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Knowledge and Awareness of Breast Cancer; Its Causes, Prevalence and Prevention.

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Abstract

Breast cancer represents the most prevalent malignancy and the leading cause of cancer-related mortality among females globally. Approximately 1.38 million new cases of breast cancer were diagnosed in 2008, with nearly 50% of all breast cancer patients and approximately 60% of deaths occurring in developing countries. A significant disparity exists in breast cancer survival rates worldwide, with the 5-year survival rate estimated at 80% in developed nations compared to less than 40% in developing countries. This study aimed to assess the level of understanding and knowledge regarding breast cancer among the population in Al Hudaydah City and its suburbs.

This study employed a descriptive cross-sectional design to determine the knowledge about the prevalence of breast cancer and its associated factors among the population of Al Hudaydah City and its suburbs, Yemen. The study was conducted in Al Hudaydah City and its suburbs from September 2022 to December 2022. The findings of this study revealed that the majority of participants exhibited low levels of knowledge concerning breast cancer and its preventive measures. Furthermore, the results indicated that while 80% of women with breast cancer were aware of breast self-examination (BSE), only 76% practiced BSE. Overall, a notable deficit in knowledge regarding breast cancer, encompassing its etiology, screening methods, and prevention strategies, was observed, with the majority possessing only a moderate level of understanding.

Keywords: Breast Cancer; Knowledge; Prevention; Etiology; Developing Countries.

1. Introduction

1.1. Incorporation of Breast Cancer

Breast cancer is the most common cancer and also the primary cause of mortality due to cancer in female around the World. About 1.38 million new breast cancer cases were diagnosed in 2008 with almost 50% of all breast cancer patients and approximately 60% of deaths occurring in developing countries. There is a huge difference in breast cancer survival rates worldwide, with an estimated 5-year survival of 80% in developed countries to below 40% for developing countries [1].

Developing countries face resource and infrastructure constraints that challenge the objective of improving breast cancer outcomes by timely recognition, diagnosis and management [2].

In developed countries like the United States, about 232,340 females will be diagnosed and death of 39,620 females will occur due to breast cancer in 2013. The lifetime risk of developing breast cancer in an American female is 12.38% [3].

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The significant decline in morality due to breast cancer in the United States from 1975 to 2000 is attributed to constant enhancement in both screening mammography and management [3].

According to the World Health Organization (WHO), enhancing breast cancer outcome and survival by early detection remains the foundation of breast cancer regulations. Different modern medicines are prescribed to treat breast cancer. Medical therapy of breast cancer with antiestrogens such as raloxifene or tamoxifen might avoid breast cancer in individuals who are at increased possibility of developing it [4].

1.2. Epidemiology of breast cancer

Currently, one in twelve females in Britain between age of 1 and 85 years gets breast cancer. With one mil- lion new cases of cancers reported in the World, breast cancer is common in females and comprises 18% of all women cancer. Incidence of breast cancer is predicted to increase to 85 per 100,000 women by 2021[5].

In 2017, 1.67 million new cases of breast cancer were diagnosed that is 25% of all cancers among women. Ferlay et al. stated that 883,000 cases are in less developed countries and 794,000 in most developed countries. According to the data, 145.2 women in Belgium and 66.3 in Poland between 100,000 suffer from breast cancer. Incidence of breast cancer in the United States is one out of eight women and in Asia one woman suffers from breast cancer out of 35. In Iran, there are 10 cases in 100,000 populations and 7000 new cases have been reported annually [6].

1.3. Breast cancer in Yemen

Breast cancer is the most common malignancy in Yemen and the first leading cause of cancer death. Breast cancer data from Yemen's main cancer registries NOC, Aden, Taiz, Mukalla, Sayoun and Shabwah showed a variation in the number of cases reported by each registry and ranged between 13.8% to 22% according to oncology centers reports. Although the incidence of breast cancer in Yemen is lower than that in industrialized nations, the number of new cases has been significantly increasing, and women present with breast cancer at younger age and with more advanced disease than women in Western countries by at least one decade, as about 73% of women were aged 50 years or younger at the time of diagnosis and the most common age group affected was 41-50 years old [6].

Diagnosis of breast cancer during the last 5 years improved the diagnosis of breast cancer by supporting the cancer centers with mammography units and CT scan through ministry of public health and world Health Organization. The pathology laboratory introduced in most of cancer centers and some private hospitals offer these services. In the next 5 years the ministry of Public Health in cooperation with WHO and IAEA discuss the probability to support cancer centers with magnetic resonance imaging and bone scan [7].

Breast cancer during 2016-2020 A total of 2201 patients were identified with a diagnosis of invasive breast cancer. Between January 2016 and December 2020, 2160 (98.1%) of female breast cancer and 41 cases (1.9%) of male breast cancer. The mean age of all patients was 47.41 years (Tables 1 and 2).

Almost 25% of the patients were younger than 40 years of age at the time of diagnosis and 58.1% were premenopausal [8].

Table 1 Distribution of all cancer and breast cancer according to oncology center during 2016-2020.

No	Onocology Cancer	All Cancers	Total of breast cancer	% of breast cancer
1	National oncology center,Aden	4350	944	22
2	Al-Amal Oncology center,Taiz	3170	495	16
3	National oncology center,Mukala	3218	404	13.8
4	National oncology center,Sayoun	1402	227	16
5	National oncology center,Shabwah	670	131	20
Total		12810	2201	17.2

Table 2 Distribution of breast cancer according to age and sex,2016-2020.

Demographic data	**Number of patients according to oncology centers**						
Characteristics, sex, Age group	**Aden**	**Taiz**	**Mukala**	**Sayoun**	**Shabwah**	**Total**	**%**
Gender							
Female	928	486	399	216	131	2160	98.1
Male	16	9	5	11	0	41	1.9
Age group							
<40 years	232	115	136	71	31	585	26.6
41-50 years	324	166	113	48	42	693	31.5
51-60 years	255	126	66	40	31	529	24.0
>60 years	133	88	78	68	27	394	17.9
Total	944	495	404	227	131	2201	100

Table 3 The ASR of breast cancer was 4.7 in 2016 and 7.7/100,000 population in 2020.

Year	**No .of cases**	**Prevalence/100,000**
2016	345	4.7
2017	386	5.3
2018	414	5.7
2019	492	6.7
2020	563	7.7

In table (3) The number of breast cancer occurrences in women has increased by 61% during the last 5 years, from 345 in 2016 to 563 in 2020 & The median age at diagnosis was 50 years. [8].

1.4. Causes of Breast Cancer

1.4.1. A previous history of breast cancer

A woman who has had breast cancer has an increased risk of getting breast cancer in the other breast.

1.4.2. Significant family history

If several members of patient's family have had particular types of cancer, patient may have an increased risk of developing breast cancer.

1.4.3. Genetic causes

Family history has long been known to be a risk factor for breast cancer. Both maternal and paternal relatives are important. The risk is highest if the affected relative developed breast cancer at a young age, had cancer in both breasts, or if she is a close relative. First-degree relatives, (mother, sister, daughter) are most important in estimating risk. Several second degree relative's grandmother, aunt) with breast cancer may also increase risk. Breast cancer in a male increases the risk for all his close female relatives. BRCA1 and BRCA2 are abnormal genes that, when inherited, markedly increase the risk of breast cancer to a lifetime risk estimated between 40 and 8S%. Women who have the BRCA1 gene tend to develop breast cancer at an early age [9].

1.4.4. Hormonal causes

Alteration in hormonal level may precipitate breast cancer. It could be attended by starting and stopping of periods (Menstrual Cycle), Pregnancy in early age, Hormonal replacement therapy, Use of oral pills etc. [10].

1.4.5. Life style and dietary cause

Sedentary life style, high dietary intake of fat obesity particularly in postmenopausal women may cause breast cancer. The use of alcohol is also another one cause of breast cancer [11].

1.4.6. Environmental cause

There is known to be a slight increase in risk in ladies who work with low doses of radiation over a long period of time- for example, X-ray technicians [12].

1.5. Types of breast cancer

According to site, it is divided into invasive and non- invasive breast cancers

1.5.1. Non-invasive breast cancer

It is a cancer that has not extended away from the lobule or ducts where it situated

,An example of a kind of non-invasive breast cancer is ductal carcinoma in situated. Ductal carcinoma in situ appears when atypical cells develop within the milk ducts, however have not extended to close proximity of tissue or outside. The word "in situ" describes "in place." Even though the atypical cells have not extended to tissues outer the lobules or ducts, they can progress and grow into invasive breast cancer [13].

The normal background of every scientific unit is demonstrated and a biological understanding of the accessible information is presented. Lobular carcinoma in-situ is understood merely a risky sign moderately than a predecessor for the successive growth of invasive cancer, so that one time the judgment is made, additional operative involvement is avoidable and sequential follow-up only is suggested. The management of ductal carcinoma in-situ should be kept in mind that breast- preserving treatment is at the present considered best therapy of breast cancer, the illness we are attempting to stop. The pitfalls of suggested management based on retrospective statistics are have been taken into account and the requirement to conduct clinical studies intended to establish the best possible beneficial treatment of non- invasive breast cancer is affirmed [14].

1.5.2. Invasive breast cancer

It exists when abnormal cells from within the lobules or milk ducts split out into close proximity of breast tissue. Cancer cells can pass through the breast to different parts of the body through immune system or the systemic circulation. They may move early in the development when the tumor is a minute or afterward when the tumor is huge Invasive breast cancer is most occurring general carcinoma in females. The regions of elevated threat are the prosperous populations of Australia and Europe wherever 6% of females suffer from invasive breast cancer prior to 75 years of age [15].

1.5.3. Stages of Breast Cancer

Breast cancer can be divided into stages based on the size of the tumor(s) and how much it has spread. Cancers that are large and/or have invaded nearby tissues or organs are at a higher stage than cancers that are small and/or still contained in the breast.

- To stage a breast cancer, doctors need to know.
- if the cancer is invasive or noninvasive
- how large the tumor is
- whether the lymph nodes are involved
- if the cancer has spread to nearby tissue or organs
- Whereas stage 0 describes the non-invasive and stage 4 describes the invasive kind of tumor [16].

Descriptions of those tumor stages are:

- **Stage 0**

This is the non-invasive stage of tumor which indicates that both cancerous and non- cancerous cells are within the boundaries of that part of the breast in which the tumor begins [17].

- **Stage 1**

This stage describes as the invasive breast carcinoma and microscopic invasion is possible in this stage. It has two categories that are 1A and 1B stage. The category 1A describes the tumor which measures up to 2 cm and none of the lymph nodes are involved in it while stage1B describes that small group of cancer cells larger than 0.2 mm founds in lymph node [18].

- **Stage 2**

Stage 2 also has two categories 2A and 2B. Stage 2A describes that the tumor is found in axillary lymph nodes or in sentinel lymph nodes but no tumor found in breast. The tumor can be smaller or larger than 2 cm but not more than 5 cm. However, stage 2B describes that the tumor could be larger than 5 cm but can't reach to the axillary lymph nodes [19].

- **Stage 3**

It has been divided into three sub categories that are 3A, 3B and 3C. Amongst which stage 3A describes that no tumor is found in breast but it can be found in 4–9 axillary lymph nodes or in sentinel lymph nodes while stage 3B describes that the tumor can be of any size but have caused swelling or ulcer on the skin of the breast and can have spread up to 9 axillary lymph nodes or to sentinel lymph nodes stage 3B can be considered as inflammatory breast cancer which includes red, warm and swollen skin of the breast. However, stage 3C describes the spread of tumor up to 10 or more than 10 axillary lymph nodes and it also have involved the lymph nodes above and below the clavicle [20].

- **Stage 4**

This is the advanced and metastatic stage of cancer and this stage describes the spread to other organs of the body that is lungs, bones, liver brain etc. [21].

1.6. Risk factors for breast cancer

There are several risk factors that increase your chances of getting breast cancer. However, having any of these doesn't mean you will definitely develop the disease. Some risk factors can't be avoided, such as family history. You can change other risk factors, such as quitting smoking, if you smoke. Risk factors for breast cancer include [22,23].

- **Age**: Your risk for developing breast cancer increases as you age. Most invasive breast cancers are found in women over age 55 years[23].
- **Gender**: White women are 100 times more likely to develop breast cancer than white men, and Black women are 70 times more likely to develop breast cancer than Black men[23].
- **Genes**: Women who have the BRCA1 and BRCA2 gene mutations are more likely to develop breast cancer than women who don't. Other gene mutations may also affect your risk. Early menstruation. If you had your first period before age 12 years, you have an increased risk for breast cancer[23].

Giving birth at an older age. Women have their first child after age 35 years have an increased risk for breast cancer[23].

- **Hormone therapy**: Women who took or are taking postmenopausal estrogen and progesterone medications to help reduce their signs of menopause symptoms have a higher risk for breast cancer[24].
- **Inherited risk:** If a close female relative has had breast cancer, you have an increased risk for developing it. This includes your mother, grandmother, sister, or daughter. If you don't have a family history of breast cancer, you can still develop breast cancer. In fact, most women who develop it have no family history of the disease[24].
- **Late menopause start:** Women who start menopause after age 55 years are more likely to develop breast cancer[24].
- Never having been pregnant: Women who have never become pregnant or carried a Pregnancy to full term are more likely to develop breast cancer[24].
- **Previous breast cancer:** If you have had breast cancer in one breast, you have an increased risk for developing breast cancer in your other breast or in a different area of the previously affected breast [24,25].

1.7. Treatment of Breast Cancer:

1.7.1. Surgical interventions

It has more than half of all breast cancer patients in Yemen have their operation is performed by general surgeons in teaching hospitals. In many patients with breast cancer at the beginning operated by general surgeon in private hospitals where chest an operation is performed. This sometimes leads to suboptimal results. [8]. The results, like positive margins, are the partial removal of breast lump or poor management of the axilla. Sentinel lymph node biopsies are not available in all hospitals[13].

High percentage of operations complicated with lymphedema. About 10% of breast cancer patients travel to India, Egypt or Jordan to undergo surgery and start treatment[14].

1.7.2. Chemotherapy

Among the most problems that negatively affected the lives of patients was the irregularity in providing chemotherapy and after discussions and dialogues with the World Health Organization and the King Salman Center and the efforts of the Ministry of Public Health, 50% of the chemotherapy list was supported by the World Health Organization and the King Salman Center and 40% supported through the ministry of public health, which had an impact positive for patients' lives and improved recovery rate[24]

Trastuzumab, a monoclonal antibody specific for HER2, was introduced at the Sana'a Oncology Center shortly after it was approved by the FDA. It has now been introduced in all centers and in all indications in the neoadjuvant, adjuvant and metastatic settings [24]. with significant restrictions on accessing palliative care and low professional training Radiotherapy

Access to radiotherapy is limited in Yemen and exclusive in Sana'a, for health care providers. Only one center in Yemen is responsible for implementing radiotherapy, however, it does not satisfy the long queue for patients who wait for a long time (up to more than 4 months). Many patients from the governorates prefer to travel to Egypt, Jordan or India, where the patients suffer a lot. Ministry of Public Health and Population was agreed with the World Health Organization to equip an accelerated line for the Sana'a Oncology Center and another line for the Aden Oncology Center in 2022 and two radiotherapy centers in Taiz and Hadramout in 2024[7,26].

1.7.3. Breast Cancer Awareness Month

"October Pink Every October, for Breast Cancer Awareness Month, all oncology centers and cancer societies and foundations get involved in recognizing this life changing movement to show solidarity and spread awareness within the community on the most common type of cancer affecting women in Yemen. October pink! This month, oncology centers joined organizations and individuals across the country fighting breast cancer by donating a portion of the October proceeds to our governorate cancer centers, national oncology centers in all Yemen governorates, and many associations and institutions working in the fight against breast cancer. Every year in the pink month of October, oncology centers holds many lectures, festivals and exhibitions to raise awareness. By supporting the National Program of Cancer Control and funding efforts to better understand cancer and treat it more effectively, the National Program of Cancer Control reduces suffering and improves the quality of life for cancer patients, survivors, and their families [27].

1.7.4. Breast Cancer Research

Although breast cancer research is limited in Yemen. A Google search resulted in a total of 30 research papers between 2001 and 2021. Data are still relatively scarce, especially on treatment outcomes and survival. Breast Cancer Genetics, triple negative breast cancer, trends in risk factors, quality of care; and other aspects of breast cancer care, such as survival and palliative care in the oncology centers in the Yemeni governorates. These shortcomings are being remedied through efforts to improve research and through the conclusion of research agreements and collaborations with universities as well as Arab and international groups [8].

1.8. WHO Cancer Care Support to Yemen 2017-2020

In the shadow of the ongoing war and conflict, cancer care was at the brink of collapse in 2015 due to the lack of medicines and medical supplies as many other services in the health sector. To respond to the humanitarian needs of cancer care WHO has been conducting the following activities in support of cancer care in Yemen 2017-2020:

- Regular procurement of essential chemotherapy drugs to ensure the regular access to medical treatment for more than 25,000 cancer patients, at the national cancer centers and units across the country.
- Provision of palliative drugs (Oral Morphine) for more than 10,000 patients with advanced cancers;
- Payment incentives to 10% of the health workers at all functioning 12 cancer care facilities including two centers for early detection of breast and cervical cancers.
- Technical and financial support to the cancer registry in Yemen.
- Two mammography machines were provided to Sanaa and Aden to increase the capacity in the early detection of breast cancer;
- One CT scan to Assadaqah hospital in Aden, where the oncology center is located, to improve the access to the diagnostic services used for the detection, staging, and follow-up purposes; [7].

A review of existing literature highlights a significant gap in research specifically focused on breast cancer within the Yemeni context [28]. The limited studies from Yemen underscore an urgent need to investigate psychosocial needs, therapeutic approaches, prognostic factors, diagnostic methods, screening practices, and prevention strategies relevant to the Yemeni population. Furthermore, there is a necessity to explore specific risk factors and other understudied aspects of breast cancer in Yemen [28].

Studies conducted in other regions, including Saudi Arabia [27, 33], Ethiopia [29], the United Arab Emirates (UAE) [26], Malaysia [30], Eastern China [31], and Nigeria [32, 37, 38], consistently reveal suboptimal levels of breast cancer knowledge and awareness among various populations, including medical students and the general public.

Specifically, a study in Saudi Arabia [27] found that a significant majority of medical students possessed substandard or below-average knowledge of breast cancer. Similarly, research in Ethiopia [29] indicated that over 90% of female health science students had satisfactory to below-average knowledge, despite most having heard of the disease. In the UAE [26], only about half of the young women surveyed had some level of information about breast cancer, with misconceptions regarding age of onset being prevalent. Malaysian undergraduate female students [30] also demonstrated below-average knowledge of breast cancer and breast self-examination (BSE), with a significant association between knowledge and BSE practice. A large survey in Eastern China [31] reported that over 80% of women had below-average awareness levels. Studies in Nigeria [32] found low levels of knowledge about breast cancer and negligible knowledge about BSE among female secondary school students.

Regarding risk factor awareness, studies in Saudi Arabia [33] and Kuwait [34] revealed a general lack of understanding of established risk factors, with misconceptions about hereditary links and other factors being common. A study of women in Karachi [27] highlighted similar misconceptions, including beliefs about contraceptives and the protective role of breastfeeding. A multi-country study across Asia, Africa, and the Americas [39] further emphasized the low awareness of key modifiable risk factors such as alcohol consumption, excessive body weight, and lack of physical activity. Research in Nigeria [37, 38] also indicated limited and sometimes inaccurate knowledge of risk factors and preventive measures.

A study in Saudi Arabia [39] found that knowledge about risk factors and screening methods was below average and correlated with education and occupation.

Within Yemen, studies indicate that breast cancer is a significant health concern and the leading cancer among women [40, 40, 41, 42, 43, 44, 45, 46, 46]. Incidence rates have been reported to range from 21% to 30% of all cancers among women in different regions of Yemen.

Overall, the reviewed literature underscores a consistent pattern of inadequate breast cancer knowledge and awareness across various populations and geographical locations, particularly in developing countries, including a recognized gap and need for more research within Yemen itself. These findings highlight the critical need for targeted educational interventions and awareness campaigns to improve understanding of breast cancer, its risk factors, screening practices, and ultimately, to potentially improve early detection and outcomes. . There is a great need to protect currently available antibiotics from being rendered ineffective by irrational antibiotic use and antibiotic resistance hence the need for conducting more research on the role of the public focusing on their knowledge and attitude towards antibiotic use, especially in Yemen. This research study aimed to contribute in filling this gap through understanding the public knowledge and attitude regarding antibiotic use from a cross sectional survey. The aim of this study to understand the public and health worker knowledge of antibiotics use and antibiotic resistance causes.

2. Materials and Methods

2.1. Methodology

2.1.1. Study design

- The study is a descriptive cross-sectional study to identify the Knowledge about
- Prevalence and Associated Factors of breast cancer among the Hodeida city population,
- Yemen. The study was conducted during the period from September 2022 to December 2022.

2.2. Study variables

study will likely investigate how different characteristics of the population (independent variables) are associated with their levels of knowledge and awareness regarding the causes, prevalence, and prevention of breast cancer (dependent variables), while also considering other factors that might play a role (confounding/intervening variables).

2.3. Study population

A sample was drawn from the population randomly at adult age with a focus on females, in Hodeida City, Yemen.

2.4. Sampling size

According to our knowledge, no previous studies about the prevalence and factors associated with breast cancer in Hodeida city have been reported.

The sample size was calculated According to the web site for sample size calculator (https://www.calculator.net/sample-sizecalculator.html) and was 190

2.5. Data collection

In the questionnaires, the participants were asked about sociodemographic characteristics, information about breast cancer including causes, prevention, prevalence and risk factors.

2.6. Data Analysis

Analysis was performed using the Statistical Package for Social Sciences (SPSS) (V.26.0, IBM, Armonk, New York, USA). Descriptive analyses were performed to present the study participants 'sociodemographic and other variables as frequencies and percentages. The participants were categorized as either having breast cancer or not.

Chi-Square and logistic regression analysis was carried out to identify variables that were associated with prevalence of breast cancer. P-value less than 0.05 consider statistically significant.

3. Results

3.1. Sociodemographic data of participants

Table 4 Sociodemographic data of participants

Sociodemographic data		**Count**	**Column %**
The gender	Male	7	3.7%
	Female	183	96.3%
The age	<20	3	1.6%
	20-40	161	84.7%
	>40	26	13.7%
Nationality	Yemeni	187	98.4%
	Non-Yemeni	3	1.6%

Marital status	Married	105	55.3%
	Single	85	44.7%
Occupation	Employee	83	43.7%
	Student	76	40.0%
	Housewife	31	16.3%
Education level	Uneducated	10	5.3%
	Basic education	14	7.4%
	Intermediate & secondary education	23	12.1%
	Higher diploma	43	22.6%
	Collegiate	100	52.6%

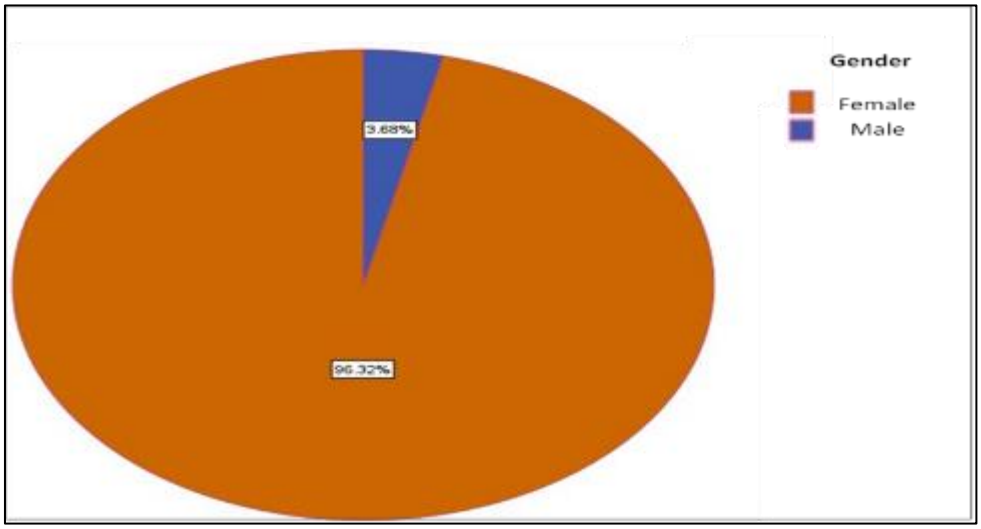

Figure 1 The gender of the participants

3.2. The age of the participants

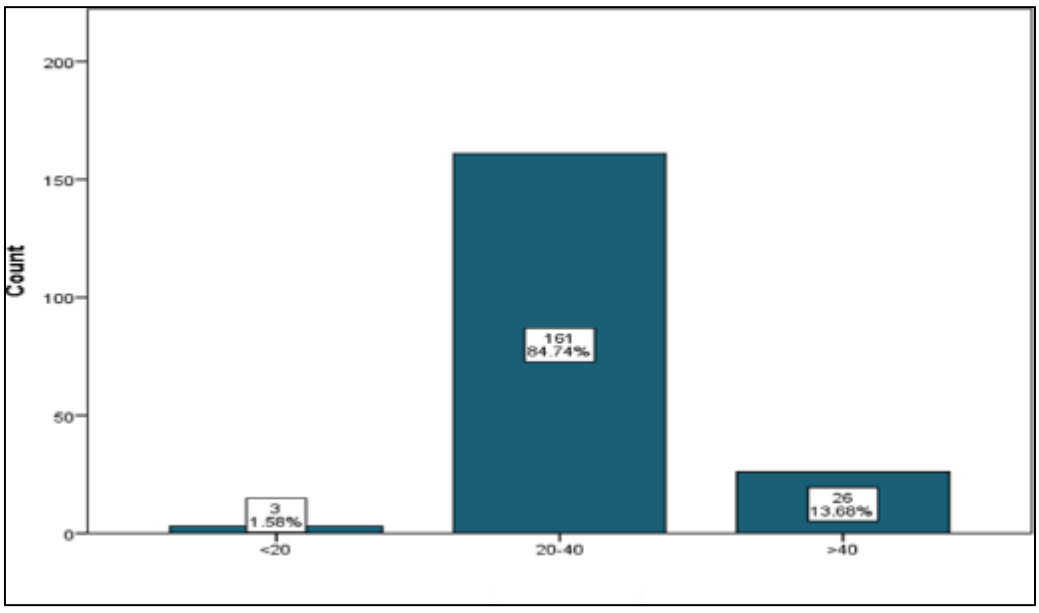

Figure 2 The age of the participants

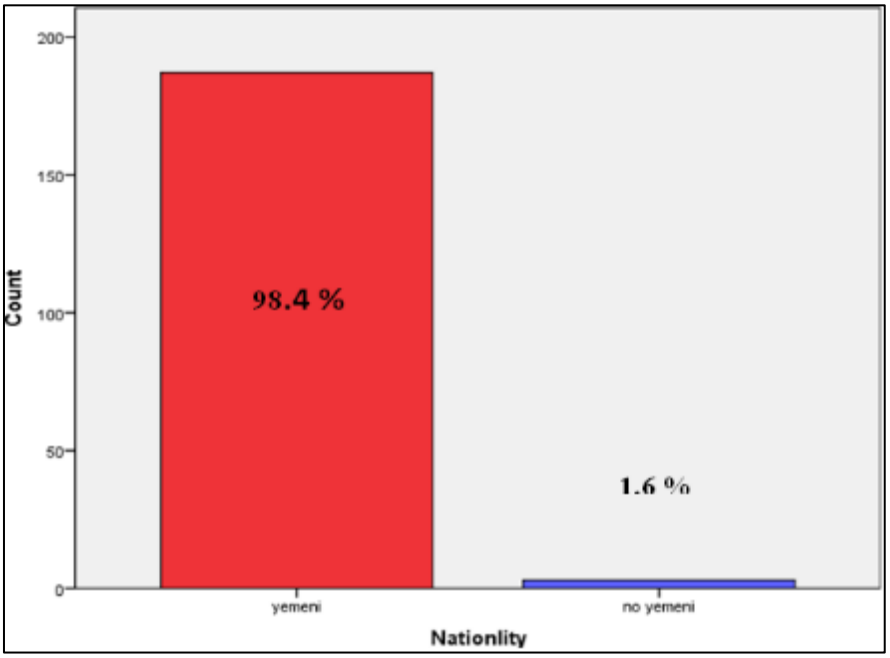

Figure 3 The nationality of the participants

3.3. The nationality of the participants

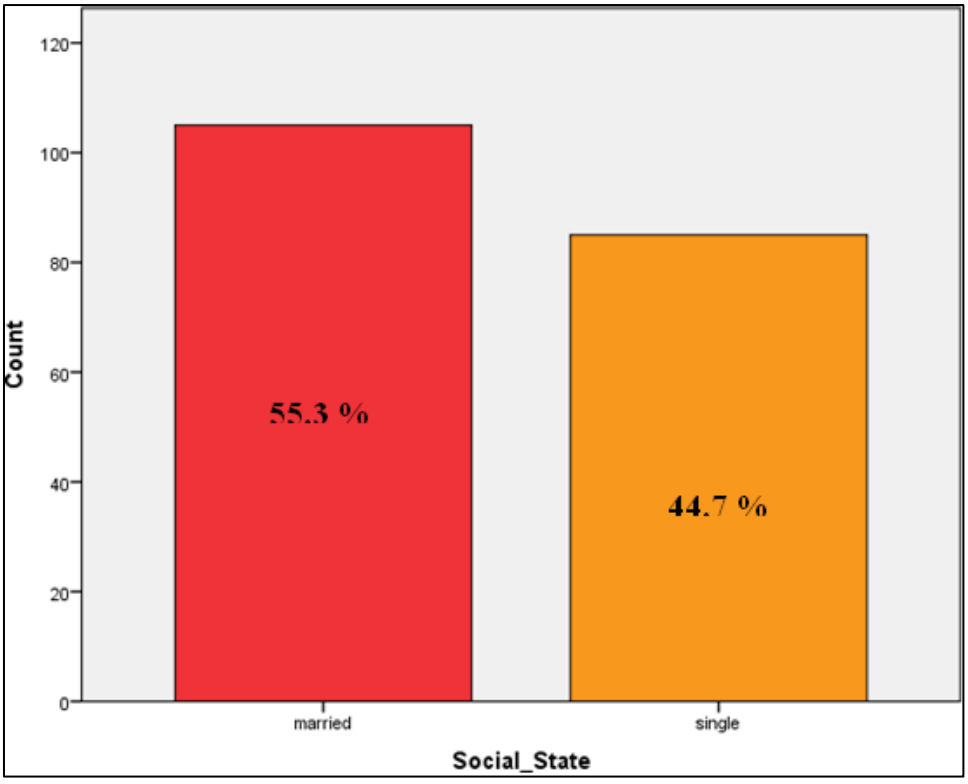

Figure 4 The social state of the participants

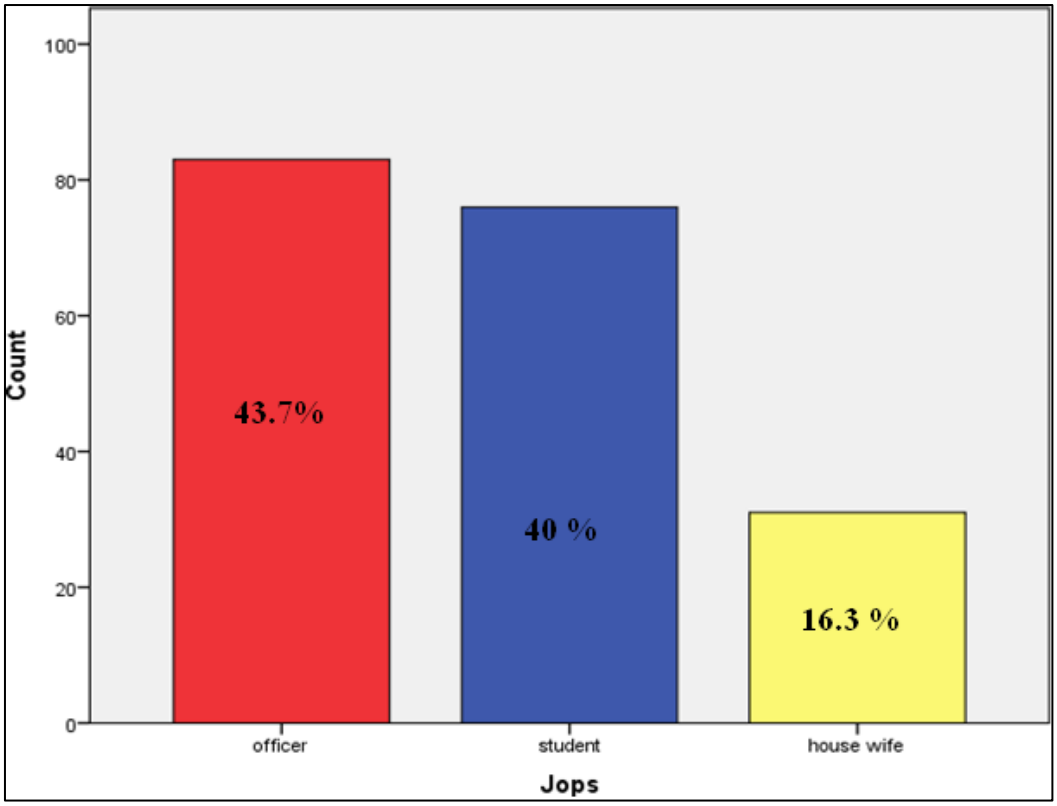

Figure 5 The jobs of the participants

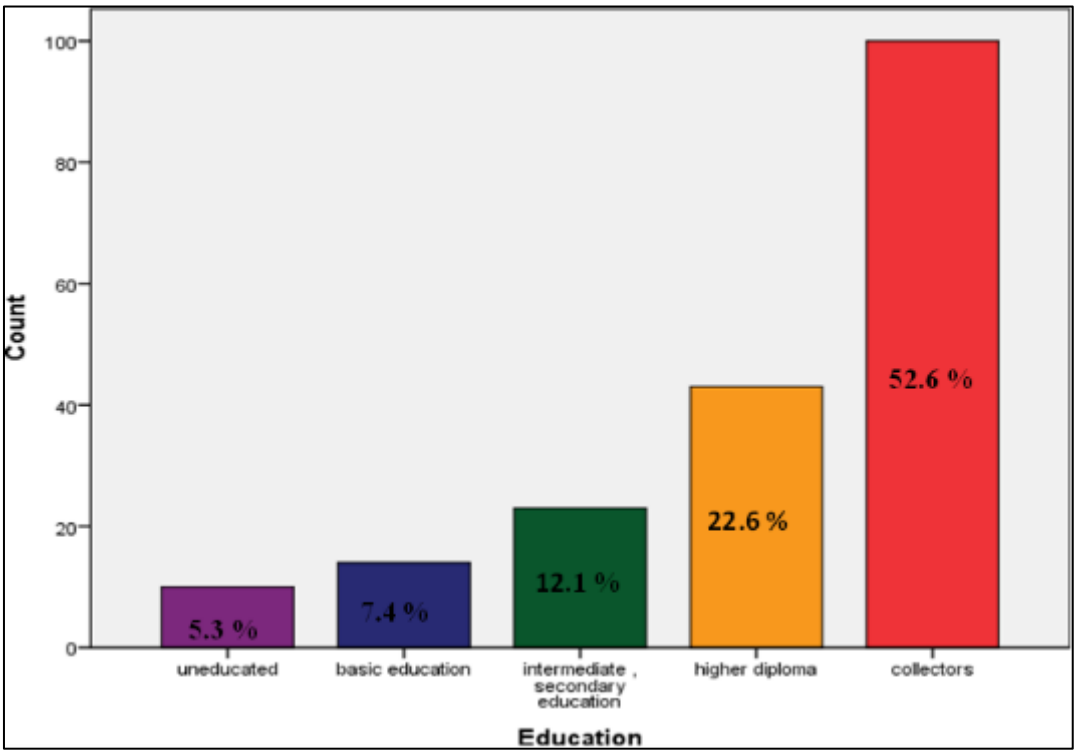

Figure 6 The education of the participants

3.4. Association between breast cancer prevalence and sociodemographic data participants

Table 5 Association between breast cancer prevalence and sociodemographic data of participants

sociodemographic data		Do you suffer from breast cancer				Chi-Square	P-value
		Yes		No			
		Count	N %	Count	N %		
The gender	Male	0	0.0%	7	4.3%	1.108	0.292
	Female	25	100.0%	157	95.7%		
The age	<20	1	4.0%	2	1.2%	13.488	0.001*
	20-40	15	60.0%	145	88.4%		
	>40	9	36.0%	17	10.4%		
Nationality	Yemeni	24	96.0%	162	98.8%	1.074	0.300
	Non-Yemeni	1	4.0%	2	1.2%		
Marital status	Married	16	64.0%	88	53.7%	0.937	0.333
	Single	9	36.0%	76	46.3%		
Occupation	Employee	5	20.0%	77	47.0%	56.099	0.000*
	Student	3	12.0%	73	44.5%		
	Housewife	17	68.0%	14	8.5%		
Education level	Uneducated	4	16.0%	6	3.7%	55.709	0.000*
	Basic education	9	36.0%	5	3.0%		
	Intermediate & secondary education	7	28.0%	16	9.8%		
	Higher diploma	1	4.0%	42	25.6%		
	Collegiate	4	16.0%	95	57.9%		

3.5. Association between sociodemographic data and knowledge about breast cancer

Table 6 Association between sociodemographic data and knowledge about breast cancer

Sociodemographic data		How do you classify your knowledge in general about breast cancer in the Republic in terms of its symptoms & prevalence?					Chi-Square	P-value
		I do not know	Not important	Medium	Large	Very big		
		Count	Count	Count	Count	Count		
The gender	Male	3.4%	0.0%	2.2%	0.0%	0.0%	2.770	0.597
	Female	75.9%	60.0%	90.1%	85.4%	75.0%		
The age	<20	20.7%	40.0%	7.7%	14.6%	25.0%	10.508	0.231
	20-40	0.0%	0.0%	5.5%	4.2%	0.0%		
	>40	100.0%	100.0%	94.5%	95.8%	100.0%		
Nationality	Yemeni	100.0%	100.0%	97.8%	97.9%	100.0%	1.099	0.894

	Non-Yemeni	0.0%	0.0%	2.2%	2.1%	0.0%		
Marital status	Married	58.6%	60.0%	52.7%	52.1%	75.0%	3.125	0.537
	Single	41.4%	40.0%	47.3%	47.9%	25.0%		
Occupation	Employee	13.8%	60.0%	44.0%	64.6%	31.3%	26.659	0.001*
	Student	62.1%	20.0%	39.6%	31.3%	31.3%		
	Housewife	24.1%	20.0%	16.5%	4.2%	37.5%		
Education level	Uneducated	13.8%	0.0%	2.2%	4.2%	12.5%	25.940	0.055
	Basic education	10.3%	20.0%	7.7%	2.1%	12.5%		
	Intermediate & secondary education	17.2%	20.0%	13.2%	2.1%	25.0%		
	Higher diploma	27.6%	0.0%	23.1%	25.0%	12.5%		
	Collegiate	31.0%	60.0%	53.8%	66.7%	37.5%		

3.6. Association between breast cancer and different variables

Table 7 Association between breast cancer and different variables

Variables		**Do you suffer from breast cancer**		**Chi-Square**	**P-value**
		Yes	No		
		N %	N %		
How to develop community awareness in general from breast cancer in terms of symptoms and treatment	I don't know	8.3%	20.9%	9.721	0.045*
	Not important	8.3%	11.7%		
	Average	70.8%	58.3%		
	Big	0.0%	6.7%		
	Very big	12.5%	2.5%		
How to classify the role of the Ministry of Health to raise awareness of society from breast cancer	I don't know	8.0%	17.2%	10.34	0.035*
	Not important	20.0%	7.4%		
	Average	32.0%	48.5%		
	Big	40.0%	22.1%		
	Very big	0.0%	4.9%		
Breast cancer affects	Both sexes	12.0%	35.2%	5.604	0.061
	Only men	0.0%	0.6%		
	Only women	88.0%	64.2%		
The most common types of cancers among women are globally and locally	Breast cancer	12.0%	1.8%	7.684	0.021*
	Lung Cancer	0.0%	1.8%		
	Colon Cancer	88.0%	96.3%		
Periodic examination every 1-2 years helps in the early diagnostic of breast cancer and rescue patients from death	Yes	96.0%	87.1%	1.655	0.198
	No	4.0%	12.9%		

Does early diagnosis of breast cancer increases access to better results to keep breast and save the patient's life	Yes	88.0%	97.6%	5.560	0.018*
	No	12.0%	2.4%		
Have you heard about the self-examination of breast	Yes	80.0%	77.9%	0.550	0.814
	No	20.0%	22.1%		
Do you have knowledge how self-examination of breasts	Yes	79.2%	59.1%	3.551	0.060
	No	20.8%	40.9%		
Do you do self-examination of breast	Yes	76.0%	38.4%	12.47	0.003*
	No	24.0%	61.6%		
Have you ever tried my early detection tests for breast cancer	Yes	68.0%	13.4%	39.46	0.005*
	No	32.0%	86.6%		
Have you been subjected to radiation therapy before?	Yes	48.0%	6.1%	37.03	0.003*
	No	52.0%	93.9%		
Do you suffer from cancer or tumor elsewhere in the bod	Yes	24.0%	3.7%	15.09	0.001*
	No	76.0%	96.3%		
Is there in family An injured person breast cancer or exposed to him	Yes	36.0%	19.6%	3.405	0.061
	No	64.0%	80.4%		
If you have a family history to injure breast cancer Do you consult your doctor or visit a specialized center	Yes	24.0%	41.6%	3.708	0.157
	No	52.0%	45.3%		
	Sometimes	24.0%	13.0%		
How much knows you are the importance of early detection of breast cancer	There is no knowledge	36.0%	18.4%	6.474	0.039*
	Medium knowledge	28.0%	53.4%		
	Good knowledge	36.0%	28.2%		
Do you know the seriousness of breast cancer in a late stage that does not discover	Yes	88.0%	75.5%	1.932	0.165
	No	12.0%	24.5%		
Have you ever attended any campaign or activity on breast cancer awareness	Yes	20.0%	37.7%	3.194	0.203
	No	80.0%	61.7%		
	Yes, but did not benefit	0.0%	0.6%		
Do you think there is sufficient awareness of breast cancer in your area	Yes	12.0%	7.4%	1.099	0.577
	No	80.0%	79.1%		
	I don't know	8.0%	13.5%		
Are most breast blocks that affect ladies are not cancerous	True	47.8%	54.9%	1.683	0.431
	I don't know	47.8%	35.4%		
	Incorrect	4.3%	9.8%		

What is the best time for self-examination	Monthly after menstruation	72.0%	52.2%	3.852	0.146
	Month on the day 10-7 of Menstrual period	8.0%	21.1%		
	A year	20.0%	26.7%		
How much knows you in ways to check breast cancer and thus early detection	There is no knowledge	24.0%	28.7%	1.280	0.527
	Average knowledge	60.0%	48.2%		
	Good knowledge	16.0%	23.2%		
Do you have knowledge of the first tags for breast cancer	Yes	64.0%	66.3%	0.490	0.824
	No	36.0%	33.7%		
What is the most offered age group for injury	Less than 20	12.0%	5.5%	5.320	0.070
	20-40	72.0%	56.4%		
	More than 40	16.0%	38.0%		

3.7. Awareness rate in general about breast cancer

Table 8 Awareness rate in general about breast cancer

Awareness rate About Breast Cancer		
High	Moderate	Low
9.6 %	60.1 %	30.3 %

3.8. The indicators of breast cancer of the participants are

Select all the symptoms you think may be an indicator of breast cancer

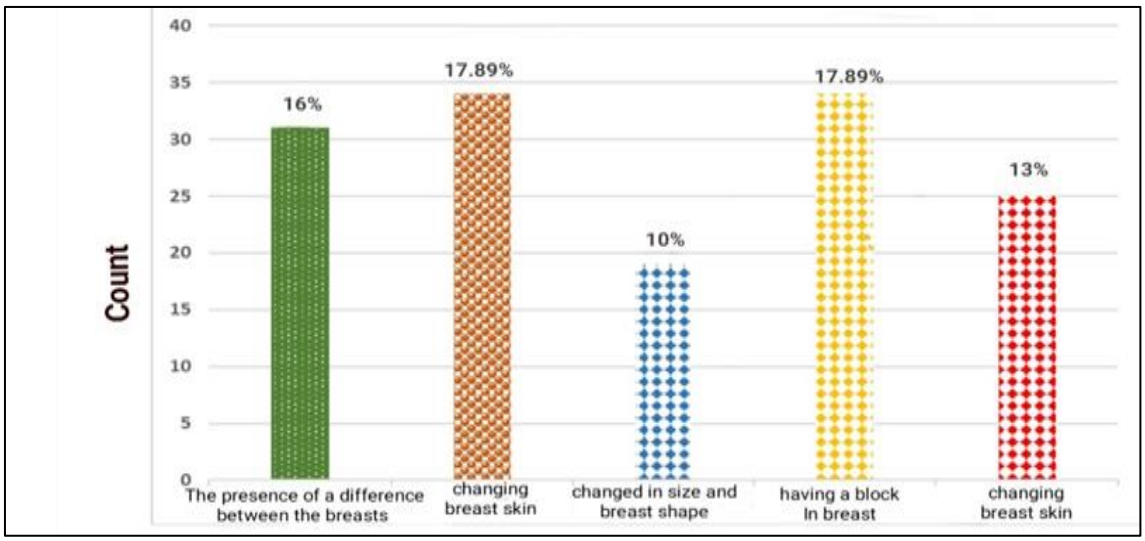

Figure 7 Indictors of breast cancer

3.9. The causes of breast cancer of the participants

What are the reasons for breast cancer

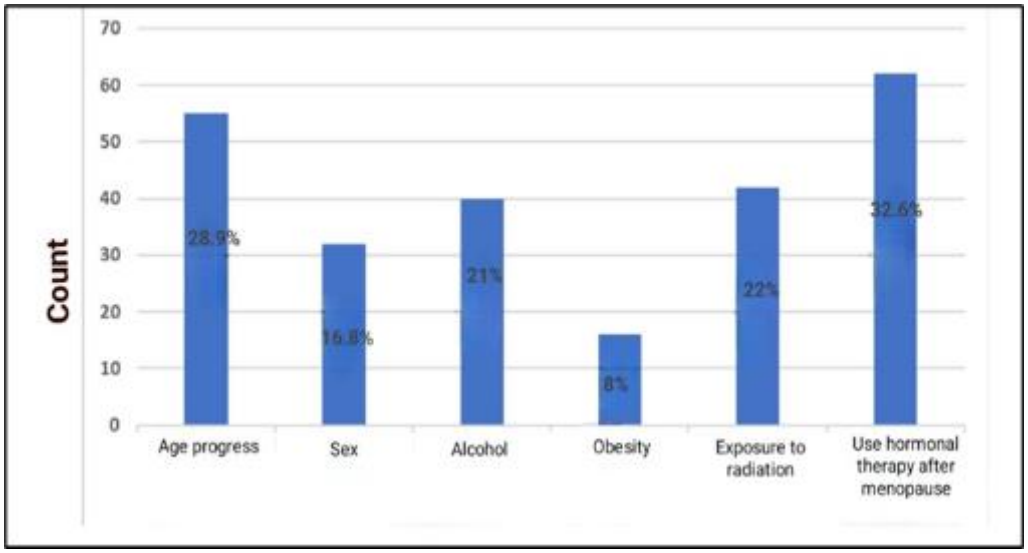

Figure 8 Causes of breast cancer

3.10. The prevention of breast cancer of the participants

What are the means of prevention to reduce the risk of breast cancer

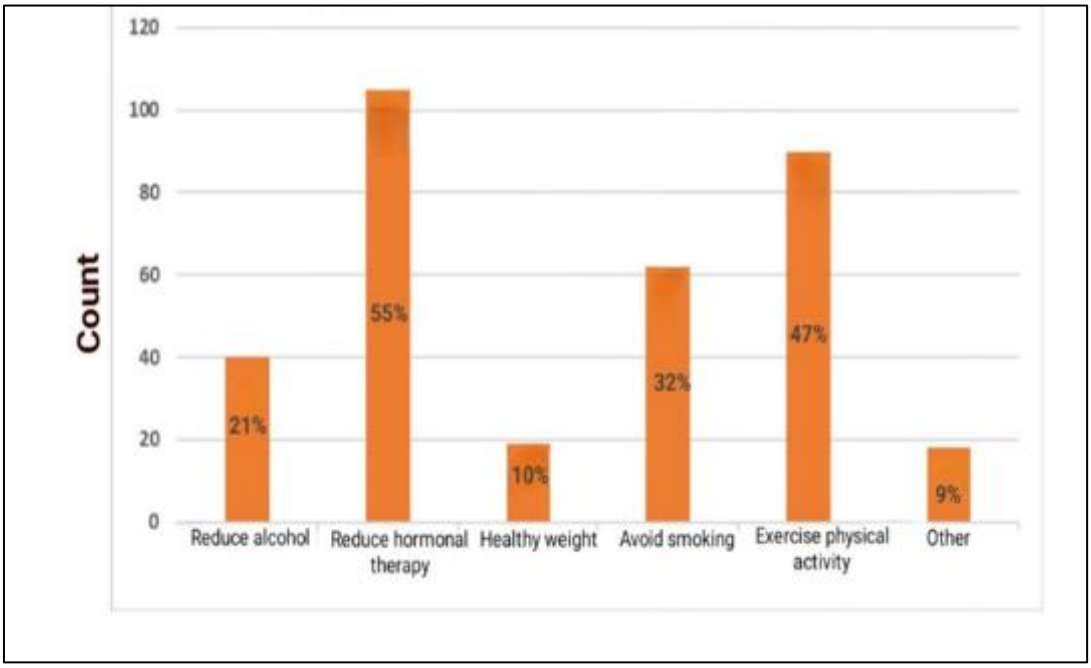

Figure 9 Prevention of breast cancer

3.11. The risk factors of breast cancer of the participants are shown in figure (10).

Any of following factors believe they may increase the risk of breast cancer

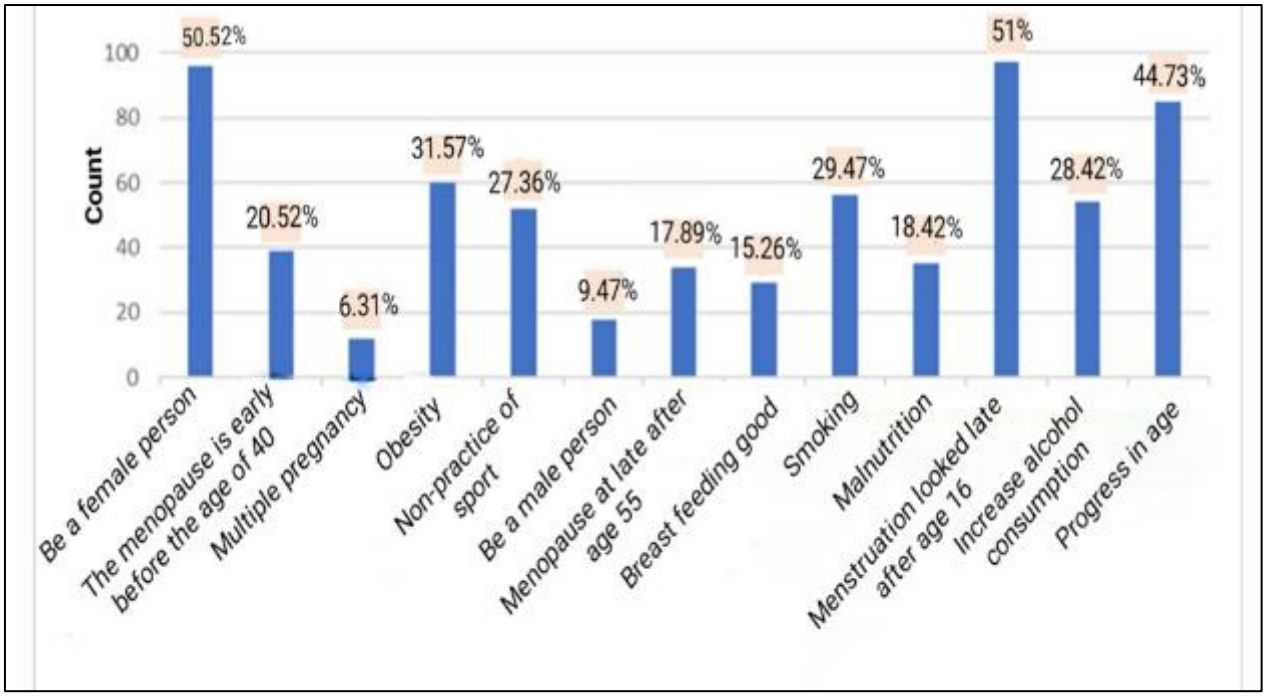

Figure 10 Risk factor of breast cancer

4. Discussion

The results of this study revealed that university education, which was the highest knowledge about breast cancer about 38 of participants compare with 14 with Higher Diploma and 5 participants with Secondary education and 4 participants with basic education was the lowest knowledge about breast cancer, this result is identical to another study conducted in Makah, which demonstrated that participants with a university education were the most knowledgeable about breast cancer [47].

In addition, Ahmed et al. [48]. found that knowledge of breast cancer was low among 411 Jordanian woman aged 18-70 years in Amman, the capital of Jordan. As the current study involved highly educated university students, it was expected that they would have greater awareness and knowledge of breast cancer than the general population. However, the findings were disappointing.

Our results showed the majority of participants 84.7% was in age between 20-40 years, this in constant with other study conduct in Jorden [49]. which showed more than 90 % was in age between 18-40.

Similar to our results from univariate analysis, Tavafian et al (2009), showed that Iranian women who regularly performed BSE, perceived more BSE benefits, fewer BSE barriers and more BSE self-efficacy than those women who had never performed BSE, while the findings of logistic regression analysis indicated that perceived barriers and self-efficacy were the only health belief variables to predict BSE performance [50] ..

Oure results showed the sociodemographic data such as age, occupation and education level has correlation with breast cancer prevalence at p-value less than 0.05 f0r all of them, this results differed with other study showed that there is no relationship between the low rate of Yemeni women performance of BSE and their socio- demographic characteristics (age, marital status and educational level), their previous history of breast problems and their breast cancer and breast cancer screening related knowledge. Similar to our results, a study of Malaysian teachers identified that there was no association between socio demographic characteristics and family history of breast cancer and BSE practice [51].

On the other hand, there are a number of studies has shown that women low rate of BSE performance was related to socio-economic status, educational level and breast cancer related knowledge and BSE practices [52].

About 80% participants in our study think the colon cancer is more prevalence than breast cancer, this results inconstant with other study showed Breast cancer is one of the most frequent cancers occurring among Yemeni women characterized by delay in diagnosis and treatment as well as the occurrence in younger group [41].

Our results showed that 80% of women with breast cancer know breast self- examination, while 76% of women with breast self-examination, this result is inconsistent with another study conducted in Yemen, Hadramout, which showed Only about one tenth of the women (10.9%) had a history of breast problems. Just around one tenth of the women (11.0% or 44) had ever performed BSE during their life and only 4.5% (18 of 400) performed it at least monthly. The study also revealed that two thirds (67.5%) of the participants had low level of knowledge and the remaining one third were categorized as intermediate (23.0%) and high (9.5%) levels of knowledge [53].

5. Conclusion

Through our study, we found that there is a clear lack of knowledge about breast cancer in terms of causes, methods of examination and prevention, and the knowledge of the majority of them was moderate. We also found that the prevalence of breast cancer was 25 cases among the participants, about 11% of the participants. We recommend conducting further studies and increasing the sample size to include a larger number. We also recommend that you conduct community awareness programs and campaigns about breast cancer

Compliance with ethical standards

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Disclosure of conflict of interest

The authors declare that they have no competing interests

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Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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