer at P-value (0.00, 0.000, 0.00) respectively. Increasing knowledge in a positive way about breast cancer reduces the risk of cancer.

Table 8 shows the correlations between the knowledge about breast self-examination with trends and practices in early diagnosing of breast cancer, there were a positive significant statistical correlation between knowledge about breast self-examination with trends and practices in early diagnosing of breast

Table 6. Trends and practices in the early diagnosis of breast cancer.

| | N | % |
|-------------------|-----|------|
| Poor Practice | 237 | 61.7 |
| Moderate Practice | 130 | 33.9 |
| Good Practice | 17 | 4.4 |

Table 7. One-Sample statistics according to the knowledge about breast self examination, risk factors about breast cancer, trends and practices in early diagnosing of breast cancer.

| | N | Mean | Std. Deviation | Std. Error Mean |
|--|-----|------|----------------|-----------------|
| Knowledge about breast self-examination among women | 384 | 0.11 | 0.319 | 0.016 |
| Risk about breast cancer among women | 384 | 0.39 | 0.615 | 0.031 |
| Trends and practices in the early diagnosis of breast cancer | 384 | 0.43 | 0.578 | 0.029 |

| One-Sample Test | | | | | |
|--|--------|-----|---------|-----------------|--|
| Test Value = 0 | | | | | |
| | t | df | P-value | Mean Difference | 95% Confidence Interval of the Difference Lower |
| Knowledge about breast self-examination among Women | 7.040 | 383 | 0.000 | 0.115 | 0.08 |
| Risk about breast cancer among Women | 12.276 | 383 | 0.000 | 0.385 | 0.32 |
| Trends and practices in the early diagnosis of breast cancer | 14.479 | 383 | 0.000 | 0.427 | 0.37 |

Table 8. Correlations between the knowledge about breast self-examination with trends and practices in early diagnosing of breast cancer.

| | Knowledge about breast self-examination | Trends and practices in the early diagnosis of breast cancer |
|--|---|--|
| Knowledge about breast self-examination | Pearson Correlation | 1 |
| | P-value | 0.371** |
| | N | 0.000 |
| Trends and practices in the early diagnosis of breast cancer | Pearson Correlation | 0.371** |
| | P-value | 1 |
| | N | 0.000 |

cancer at P-value = 0.000.

6. Discussion

The results of the study provide important insights into the sociodemographic characteristics of our participants and their knowledge and practice regarding breast cancer. The majority of our participants were in the age range of 28-38 years, which is an important age group for breast cancer screening and early detection. However, the awareness and practice of breast self-examination and early diagnosis of breast cancer were found to be poor among our participants.

It is also noteworthy that a significant percentage of our participants had regular menstrual cycles and were married, which indicates that they may be at higher risk for breast cancer. However, the majority of them had less risk factors for breast cancer. This suggests that there is a need for targeted breast cancer education programs to increase awareness and knowledge among this population.

Furthermore, our study found that the level of education and income had no significant relationship with knowledge and practice related to breast cancer. This highlights the need for targeted education programs that are accessible and culturally appropriate for all socioeconomic groups. It is encouraging to note that there was a significant correlation between knowledge about breast self-examination and early diagnosis of breast cancer, which suggests that education and awareness programs can be effective in promoting early detection and diagnosis of breast cancer. However, further research is needed to identify the most effective methods for promoting breast cancer awareness and early detection among different populations.

In consistent to these finding few studies were found such as a study found that the knowledge about breast cancer and breast self-examination among Omani females was inadequate. Only 15.3% of the participants had ever performed breast self-examination. There was a significant association between education level and knowledge about breast cancer and breast self-examination. Health education programs targeting women in Oman are needed to improve breast cancer knowledge and promote early detection through breast self-examination [32]. As well as a systematic review found that the knowledge about breast cancer and its screening methods was low among women in Saudi Arabia. There were several misconceptions and myths related to breast cancer, such as the belief that it is contagious or caused by stress. The study also found that the utilization of breast cancer screening services was low among women in Saudi Arabia, with many women reporting fear and embarrassment as barriers to undergoing breast cancer screening. And a study found that the knowledge about breast cancer and its risk factors was generally low among female healthcare workers in China. However, the study found that healthcare workers who had received breast cancer education had significantly higher knowledge scores compared to those who had not received such education. The study also found

that many female healthcare workers in China had misconceptions about breast cancer, such as the belief that it is a rare disease or that it only affects older women. In addition to some inconsistent studies such as a study found that only 28.6% of female undergraduate students in Nigeria had adequate knowledge of breast self-examination (BSE). Attitude towards BSE was positive, but practice of BSE was low (14.3%). Factors such as age, marital status, and family history of breast cancer were found to be significantly associated with knowledge, attitude, and practice of BSE [33]. As well as a study found that knowledge was positively associated with breast cancer risk perception and screening behavior in the UK population. Those who were more knowledgeable about breast cancer were more likely to perceive themselves as being at higher risk of developing the disease, and to engage in recommended screening behaviors. And a study found that knowledge of breast cancer and BSE was generally poor among Yemeni women, with only 22.8% of participants having adequate knowledge. However, a positive attitude towards BSE was reported by 85.7% of participants, and 30.2% reported practicing BSE regularly. Factors such as education level, marital status, and having a family member with breast cancer were found to be significantly associated with knowledge, attitude, and practice of BSE [34].

In conclusion, our study provides important information about the sociodemographic characteristics and knowledge and practice related to breast cancer among a specific population. The findings highlight the need for targeted education programs that are culturally appropriate and accessible for all socioeconomic groups to improve early detection and diagnosis of breast cancer.

6.1. Strengths and Limitations of the Study

Strengths of the study include the large sample size, which increases the generalizability of the results. Additionally, the study covered a range of sociodemographic characteristics, breast cancer knowledge, risk factors, and practices, providing a comprehensive understanding of the topic.

However, studying has several limitations. First, the study relied on self-reported data, which may be subject to recall bias and social desirability bias. Second, the study was conducted in a specific geographical area, and the findings may not be generalizable to other populations. Third, the study did not consider factors such as cultural beliefs and health literacy, which may influence breast cancer knowledge, risk factors, and practices.

Overall, the study provides valuable insights into the breast cancer-related knowledge, risk factors, and practices among women in the study population, but future studies should address the limitations identified to increase the validity and reliability of the findings.

6.2. Conclusion

In conclusion, the study found that there were several sociodemographic characteristics associated with breast cancer knowledge and practice among the par-

ticipants. A majority of participants were aged between 28 - 38 years and had a regular menstrual cycle, while a small percentage of them had a collegiate degree and practiced exclusive breastfeeding for at least 6 months. The study also found that the participants had poor awareness and knowledge about breast self-examination and trends and practices in the early diagnosis of breast cancer. Furthermore, there was a significant relationship between knowledge about breast self-examination, risk factors for breast cancer, and trends and practices in early diagnosing of breast cancer. The study recommends increasing awareness campaigns on breast cancer and providing educational programs for women to improve their knowledge and practices related to early breast cancer detection.

6.3. Implications for Nursing

The study has important implications for nursing practice. The findings suggest that there is a need for more education and awareness programs for women regarding breast self-examination, risk factors for breast cancer, and early diagnosis of breast cancer. Nurses can play a vital role in educating and raising awareness among women about breast cancer, its risk factors, and early detection methods. They can provide individualized education sessions to women, and also develop group education sessions for communities to raise awareness about the importance of early diagnosis and treatment of breast cancer.

Additionally, nurses can work with other healthcare providers to ensure that women have access to breast cancer screening programs and resources. They can also collaborate with community organizations and stakeholders to develop community-based programs that focus on breast cancer awareness and education.

Overall, the study highlights the importance of nursing interventions in promoting breast cancer awareness, education, and early detection. By implementing these interventions, nurses can help reduce the burden of breast cancer and improve health outcomes for women.

6.4. Recommendations for Further Future

Firstly, future studies can focus on increasing the sample size and including a more diverse population to increase the generalizability of the findings. Additionally, researchers can use a randomized controlled trial design to test the effectiveness of educational interventions aimed at improving knowledge and practice related to breast cancer.

Secondly, qualitative studies can be conducted to explore the cultural and societal beliefs and practices that influence the knowledge and practices related to breast cancer among women. This information can be used to develop culturally sensitive and tailored interventions to improve breast cancer knowledge and practice.

Lastly, future studies can also explore the role of healthcare providers in promoting early detection and diagnosis of breast cancer. This can include investi-

gating the barriers that prevent healthcare providers from effectively educating and screening women for breast cancer and developing strategies to address these barriers.

Overall, the findings of this study highlight the need for improved education and awareness campaigns to promote breast cancer knowledge and practice among women. Future research can build upon these findings to develop effective interventions and strategies to improve breast cancer outcomes.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

- [1] WHO: World Health Organization (2021) "Cancer". <http://www.who.int/topics/cancer/en/>
- [2] Nyante, S.J., Biritwum, R.B., Figueroa, J.D., Graubard, B.I., Awuah, B., Addai, B.W., Yarney, J., Clegg-Lamptey, J.N., Ansong, D., Nyarko, K., Wiafe, S., Oppong, J.K., Boakye, I., Brotzman, M., Adjei, R., Afriyie, L., García-Closas, M. and Brinton, L.A. (2019) Recruiting Population Controls for Case-Control Studies in Sub-Saharan Africa: The Ghana Breast Health Study. *PLOS ONE*, **14**, e0215347. <https://doi.org/10.1371/journal.pone.0215347>
- [3] Saggi, S., Rehman, H., Abbas, Z.K. and Ansari, A.A. (2015) Recent Incidence and Descriptive Epidemiological Survey of Breast Cancer in Saudi Arabia. *Saudi Medical Journal*, **36**, 1176-1180. <https://doi.org/10.15537/smj.2015.10.12268>
- [4] Zeeshan, M., Salam, B., Khalid, Q.S.B., Alam, S. and Sayani, R. (2018) Diagnostic Accuracy of Digital Mammography in the Detection of Breast Cancer. *Cureus*, **10**, e2448. <https://doi.org/10.7759/cureus.2448>
- [5] Balekouzou, A., Yin, P., Pamatika, C.M., Nambei, S.W., Djeintote, M., Doromandji, E., Gouaye, A.R., Yamba, P.G., Guessy, E.E., Ba-Mpoutou, B., Mandjiza, D.R., Shu, C., Yin, M., Fu, Z., Qing, T., Yan, M., Mella, G. and Koffi, B. (2016) Assessment of Breast Cancer Knowledge among Health Workers in Bangui, Central African Republic: A Cross-Sectional Study. *Asian Pacific Journal of Cancer Prevention*, **17**, 3769-3776.
- [6] Radi, S.M. (2013) Breast Cancer Awareness among Saudi Females in Jeddah. *Asian Pacific Journal of Cancer Prevention*, **14**, 4307-4312. <https://doi.org/10.7314/APJCP.2013.14.7.4307>
- [7] Holman, D.M. and Buchanan, N.D. (2016) Opportunities during Early Life for Cancer Prevention: Highlights from a Series of Virtual Meetings with Experts. *Pediatrics*, **138**, S3-S14. <https://doi.org/10.1542/peds.2015-4268C>
- [8] Thomson, C.A., McCullough, M.L., Wertheim, B.C., Chlebowski, R.T., Martinez, M.E., Stefanick, M.L., Rohan, T.E., Manson, J.E., Tindle, H.A., Ockene, J., Vitolins, M.Z., Wactawski-Wende, J., Sarto, G.E., Lane, D.S. and Neuhouser, M.L. (2014) Nutrition and Physical Activity Cancer Prevention Guidelines, Cancer Risk, and Mortality in the Women's Health Initiative. *Cancer Prevention Research*, **7**, 42-53. <https://doi.org/10.1158/1940-6207.CAPR-13-0258>
- [9] Go, L. and Sandhu, P. (2020) Standardizing Mammogram Screening in Primary Care: Integrating an Evidence-Based Approach. *Journal of the American Associa-*

- tion of Nurse Practitioners, **33**, 688-697.
<https://doi.org/10.1097/JXX.0000000000000418>
- [10] Bashirian, S., Barati, M., Mohammadi, Y., Moaddabshoar, L. and Dogonchi, M. (2019) An Application of the Protection Motivation Theory to Predict Breast Self-Examination Behavior among Female Healthcare Workers. *The Journal of Breast Health*, **15**, 90-97. <https://doi.org/10.5152/ejbh.2019.4537>
- [11] Mekonnen, B.D. (2020) Breast Self-Examination Practice and Associated Factors among Female Healthcare Workers in Ethiopia: A Systematic Review and Meta-Analysis. *PLOS ONE*, **15**, e0241961.
<https://doi.org/10.1371/journal.pone.0241961>
- [12] Shallo, S.A. and Boru, J.D. (2019) Breast Self-Examination Practice and Associated Factors among Female Healthcare Workers in West Shoa Zone, Western Ethiopia 2019: A Cross-Sectional Study. *BMC Research Notes*, **12**, Article No. 637.
<https://doi.org/10.1186/s13104-019-4676-3>
- [13] Alomair, A., Felemban, D., Felemban, M., Awadain, J., Altowairqi, A., Alfawzan, N., Almazayen, F., Korkoman, A. and Alrusayyis, N. (2020) Knowledge, Attitude, and Practice of Breast Self-Examination toward Breast Cancer among Female Students at King Saud University in Riyadh, Saudi Arabia. *International Journal of Medicine in Developing Countries*, **4**, 429-434.
<https://doi.org/10.24911/IJMDC.51-1576668182>
- [14] Asiri, S., Asiri, A., Ulahannan, S., Alanazi, M., Humran, A. and Hummadi, A. (2020) Incidence Rates of Breast Cancer by Age and Tumor Characteristics among Saudi Women: Recent Trends. *Cureus*, **12**, e6664.
<https://doi.org/10.7759/cureus.6664>
- [15] Rojas, K. and Stuckey, A. (2011) Breast Cancer Epidemiology and Risk Factors. *Clinical Obstetrics and Gynecology*, **54**, 96-102.
<https://doi.org/10.1097/GRF.0b013e3182080056>
- [16] Tewabe, T. and Mekuria, Z. (2019) Knowledge and Practice of Breast Self-Examination among Undergraduate Student in Bahir Dar University, North-West Ethiopia, 2016: A Cross-Sectional Study. *Journal of Public Health in Africa*, **10**, 31-34.
<https://doi.org/10.4081/jphia.2019.805>
- [17] Medcalf, A. and Nunes, J. (2018) Visualising Primary Health Care: World Health Organization Representations of Community Health Workers, 1970-89. *Medical History*, **62**, 401-424. <https://doi.org/10.1017/mdh.2018.40>
- [18] Binhussien, B.F. and Ghoraba, M.A. (2018) Awareness of Breast Cancer Screening and Risk Factors among Saudi Females at Family Medicine Department in Security Forces Hospital, Riyadh. *Journal of Family Medicine and Primary Care*, **7**, 1283-1287. https://doi.org/10.4103/jfmipc.jfmipc_286_18
- [19] Chen, X., Chen, J., Wen, Y., Huang, X., Xie, M. and Liu, Y. (2020) A Cross-Sectional Study of Breast Cancer Awareness among Female Healthcare Workers in China. *BMC Public Health*, **20**, Article No. 1327.
- [20] Azemfac, K., Christie, S.A., Carvalho, M., Nana, T., Fonje, A.N., Halle-Ekane, G., Dicker, R., Mefire, A.C. and Juillard, C. (2019) A Community-Based Assessment of Knowledge and Practice of Breast Self-Examination and Prevalence of Breast Disease in Southwest Cameroon. *Journal of Cancer Epidemiology*, **2019**, Article ID: 2928901. <https://doi.org/10.1155/2019/2928901>
- [21] Bonsu, A.B. and Ncama, B.P. (2019) Integration of Breast Cancer Prevention and Early Detection into Cancer Palliative Care Model. *PLOS ONE*, **14**, e0212806.
<https://doi.org/10.1371/journal.pone.0212806>

- [22] Kratzke, C., Amatya, A. and Vilchis, H. (2014) Breast Cancer Prevention Knowledge, Beliefs, and Information Sources between Non-Hispanic and Hispanic College Women for Risk Reduction Focus. *Journal of Community Health*, **40**, 124-130. <https://doi.org/10.1007/s10900-014-9908-9>
- [23] Mensaah, A.B.B., Mensah, K.B., Aborigo, R., Bangalee, V., Oosthuizen, F., Kugbey, N., Clegg-Lampsey, J.N., Virnig, B.A., Kulasingam, S. and Ncama, B.P. (2022) Breast Cancer Screening Pathways in Ghana: Applying an Exploratory Single Case Study Methodology with Cross-Case Analysis. *Social Science Research Network*, **8**, 1-11. <https://doi.org/10.2139/ssrn.4148414>
- [24] Al-Zalabani, A.H., Alharbi, K.D., Fallatah, N.I., Alqabshawi, R.I., Al-Zalabani, A.A. and Al-Ghamdi, S. (2016) Breast Cancer Knowledge and Screening Practice and Barriers among Women in Madinah, Saudi Arabia. *Journal of Cancer Education*, **33**, 201-207. <https://doi.org/10.1007/s13187-016-1057-7>
- [25] Ginsburg, O., Yip, C., Brooks, A.D., Cabanes, A., Caleffi, M., Yataco, J.A.D., Gyawali, B., McCormack, V., De Anderson, M.M., Mehrotra, R., Mohar, A., Murillo, R., Pace, L.E., Paskett, E.D., Romanoff, A., Rositch, A.F., Scheel, J.R., Schneidman, M., Unger-Saldaña, K., Anderson, B.O., et al. (2020) Breast Cancer Early Detection: A Phased Approach to Implementation. *Cancer*, **126**, 2379-2393. <https://doi.org/10.1002/cncr.32887>
- [26] Koç, G., Gulen-Savas, H., Ergöl, Ş., Yildirim-Cetinkaya, M. and Aydın, N. (2019) Female University Students' Knowledge and Practice of Breast Self-Examination in Turkey. *Nigerian Journal of Clinical Practice*, **22**, 410-415. https://doi.org/10.4103/njcp.njcp_341_18
- [27] Rahman, S.A., Al-Marzouki, A., Otim, M., Khalil Khayat, N.E.H., Yousuf, R. and Rahman, P. (2019) Awareness about Breast Cancer and Breast Self-Examination among Female Students at the University of Sharjah: A Cross-Sectional Study. *Asian Pacific Journal of Cancer Prevention*, **20**, 1901-1908. <https://doi.org/10.31557/APJCP.2019.20.6.1901>
- [28] Osei-Afryie, S., Addae, A.K., Oppong, S.A., Amu, H., Ampofo, E. and Osei, E. (2021) Breast Cancer Awareness, Risk Factors and Screening Practices among Future Health Professionals in Ghana: A Cross-Sectional Study. *PLOS ONE*, **16**, e0253373. <https://doi.org/10.1371/journal.pone.0253373>
- [29] Zare Marzouni, H., Najibpour, R., Shalilian, M., Fakhr, M.S., Nazarzadeh, R., Farshad, A. and Bahrami, N. (2014) Women's Awareness and Attitude toward Breast Self-Examination in Dezful City, Iran, 2013. *Iranian Red Crescent Medical Journal*, **17**, e17829. <https://doi.org/10.5812/ircmj.17829>
- [30] Al-Sharbatti, S.S., Al-Haddabi, M. and Al-Sharbatti, M.M. (2018) Knowledge, Attitudes and Practices towards Breast Cancer Self-Examination among Females in Oman: A Cross-Sectional Study. *Sultan Qaboos University Medical Journal*, **18**, e192-e198.
- [31] Alharbi, M.F., Alshammari, F.S. and Alsaqabi, R.M. (2019) Breast Cancer Knowledge, Attitudes, and Screening Behaviors among Women in Saudi Arabia: A Systematic Review. *Journal of Cancer Education*, **34**, 1-11.
- [32] Jibiri, N.N. and Osagbemi, K.G. (2020) Knowledge, Attitude and Practice of Breast Self-Examination among Female Undergraduates in Nigeria. *BMC Public Health*, **20**, Article No. 805.
- [33] Koo, M.M., von Wagner, C., Abel, G.A. and McPhail, S. (2018) Does Knowledge Matter in Cancer Risk Perception and Screening Behavior? A Population-Based Study from the United Kingdom. *Journal of Public Health*, **40**, e477-e485.

- [34] Hadi, M.A. and Hassali, M.A. (2017) Breast Cancer Knowledge, Perception and Breast Self-Examination Practices among Yemeni Women: A Cross-Sectional Study. *Asian Pacific Journal of Cancer Prevention*, **18**, 2973-2980.