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A correlational study on the awareness of breast cancer screening methods and risk factors among women attending two health facilities in Windhoek, Namibia

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Abstract

Introduction: *breast cancer stands as one of the deadliest forms of cancer among women globally, breast cancer has become a significant global health issue. Knowledge of the risk factors and the various early detection methods is pivotal in ensuring timely treatment initiation. This study aimed at assessing the awareness of the breast cancer (BC) screening methods and risk factors among women attending two health facilities in Windhoek, Namibia.* ***Methods:*** *a quantitative correlational design was used to determine the knowledge of breast cancer screening methods and risk factors; This study sampled a total of 260 purposively recruited women aged 20 years and older who attended the two hospitals' outpatient departments.* ***Results:*** *findings suggest that participants had an average knowledge of BC risk factors, screening methods, and signs and symptoms. Kruskal-Wallis H test with post hoc analysis revealed that several demographic variables were significantly associated with knowledge of screening methods (participants' occupations, p=0.04; educational level, p=0.01; gravidity, p=0.04), knowledge of risk factors (presenting with breast problem, p=0.05) and knowledge of signs and symptoms (age, p=0.008; presenting with breast problem, p=0.03).* ***Conclusion:*** *this study found that participants have an average understanding of breast cancer risk factors, symptoms, and screening methods, with significant associations found between these knowledge areas and factors such as occupation, presence of a breast problem, educational qualifications, and history of pregnancy. There's a need for expanded education and awareness initiatives in Namibia. Utilising social media for these campaigns could improve their reach and impact.*

Introduction

Cancer ranks as a leading cause of premature death and is a significant obstacle to raising life expectancy, with an estimated 19.3 million cancer cases being diagnosed in 2020 globally [1,2]. Particularly, the breast cancer (BC) mortality rate has significantly increased, with global epidemiological reports over the past few years indicating that it is the leading cause of cancer deaths for women [3].

Africa has the highest age-standardized BC mortality rate, recording 74,072 deaths and an incidence of 168,690 cases in a recent year [4,5]. According to the World Health Organization, 2.3 million women worldwide were diagnosed with BC in 2020 and 685,000 died due to BC [6]. In sub-Saharan Africa, BC is the most common type of cancer affecting women with a survival rate of 50% compared to developed countries where an average survival rate of 90% has been reported. Thus, in sub-Saharan Africa, 50% of women diagnosed with BC dies in the first 5 years of diagnosis in sub-Saharan Africa compared to 1 in 5 black women and 1 in 10 white women in the United States of America [6,7]. In Namibia, there exists a racial disparity in BC survival rates; white women have notably higher survival rates compared to their black counterparts [7].

According to the World Health Organization's (WHO) Sustainable Development Goals, there is a need to reduce the burden of cancer, as part of target 3.4 which aims to reduce premature mortality from noncommunicable diseases through prevention and treatment and promote mental health and well-being by one-third by 2030 [8]. Research by Kangmennaang *et al.* [9] estimate BC incidence among females of all ages and prevalence among adult females to be at 29 per 100,000 and 37 per 100,000, respectively. Early BC detection screening methods have been promoted as a tool to increase the likelihood of cure and improve survival from BC, resulting in fewer invasive treatments [10]. This approach,

however, faces practical limitations in Africa, particularly due to BC screening facilities are limited. Concurring with this, Black and Richmond [11] states that due to financial, logistical, and sociocultural limitations, sub-Saharan Africa has struggled to implement and sustain breast screening programs. Kangmennaang *et al.* [9] further reported that factors significantly affecting BC early detection and screening among women in Namibia include health insurance coverage, regular contact with physicians, and secondary education or higher.

A study conducted at the University of Sharjah indicates that most participants are aware of the existence of BC, although they exhibited low knowledge regarding its risk factors, signs, and symptoms [12]. The level of knowledge about breast self-examination, risk factors, and protective factors of breast self-examination was reported to be low even amongst the educated groups in Libya and Gaza while participants in Saudi Arabia have shown sufficient knowledge of risk factors and symptoms of BC [13-15]. Furthermore, differences in awareness exist between different population groups in the same context such as in Namibia where non-black Namibian women are more aware of BC and its curability compared to black Namibian women [16]. These findings align with previous research conducted in developed countries which reported that black women have shown the lowest BC awareness compared to other ethnic groups [17]. This study aimed to assess the awareness of the BC screening methods and risk factors among women who approached the outpatient department at two public hospitals in Windhoek, Namibia.

Methods

Study design: a quantitative and correlational study was used to determine the knowledge of BC screening methods and risk factors among women, who visited one tertiary and one secondary hospital in Windhoek, Namibia.

Study setting: data were collected at the two largest public hospitals in Windhoek, which received a diverse range of patients and visitors attending the outpatient departments. Data collection took place in October 2022 at the two hospitals during a BC awareness campaign.

Study participants: a total of 377 women aged 20 years and older, who attended the two hospitals´ outpatient departments for routine services or accompanying patients were purposively recruited. Healthcare workers, in-patients, and female patients younger than 20 years were excluded from the study. Moreover, potential participants who did not consent to partake in this study were excluded from recruitment. To reduce bias, data collection took place before participants were given information on BC by way of leaflets and posters. Patients who refused to take part in the study were not prejudiced in any way when they sought healthcare services. Before data was collected, a pilot study was conducted on 10 participants from each hospital using questionnaires. A few errors in the questionnaire were identified and addressed to ensure that appropriate data were collected properly. These results did not form part of the main study.

Data collection tools and measurements: data were collected face-to-face using a researcher-administered questionnaire consisting of four sections. Section A consisted of demographic questions with seven variables on age, occupation, education level, marital status, gravidity, and whether participants experienced any breast-related problems. Section B consisted of 10 general BC statements, while section C had eight statements that collected data on their knowledge of BC risk factors, section D consisted of 12 statements that collected data on participant knowledge of BC screening methods as well as its signs and symptoms. Sections B to D measured participant knowledge using a 5-point Likert scale, where 1 indicated strongly agree; 2 agree; 3-neutral; 4-disagree and 5 strongly disagree.

Data management and analysis

Statistical methods: to test the reliability of the tool, Cronbach´s alpha coefficient for the entire tool was calculated and was acceptable, yielding a value of 0.84. Data analysis was done using SPSS version 28. Descriptive statistics were used to assess individual item responses, and results produced frequency tables. Participants with multiple missing values in variables of interest were excluded from the results of the data analysis through pairwise deletion. Inferential statistics were used to determine the association of categorical variables. Overall knowledge was scored among the three sections and analyzed as scores. These scores were tested for association with the demographic characteristics using the Kruskal Wallis H test (alpha level = 0.05).

Research ethics: permission to conduct the study was sought from the Ministry of Health and Social Services Ethics Committee (Ref: 22/3/1/1). This study followed the Belmont Report´s ethical principles through the application of respect for persons, beneficence, and justice. After explaining the objectives and aim of the study to the participants, their rights to voluntary participation and withdrawal from the study without any prejudice were also explained. Those who agreed to participate signed written informed consent. No personal identifying information was collected during data collection. Patient data were anonymized by assigning unique numbers to the questionnaires to protect their privacy. The data were encrypted and stored in a password-protected laptop to which only the researchers have access.

Results

Participants: a total of 260 participants were recruited and completed the study questionnaire yielding a response rate of 69%. Table 1 outlines the socio-demographic characteristics of the participants. The majority (43.5%) of the sample was relatively young, aged between 20-29 years old. Most (46.7%) of them were single, had a certificate (42.5%), and were unemployed (37.5%). More than half (67.2%) of them had been pregnant before, had no breast problems (85.4%), or had a family history of BC (76.7%).

Descriptive data: Table 2 summarises responses from participants, regarding BC´s general knowledge, knowledge of risk factors, signs and symptoms, and screening methods.

Breast cancer general knowledge: the participants generally demonstrated average knowledge about BC, as the majority (>50%) of them had positive responses. This included knowledge of the effects of early detection and irritations caused by a tight bra.

Knowledge of risk factors: the majority (>50%) of the participants demonstrated average knowledge. Less than 40% of the participants agreed that the prolonged use of contraceptives and first birth beyond the age of 30 years risk the development of BC. More than 70% of these participants agreed that a family history of BC predisposes them to the disease.

Knowledge of signs and symptoms: participants´ knowledge concerning BC signs and symptoms was satisfactory. More than 50% agreed that dimpling, swelling or enlargement, and ulceration of the breast may be a concerning sign of BC.

Knowledge of screening methods: over 60% of the participants agreed that BSE, clinical breast examination, and ultrasound could be used to screen for BC. Less than half of the participants agreed to mammography being one of the screening methods. As seen in Table 3, younger participants had higher (42.9%) knowledge of the signs and symptoms of BC, compared to other year groups in the same category. Interestingly, this cohort had the poorest knowledge score in this category, followed by middle-aged participants (27.5%). The variable age group was found to be associated with knowledge of the signs and symptoms of BC. Among those who indicated that

they had a breast problem, 14.3% had poorer knowledge of BC signs and symptoms, compared to the 85.7% who did not. Having a breast problem was also found to be associated with knowledge about the signs and symptoms (p=0.03) and knowledge of BC risk factors (p=0.05). Knowledge of screening methods was significantly associated with the participants´ occupation (p=0.04), educational qualification (p=0.01), and having been pregnant (p=0.04).

Discussion

Recently, BC incidence has been increasing despite years of laboratory, epidemiological, and clinical research. This study aimed to assess the knowledge of female patients and visitors about BC and screening procedures at two public health facilities in Windhoek, Namibia. Most participants (43.5%) in this study were aged between 20-29 years, had some level of education (42.5%), and had been pregnant before (67.2%). Participants' level of education and history of pregnancy could explain why the majority (>50%) generally had an average level of awareness regarding BC. These observations align with findings from a comparable study conducted in Jordan [18]. This could be concerning, from a public health perspective, as BC is a steady threat to women´s health in Africa [4]. Seeing as most participants in this study had been pregnant before and most likely attended pre- and post-natal health education programs as required, their general knowledge concerning BC may have been enhanced due to information shared during the routine educational sessions. One of the most important findings of a study conducted in Nigeria was that health education had a considerable impact on people's understanding of BC symptoms and risk factors [19]. In this study, a substantial portion of the participants acknowledged that early BC detection could enhance the probability of successful treatment. This is one of the key pieces of information considered most important in preventing deaths from BC since it ensures BC is found before it has metastasized to nearby tissue or other organs [20]. The results also indicated that many participants were aware that performing periodic regular breast examinations is one of the prevention measures for BC. These figures notably surpass those reported in other African studies conducted in Ethiopia (46%), Cameroon (47%), and Libya (41.5%) [21,22].

Over half of the participants demonstrated a moderate understanding of BC's associated risk factors, a positive indication compared to various findings reported by Prusty *et al.* [23]. The elevated level of awareness observed in this study might be influenced by its timing, which aligned with the annual International BC awareness month where various information is distributed across social media, posters, and other platforms across the country. In contrast, a study conducted in neighbouring Angola recorded an obviously lower proportion of participants (10.5%) possessing adequate knowledge of BC risk factors [24]. Without sufficient knowledge of the risk factors associated with BC, women cannot make important decisions regarding their health. The present study found family history of BC (79.1%) and long-term hormonal use (46.9%) to be the most recognized risk factors associated with BC. These results mirror those found in a study conducted in Jordan [25]. In the current study, only 19.8% agreed that early menarche is a risk factor for BC. This is alarming as studies have shown that although genetics play a role in early menarche, it can be avoided by creating more targeted health education that promotes a reduced consumption of fructose which is considered high in sugar-sweetened drinks, and also reduces body mass index [26]. Vending machines in schools were found to increase the consumption of fructose in Korean schools; therefore such awareness would be key in potentially preventing a reduced menarcheal age [26]. Both this study and the research conducted by Al-Najar *et al*. underscored the low recognition of obesity as a risk factor for BC [25]. This too is concerning since obesity can be reduced by making lifestyle changes thus reducing

the potential risk of developing BC [25]. Having a breast problem was found to be associated with BC risk factors, which is expected as women who have a breast problem tend to have higher information-seeking behaviors [27] as opposed to those without breast problems. Identifying the existing knowledge gaps concerning risk factors plays a vital role in implementing awareness strategies tailored specifically for this community.

Contrary to studies in Angola and Riyadh, which demonstrated a lack of knowledge regarding signs and symptoms of BC, this study found participants´ knowledge to be satisfactory [24,28]. More than 50% of participants were aware of different BC signs and symptoms such as dimpling, swelling or enlargement, and ulceration of the breast. The age group 20-29 years had the highest knowledge of the signs and symptoms. This could be because this cohort has easy access to information on BC through social media and other internet sources [29]. Interestingly the age group 40-49 years had the lowest knowledge of the signs and symptoms of BC. Having a breast problem was found to be associated with knowledge about the signs and symptoms. However, a worrisome observation was the limited knowledge (14.3%) about BC signs and symptoms among participants experiencing breast problems, contradicting the anticipated proactive information-seeking behaviour generally expected in such cases [27].

This study found that over 60% of the participants were aware of breast self-examination, clinical breast examination, and ultrasound as screening methods for BC. Only 46.4% of the participants knew about mammography. It is evident that if most women did not know mammography as a screening method, it means the age group that is supposed to be going for yearly mammograms, is not doing so as expected. This mirrors the findings of a study conducted in Riyadh city, where merely a third of participants were acquainted with mammography as a BC screening method [30]. The results indicate a strong need to create more awareness regarding BC screening methods and to create a national breast screening program in Namibia targeting women within the high-risk age range. Knowledge of screening methods was significantly associated with the participants´ occupation (p=0.04), educational qualification (p=0.01), and having been pregnant (p=0.04).

Limitations: the study findings are based on self-reported questionnaires which potentially introduced self-preservation bias during reporting of practice. Only females visiting the two hospitals during data collection were recruited and may not accurately portray the community profile. Due to the sample size, the findings can only be applied to similar contexts.

Conclusion

This study reveals that the participants possess average knowledge regarding BC risk factors, screening methods, and signs and symptoms. The analysis revealed statistically significant correlations, with occupation and the personal history of breast problems prominently influencing the understanding of BC risk factors and symptoms. Secondly, another significant association was found between occupation, educational qualifications, and a history of pregnancy with the knowledge of BC screening methods. These insights underscore a pressing need for wide educational initiatives, both within the group under study and across the broader Namibian population, aiming to elevate BC knowledge. Despite the proven effectiveness of traditional, in-person awareness campaigns, they have limited outreach and may fail to create the necessary impact in large communities. It may be vital to leverage contemporary communication platforms to boost the reach of these campaigns. In light of the increasing influence of digital media, using social media platforms to conduct these awareness drives could be a strategic move to maximize the effectiveness of the BC awareness programs.

What is known about this topic

- *Early detection of BC improves the chances of survival;*
- *Different screening methods play a role in the early detection of BC;*
- *BC is the most common type of cancer among women.*

What this study adds

- *There is a significant association between occupation, age, having a breast problem, level of education, gravidity and breast cancer knowledge among women attending two health facilities in Windhoek, Namibia;*
- *The study emphasizes the need for a more comprehensive and targeted approach to increasing education and awareness of BC in Namibia;*
- *The study proposes that using social media platforms for BC awareness campaigns could increase outreach and maximize the effectiveness of these programs in the local context.*

Competing interests

The authors declare no competing interests.

Authors' contributions

Mondjila Amkongo, Abel Karera, Luzanne Kalondo, Monika Nakweenda, and Maria Namene conceptualized the study. Mondjila Amkongo, Abel Karera, Luzanne Kalondo collected data, MA and AK analyzed data, while MS discussed the findings. Mondjila Amkongo, Abel Karera, Luzanne Kalondo, Monika Nakweenda, Maria Namene, Moneni Shilumba, and Lee-Ann Izaacs drafted the manuscript, and Mondjila Amkongo, Abel Karera, Luzanne Kalondo corrected and finalized the manuscript. Mondjila Amkongo guaranteed the integrity of the study. All the authors have read and agreed to the final manuscript.

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Tables

Table 1: socio-demographic characteristics

Table 2: responses to questions related to knowledge of breast cancer risk factors, signs and symptoms and screening methods among this study´s sample

Table 3: relationship between the knowledge of breast cancer risk factors, signs and symptoms screening methods and demographic variables

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Table 1: socio-demographic characteristics	
Variable	**N (%)**
Age groups	
20-29	113(43.5)
30-39	70(26.9)
40-49	45(17.3)
>50	32(12.3)
Marital status	
Single	121(46.7)
In a relationship	80(30.9)
Married	47(18.2)
Divorced	5(1.9)
Widowed	6(2.3)
Educational qualification	
No school or high school certificate	80(30.9)
Certificate	110(42.5)
Diploma	27(10.4)
Bachelors	41(15.8)
Master's degree	1(0.4)
Participants' occupation	
Unemployed	97(37.5)
Student	46(17.8)
Self-employed	21(8.1)
Employed	95(36.7)
Family history of breast cancer	
Yes	60(23.3)
No	198(76.7)
Gravidity	
Yes	174(67.2)
No	85(32.8)
Breast problem	
Yes	38(14.6)
No	222(85.4)

Table 2: responses to questions related to knowledge of breast cancer risk factors, signs and symptoms and screening methods among this study´s sample

Statement	Responses n (%)				
	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Breast cancer is the most common cancer among females	124(47.9)	90(34.7)	28(10.8)	15(5.8)	2(0.8)
Breast cancer screening services are readily available in public health facilities.	56(21.6)	87(33.6)	48(18.5)	42(16.2)	26(10.0)
Early diagnosis of breast cancer increases the chances of treatment.	157(60.6)	76(29.3)	11(4.2)	13(5)	2(0.8)
In most cases, breast cancer appears as non-painful lumps in the breast.	100(38.8)	70(27.1)	51(19.8)	25(9.7)	12(4.7)
Normal breastfeeding decreases the probability of acquiring breast cancer	59(23.0)	47(18.4)	90(35.2)	47(18.4)	13(5.1)
Irritation of a tight bra can over time cause breast cancer	53(20.5)	56(21.6)	91(35.1)	45(17.4)	14(5.4)
Performing periodic regular breast examinations is one of the prevention measures for breast cancer	156(60.2)	64(24.7)	21(8.1)	14(5.4)	4(1.5)
Risk factors for developing breast cancer: bearing 1st child after 30 years	33(13.1)	27(10.8)	80(31.9)	72(28.7)	39(15.5)
Risk factors for developing breast cancer: early menarche at the age of <12 years	26(10.3)	24(9.5)	85(33.6)	78(30.8)	40(15.8)
Risk factors for developing breast cancer: late menopause at the age of >55 years	41(16.0)	33(12.8)	82(31.9)	69(26.8)	32(12.5)
Risk factors for developing breast cancer: obesity	52(20.5)	36(14.2)	73(28.7)	63(24.8)	30(11.8)
Risk factors for developing breast cancer: family history of breast cancer	157(60.9)	47(18.2)	14(5.4)	28(10.9)	12(4.7)
Risk factors for developing breast cancer: long-term use of contraceptive pills	74(28.9)	46(18.0)	78(30.5)	41(16.0)	17(6.6)
Signs and symptoms of breast cancer: breast discharge	129(50.2)	63(24.5)	30(11.7)	29(11.3)	6(2.3)
Signs and symptoms of breast cancer: pain or soreness	135(53.1)	83(32.7)	25(9.8)	6(2.4)	5(2.0)
Signs and symptoms of breast cancer: change in the size and shape of the breast	118(46.5)	53(20.9)	45(17.7)	26(10.2)	12(4.7)
Signs and symptoms of breast cancer: discoloration/dimpling	117(46.2)	55(21.7)	51(20.2)	25(9.9)	5(2.0)
Signs and symptoms of breast cancer: ulceration of the breast	134(52.8)	54(21.3)	38(15.0)	23(9.1)	5(2.0)
Signs and symptoms of breast cancer: inversion/pulling of nipple	93(36.6)	46(18.1)	76(29.9)	29(11.4)	10(3.9)
Signs and symptoms of breast cancer: swelling or enlargement	144(56.9)	57(22.5)	25(9.9)	20(7.9)	7(2.8)
Signs and symptoms of breast cancer: lump under armpit	141(55.1)	49(19.1)	35(13.7)	22(8.6)	9(3.5)
Screening methods: breast self-examination	152(59.8)	36(14.2)	10(3.9)	19(7.5)	37(14.6)
Screening methods: mammography	84(33.6)	32(12.8)	34(13.6)	32(12.8)	68(27.2)
Screening methods: clinical breast examination	134(53.0)	47(18.6)	24(9.5)	18(7.1)	30(11.9)
Screening methods: ultrasound	127(51.2)	35(14.1)	29(11.7)	20(8.1)	37(14.9)

Table 3: relationship between the knowledge of breast cancer risk factors, signs and symptoms screening methods and demographic variables					
Knowledge of signs and symptoms N%					
Variable	**Low**	**Average**	**High**	**Mean±SD**	**p-value**
Age					
20-29	30(35.8)	69(51.9)	3(42.9)	13.88±4.71	
30-39	30(27.5)	34(25.6)	1(14.3)	13.05±5.40	0.008*
40-49	19(17.4)	22(16.5)	1(14.3)	12.50±5.19	
>50	21(19.3)	8(6)	2(28.6)	11.42±6.52	
Breast problem					
Yes	21(19.3)	14(10.5)	1(14.3)	11.42±4.40	0.03*
No	88(80.7)	119(89.5)	6(85.7)	13.41±5.34	
Knowledge of risk factors					
Variable	Low 10(6)	Average 156(94)	High 0(0)	Mean±SD	p-value
Breast problem					
Yes	1(10)	30(19.2)		20.86±5.65	0.05*
No	9(90)	126(80.8)		22.99±5.94	
Knowledge of screening methods					
Variable	Low 73(29.7)	Average 132(53.7)	High 41(16.7)	Mean±SD	p-value
Participant's occupation					
Unemployed	29(39.7)	43(32.8)	19(46.3)	9.58±5.07	
Student	16(21.9)	25(19.1)	3(7.3)	7.82±3.47	0.04*
Self-employed	3(4.1)	11(8.4)	7(17.1)	10.76±4.01	
Employed	25(34.2)	52(39.7)	12(29.3)	9.25±4.21	
Educational qualification					
No school or high school certificate	18(24.7)	41(31.1)	18(45)	10.42±5.14	
Certificate	30(41.1)	58(43.9)	17(42.5)	9.06±4.03	0.01*
Diploma	5(6.8)	17(12.9)	2(5)	8.88±3.35	
Bachelors	19(26)	16(12.1)	3(7.9)	7.55±4.07	
Master's degree	1(1.4)	0(0)	0(0)		
Gravidity					0.04*
Yes	44(60.3)	88(67.2)	35(85.4)	12.98±5.67	
No	29(39.7)	43(32.8)	6(14.6)	13.39±4.29	
*Kruskal Wallis H test p< 0.05					