RESEARCH ARTICLE

Breast Cancer Screening in Tunisia: A Cross-Sectional Study on Women's Knowledge, Attitudes and Practices

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Abstract

Introduction: In Tunisia, the incidence and mortality rates of breast cancer are relatively high and are projected to remain a significant health burden by 2030. We aimed to evaluate the knowledge, attitudes, and practices of Tunisian women regarding breast cancer screening and to determine the factors associated with good practice using multivariable regression. **Methods:** We conducted a cross-sectional descriptive study among adult female Tunisian population for 10 days period (from 6 till 16 October 2022), using an online self-administered survey. We assessed knowledge related to breast cancer and screening methods, screening practices and attitudes towards breast cancer screening. Good knowledge, good attitude and good practices were defined as achieving ≥75% correct answers. **Results:** In total of 183 females were included (Mean age 33.7±8.2[18 – 64]). Almost all participants (96.7%, n= 177) lived in urban areas and 74.3% (n=136) were married. One-third of the participants were housewives (33.9%, n=62) and 83.6% (n=153) had an academic education. One participant (0.5%) had a personal history of breast cancer, while 26.2% (n=48) reported a family history of breast cancer. Among the participants, 42.6% (n=78) demonstrated good knowledge, 88.5% (n=162) had a good attitude score, and 21.3% (n=39) achieved a good practice score. Good practice was associated with good knowledge (Adjusted OR= 5.0, 95%CI [2.2-11.2],p<0.01), age ≥35 years (Adjusted OR= 2.5, 95% CI [1.1-5.4], p=0.02) and a family history of breast cancer (Adjusted OR= 2.2, 95% CI [1.0-5.1], p=0.04). **Conclusion:** Our study showed a moderate knowledge and practice regarding breast cancer screening, alongside a generally good attitude. The factors associated with good practice underscore the importance of educational interventions and the targeted screening strategies.

Keywords: Breast cancer- screening- Tunisia- KAP study

Introduction

Breast cancer is a significant global health problem presenting the common cause of cancer death in women worldwide [1]. In 2020, an estimated 2.3 million new cases, and 685.000 related deaths due to breast cancer in the world [2]. The Global Burden of Disease (GBD) also reported 2.08 million incident cases of breast cancer and 674.000 deaths globally [3]. Breast cancer is one of the three dominated cancers in the Central Maghreb countries, both now and for the next two decades [4]. In the Middle East and North Africa region, age-standardized incidence and death rates of female breast cancer increased respectively by 90.9% and 24.0% between 1990 and 2019 [5].

In Tunisia and in 2023, breast cancer was the most frequent cancer in females and counted for more than one third of cancers among them, according to the Northern Tunisia Cancer Registry [6]. In 2017, breast cancer incidence was 50.17/100,000 persons years, and the mortality rate was 14.04/100,000 persons years in Tunisia [7]. Without effective interventions, the number of DALYs due to breast cancer would reach 40,071 in 2,030 with a standardized rate of 507/100,000 persons years and the number of YLL predicted will attain 36,457 with a standardized rate of 461/100,000 persons years [7]. Besides, it remains an important public health issue that is usually discovered in late stages [8]. In fact, early screening is recommended once in a year (for women aged between 50 and 74 years) and performed by doctors or midwifes during medical visits. In 2021, the screening coverage for breast cancer was 10%, with 30% of breast cancer diagnosed at early stage and 15% at the metastatic stage [9]. The high incidence of breast cancer, the high mortality and the high burden of diseases related to breast cancer, highlights the impact that breast cancer is having on the Tunisian female population as well as on the healthcare system.

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The incidence and mortality rates related to breast cancer vary across different countries, with disparities often linked to sociodemographic factors, access to healthcare, and cultural practices [10, 11].Early detection of breast cancer plays a crucial role in improving treatment outcomes and survival rates [12]. Several screening modalities are recommended for the early detection of breast cancer depending on several factors such as age and other risk factors [13].

Mammography is widely considered as the gold standard for breast cancer screening, with a sensitivity higher than 75% and specificity higher than 85% [14]. Other screening exams include clinical breast examination performed by a healthcare professional andself-breast examination [13]. These techniques have been proven ineffective in significantly reducing the mortality risk associated with breast cancer.

Despite the availability of effective screening methods, there are various barriers that can hinder women from participating in breast cancer screening programs [15]. Barriers in the literature are categorized into individual-level factors (including lack of knowledge, fear or anxiety related to breast cancer), healthcare system-level factors (including access to health care) and sociocultural factors (including cultural beliefs and social norms) [16,17].

We aimed to evaluate the knowledge, attitudes and practices of Tunisian women regarding breast cancer screening and to determine the associated factors for good practices.

Materials and Methods

Study design, period and participants

We conducted a cross-sectional descriptive study among female Tunisian population during 10 days (from 6 till 16 October 2022).

Inclusion criteria

Women who were ≥18 years old and who accepted to participate were included in our study.

Exclusion criteria

Unfinished questionnaires were excluded from our study.

Measurement tool and data collection

An auto administered questionnaire (Annex 1) was developed by experts using Google Forms ,then it was shared through most popular Tunisian online Meta pages (Facebook). Considering that approximately 7.7 million Tunisians have Facebook accounts, using Facebook allowed us to reach a broad segment of the population.

The questionnaire was then shared on various Tunisian Facebook pages and groups, primarily female-oriented groups, as the study focused on women's perspectives. We specifically selected public and accessible groups with more than 1,000 members to maximize visibility and participant diversity. The questionnaire was posted publicly within these groups, and no paid advertisements were used. To increase response rates, the questionnaire link was reposted twice, with one-week intervals between each posting. Participation was voluntary and anonymous, and participants could complete the questionnaire at their convenience.

The questionnaire contained sociodemographic characteristics: age, living area (rural or urban), marital status, educational level, occupation Personal and family history of breast cancer, types of breast cancer early screening.

- Questions related to the knowledge about breast cancer:« What are the most frequent cancer types », « what is the most dangerous cancer type», «Do you know the early screening methods for breast cancer in Tunisia, if yes; what are breast cancer early screening methods and strategies » and « what are breast cancer's risk factors ».

- Questions regarding breast cancer screening practices for each participant: self-examination, clinical breast examination and radiological exam, and their periodicity.

- Questions about attitudes were: « If the participant is willing to have breast cancer screening » and the reasons to not to be willing screened.

The completing time for the questionnaire is 6 – 10 minutes.

Statistical analysis

Data entry and analysis were conducted using SPSS; Version 21.0. Quantitative variables were represented by means (±) and standard deviations (SD). Qualitative variables were represented by effectives and percentages. Chi square and Student Tests were used to compare percentages and means, respectively.

We conducted binary multivariable logistic regression to determine factors associated with good practices, as a main outcome.

Knowledge, attitudes and practices scores were obtained by adding the total number of correct answers (counted as 1) and dividing them by the total number of questions in each section. Responses with "*I don't know*" were counted as zero to obtain the final scores.

Good knowledge, good attitude and good practices were defined as having ≥75% of good answers, and low knowledge, low attitude and bad practices were defined as having ≤25% of good knowledge. Moderate Knowledge, moderate attitude and moderate practices were defined as having between 25-75% of good answers. For univariate and multivariate analysis, we defined the scores as dichotomous variables: having ≥75% of good answers was defined as "good" and having <75% of good answers was defined as moderate of low.

Ethical considerations

All participants aged ≥ 18 years and who gave an online informed consent to participate were included; the questionnaire was anonymous (blinded) , and no personal records were taken from the participants.

Results

Socio-demographic characteristics of the study population (Table 1). In total 183 females participated in the study. Mean age was 33.7±8.2 [18 – 64]. Almost all the participants (96.7%, n= 177) lived in urban areas

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Table 1. Socio- Demographic Characteristics of Participants in the KAPs Study Related to Breast Cancer Screening, Tunisia, October 2022 (n=183)

Socio-demographic characteristic	Number	Percentage (%)
Area of residence		
Urban	177	96.7
Rural	6	3.3
Marital status		
Married	136	74.3
Single	41	22.4
Divorced	5	2.7
Widow	1	0.5
Educational level		
High school	30	16.4
University	153	83.6
Occupation		
Housewife	62	33.9
Employee	55	30.1
CEO	55	30.1
Daily worker	11	6
Family history of breast cancer		
Yes	48	26.2
No	135	73.8
Personal history of breast cancer		
Yes	1	0.5
No	182	99.5

and 74.3% (n=136) were married. One third of the group were housewives (33.9%, n=62) and 83.6% (n=153) had an academic education. One participant (0.5%) had a personal history of breast cancer and 26.2% (n=48) had a family history of breast cancer.

Knowledge score

Global knowledge score varied between zero and 100% with a mean score of 69.4% ± 21. More than half of participants had moderate knowledge score: 55.2% (n=101); 42.6% (n=78) had a good knowledge score of breast cancer and four participants (2.2%) had low knowledge score.

Table 2. Reasons Reported by Tunisian Female for Not Performing Early Breast Cancer Screening, Tunisia, October 2022 (n=183)

Reasons	Number	Percentage (%)
Being under age 40	66	36.1
Not having enough time	63	34.4
Afraid of the results	48	26.2
Not knowing where to do the screening	39	21.3
Not covering screening finances	34	18.6
Not knowing the reasons of the screening	4	2.2

Table 3. Mean Ages of Participants with Breast Cancer Screening Methods, Tunisia, October 2022

Breast cancer screening method	Mean age
Practiced mammography or ultrasound screening	38.9±7.9
Did not practice mammography of ultrasound screening	31.7±7.4
Practiced medical breast examination	39.6±7.7
Did not practice medical breast examination	30.9±7.7
Practiced self-breast examination	35.6±8.3
Did not practice self-breast examination	29.2±5.9

According to participants, breast cancer was reported as the most frequent cancer among Tunisian female population in 80.3% (n=147) of cases, and as the most dangerous in 36.6% (n=67) of cases. One third of the study population (35%, n=64) reported breast cancer as both the most frequent and the most dangerous.

Less than half of the group (41.5%, n=76) knew about breast cancer risk factors

Eighty six percent of participants (n=158) believed that breast cancer could be prevented with early detection and reported the following means for early detection: clinical breast examination by a doctor or a midwife (90.7%, n=166), breast self-exam (89.6%, n=164), mammography (82.5%, n=151) and breast ultrasound (72.7%, n=133). Twenty-five percent of participants (n=47) did not know any screening methods for breast cancer.

Attitude score

The willingness to have breast cancer screening was reported by 88.5% (n=162) of participants. Participants who did not want to perform early breast cancer screening (11.5%, n=21), listed these major causes: being under age 40 (36.1%, n=66), not having enough time (34.4%,n=63), or being afraid of the results (26.2%, n=48) (Table 2).

Practice score

Global practice scores varied from 0 to 100%, with a mean score of 41.4% ± 31.4. Moderate practice was reported in 44.3% (n=81) of participants. One third of the group had a low practice score (34.4%, n=63) and 21.3% (n=39) had a good practice score. Self-examination of breast was performed at least once by 70.5% (n=129) of participants. Half of them (49.2%, n=90) have had at least one clinical breast examination for breast cancer. During the last year, 40.4% (n=74) of participant performed breast self-examand 19.7%(n=36) had a clinical breast examination. Mammography and breast ultrasound were performed at least once in their life for 27.9 %(n=51) of participants: among them, 16.4% (n=30) of participant had it during a screening day, and 9.3%(n=17) made it after a medical prescription. Forty percent of participants never had a radiologic screening (41%, n=75).

Mean age of participants who have had mammography or breast ultrasound was significantly higher compared to those who had never had these exams (38.9 ± 7.9 VS 31.7 ± 7.4, p<0.01). Also, mean age of participants

Table 4. Statements Related to the Knowledge, Attitude and Practices Scores, Tunisia, October 2022 (n=183)

Statement	Number	Percentage (%)
Knowledge score		
In your opinion, what is the most frequent cancer among the Tunisian female population ?		
Breast cancer	147	80.3
Cervical cancer	5	2.7
Colon cancer	3	1.6
Other types of cancer	2	1.1
I don't know	26	14.2
In your opinion, what is the most dangerous cancer among the Tunisian female population ?		
Breast cancer	67	36.6
Cervical cancer	41	22.4
Colon cancer	17	9.3
Other types of cancer	11	6
I don't know	47	25.7
In your opinion, is there a method for early detection of breast cancer ?		
Yes	158	86.3
No	0	0
I don't know	25	13.7
What are the methods of early detection of breast cancer ?		
Clinical breast examination by doctor or midwife*	166	90.7
Breast-self examination	164	89.6
Mammography	151	82.5
Breast ultrasound	133	72.7
Do not know	47	25.7
Other	41	22.4
Do you know the risk factors for breast cancer ?		
Yes	76	41.5
No	107	58.5
Attitude score		
Do you want to undergo early detection for breast cancer?		
Yes	162	88.5
No	21	11.5
Practices score		
Have you ever performed a breast self-exam at least once in your life?		
Yes	129	70.5
No	54	29.5
When was the last time you performed a breast self-exam?		
Never	54	29.5
Less than a year ago	74	40.4
More than a year ago	55	30.1
Have you ever visited a doctor or midwife for a breast exam?		
Yes	90	49.2
No	93	50.8
When was the last time you had a breast exam by a doctor or midwife?		
Never	93	50.8
Less than a year ago	36	19.7
More than a year ago	54	29.5
Have you ever had a mammography or an ultrasound screening ?		
Yes	51	27.9
No	132	72.1

who practiced breast self-examand had clinical breast examination was higher compared to those who did not practice breast self-examand those who had not clinical breast examination (35.6 ± 8.3 vs. 29.2 ± 5.9, p<0.01 and 39.6 ± 7.7 vs. 30.9± 7.7, p<0.01) (Table 3). Statements related to each score are presented in Table 4 Factors associated with good knowledge, good practices and good attitudes among participants: Univariate analysis (Table 5) and multivariate analysis (Table 6)

There were no significant differences in Knowledge, attitude or practices between urban and rural areas. Married women have had a better practice regarding breast cancer, compared to unmarried participants, with a crude OR of 2.3 [1-5.6], p=0.04. Participants with good knowledge had better practice regarding breast cancer (Crude OR 3.4[1.8-6.4], p<0.01). The mean age of participants with good practice was significantly higher in participants with good practice compared to those with low or moderate practice score (37.6 vs 32.7 years, p=0.002).

Mean age of participants with good knowledge did not significantly differ from participants with low or moderate knowledge (34.7 vs 33.1 years, p=0.2). There was also no difference in ages between participants with good practices and those with low or moderate practices (33.7 vs 33.6, p=0.9). In multivariate analysis, good practice was associated with good knowledge (Adjusted OR= 5.0, 95%CI [2.2-11.2],p<0.01), age ≥35 years (Adjusted OR= 2.5, 95% CI [1.1-5.4], p=0.02) and family history of breast cancer (Adjusted OR= 2.2, 95% CI [1.1-5.1], p=0.04) (Table 3).

Discussion

Our study found a moderate knowledge, moderate practice and good attitude of participants regarding breast cancer and early screening in Tunisia. Family history of breast cancer was the only factor found to be associated with a good attitude. On another hand, good practice was associated with good knowledge, family history of breast cancer and age ≥ 35years.

A study conducted in 2009 among 900 women [18], in Monastir region (Tunisia) found poor knowledge of breast cancer and screening methods, along with low level of practice of screening. In fact, the different findings regarding the level of knowledge and practices could be explained by the differences in the sampling and the sociodemographic differences between participants (age, and level of education). However, we found similar factors associated with breast cancer screening practice: good knowledge and family history of breast cancer.

In our study, the family history of breast cancer was associated with good attitude and good practice. A study conducted in United States of America, showed that women with first degree relative with breast cancer were more likely to engage in appropriate screening behaviors [19]. Although family history of breast cancer was not found to be a predictor of greater psychological distress [20], having a family member with breast cancer could raise awareness and knowledge about the diseases, and thus have an indirect impact on attitudes and practices. In fact, the knowledge about breast cancer and screening is

Table 5. Factors Associated with Good Knowledge, Good Practices and Good Attitudes towards Breast Cancer and Breast Cancer Screening: Univariateanalysis, Tunisia, October 2022

Factors	Good knowledge			Good attitude			Good practice		
	n (%)	Crude OR 95% CI	p-value	n (%)	Crude OR 95% CI	p-value	n (%)	Crude OR 95% CI	p-value
Area			1			1			1
Rural	2 (33.3)	1		6 (100)	1		1 (16.7)	1	
Urban	76 (42.9)	1.3 [0.4-4.0]		156 (88.1)	0.8 [0.8-0.9]		38 (21.5)	1.3 [0.2-7.8]	
Age(years)			0.6			0.8			0.01
<35	42 (41.2)	1		90 (88.2)	1		15 (14.7)	1	
≥35	36 (44.4)	1.0 [0.8-1.4]		72 (88.9)	1.0 [0.5-2.4]		24 (29.6)	1.2 [1.0-1.4]	
Marital status									
Un- married	17 (36.2)	1	0.3	40 (85.1)	1	0.4	5 (10.6)	1	0.04
Married	61 (44.9)	1.2 [0.8-1.9]		122 (89.7)	1.0 [0.9-1.2]		34 (25.0)	2.3 [1-5.6]	
Level of education									
University	64 (41.8)	1	0.6	136 (88.9)	1	0.7	32 (20.9)	1	0.8
High schools	14 (46.7)	1.1 [0.7-1.7]		26 (86.7)	0.9 [0.8-1.1]		7 (23.3)	1.1 [0.5-2.3]	
Working									
Yes	55 (45.5)	1	0.3	107 (88.4)	1	1	24 (19.8)	1	0.6
No	23 (37.1)	0.8 [0.6-1.2]		55 (88.7)	1 [0.9-1.1]		15 (24.2)	1.2 [0.7-2.1]	
Knowledge	-	-	-	93 (88.6)	1	0.9	11 (10.5)	1	<0.01
Low or moderate Good				69 (88.5)	1 [0.4-2.3]		28 (35.9)	3.4 [1.8-6.4]	
Family history of breast cancer									
No	55 (40.7)	1	0.4	115 (85.2)	1	0.01	23 (17.0)	1	0.02
Yes	23 (47.9)	1.3 [0.7-2.6]		74 (97.9)	1.1 [1.1-1.2]		16 (33.3)	1.9 [1.1-3.4]	
Personal history of breast cancer									
No	77 (42.3)	1	0.4	161 (88.5)	1	1	38 (20.9)	1	0.2
Yes	1 (100)	2.3 [1.9-2.8]		1 (100)	1.1 [1.1-1.2]		1 (100)	4.7 [3.6-6.3]	

Table 6. Factors Associated with Good Practices Regarding Breast Cancer among Participants, Tunisia, October2022 : Multivariate analysis (Table3) (n= 183)

Factor	Adjusted OR	95% CI	p-value
Good knowledge	5.0	2.2-11.2	<0.01
Age ≥35	2.5	1.1-5.4	0.02
Family history of breast cancer	2.3	1.1-5.1	0.04

commonly related to the screening activity [21]; the most common barriers for breast cancer screening reported in several studies were that participant were unaware of the screening methods [22, 23]. These results align with the findings of our study, in which less than half of participants knew about breast cancer risk factors. Thus, participants with good knowledge score were five times more likely to have good practice compared to those with low or moderate knowledge score. As a result, several countries such as Lebanon focused on education and awareness campaigns to encourage early breast cancer screening which had an impact by an increase in early stage of breast cancer along with a decrease in the aggressive stages [24].

Older females were more likely to adhere to breast cancer screening in our study, however, other studies found a negative association between age and practice of self-examination [25]. In fact, older women could believe that they are less susceptible to breast cancer than younger women and would have a less positive attitude towards breast cancer screening [26]. On another hand, other studies found that younger women practice breast cancer screening more frequently compared to other women [27]. These differences could be related to the guidance of the screening program, which targets older women or reaches older women more. It might be also related to the marital status of the participants, who are more likely to seek breast cancer screening [28].

The family history of breast cancer was associated with good practice in our study. In fact , other studies found that medical request is usually influenced by the pathology and by the patient's circle [29, 30]. This demonstrates the relation between breast cancer risk perception and family history of breast cancer [31].

Most of our participants resided in urban areas (96.7%, n=177) and were university-educated (83.6%, n=153). This demographic likely reflects individuals with better socioeconomic status, greater access to higher education, and more frequent engagement with digital platforms such as social media [32]. These factors potentially influenced the levels of knowledge and screening practices observed.

Online surveys enable quick, cost effective data

collection and anonymity. Person-to-person surveys permit interactions with the interviewers and ensure better respondent engagement [33]. Nevertheless, person-to-person surveys may introduce social desirability bias, where respondents answer in a manner favorable to the interviewer [34]. Mixed-mode surveys combining online and in-person methods would have been more sufficient to robustly detect this association by balancing the strengths and weaknesses of each mode [34].

Our study was conducted through an online questionnaire and allowed an objective measurement of the knowledge and practices among Tunisian females regarding breast cancer. However, this technique could have introduced a selection bias. Women taking the online surveys may have specific characteristics that are not found in the whole population (access to internet, usage of electronic devises).This could also potentially influenced the levels of knowledge and screening practices observed in our study. Using an online survey may have introduced some selection bias, as it only included Facebook users who are members of specific groups, but by targeting multiple large and diverse groups, we aimed to minimize this limitation. Adding to this, we did not perform a random sampling method. Thus, our results could not be generalized to the whole Tunisian female population. Besides, the screening by mammography and ultrasound was self-reported, this could be better if it was reported through the medical records of the participants. Conducting the study during the Cancer Awareness Month (October) could also introduce a measure bias as women are more likely to be exposed to awareness campaign and free screening.

We recommend targeting young participants to raise knowledge and awareness about breast cancer risk factors and the major role of screening in cancer prevention. We suggest conducting a case control study to better understand the direction of causalities between risk factors and to support medical doctors to take detailed family history and educating women about their risk regarding breast cancer. Further studies targeting rural and less-educated populations are also needed.

Our study showed a moderate knowledge and practice regarding breast cancer screening, with a good score of attitude. Factors found to be associated with good practice underscore the importance of educational interventions and the targeted screening.

Author Contribution Statement

Acknowledgements

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