ORIGINAL ARTICLE

PREDICTORS OF BREAST SELF-EXAMINATION UPTAKE AMONG WOMEN IN MALE' REGION, MALDIVES

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ABSTRACT

Breast cancer (BC), is the most common cancer that affects women, and one of the significant causes of mortality among them. Screening and early detection of the disease are encouraged as a means of reducing mortality and enhancing the prognosis. The purpose of the study is to determine the prevalence of Breast Self-Examination (BSE) uptake and to identify the factors that are associated with the BSE uptake among Maldivian women in the Male' region. The cross-sectional study was carried out over a period of 3 months in the Male' region, of the Maldives. A total of 600 female citizens aged 20-79 years were selected using stratified random sampling method. Data were collected using an interviewer-administered questionnaire. About 82.70%, 54.80%, and 63.30% of the respondents had heard about BC, breast cancer screening (BCS), and BSE respectively. 50.80% of the respondents had ever performed BSE with only 22.00% performed it regularly. The significant predictors for BSE uptake were: ever heard about BC [OR=2.069, 95% CI(1.081-3.959)], ever heard about BSE [OR=2.342, 95% CI(1.326-4.137)], ever heard about clinical breast examination (CBE) [OR=1.946, 95% CI(1.117-3.390)], knowledge on early detection of BC [OR=1.077, 95% CI(1.011-1.148)], perceptions on the severity of BC [OR=1.062, 95% CI(1.010-1.116)], perceptions on barriers towards BSE [OR=0.900, 95% CI(0.846-0.958)] and self-efficacy [OR=1.112, 95% CI(1.076-1.150)]. The findings indicated that there is a pressing need for continued education and behaviour modification intervention programs using theories and models to increase women's overall knowledge and awareness of BC and BCS and modify the long-held incorrect beliefs and misconceptions. In particular, the relevant authorities should play a proactive role in raising awareness of BC and promote BCS.

***Keywords**: Predictors, Breast Cancer, Breast Self-Examination, Maldives*

INTRODUCTION

Breast cancer (BC), is the most common cancer that affects women, and one of the significant causes of mortality among them [1]. The prevalence rate of the disease is projected to rise to 2 million by the year 2030, and most of the incidences are expected to emerge from the developing countries [2]. BC is identified as the second-highest cancer in the Maldives and in females across the population, it is the most common cancer [3, 4].

Early detection of BC plays a key role in improving prognosis, decreasing morbidity and mortality rates [5-7]. Screening and early detection of the disease are encouraged as a means of reducing mortality and enhancing the prognosis [8]. The most common methods for early detection of BC include Breast Self-Examination (BSE), Clinical Breast Examination (CBE) and Mammography Screening [9]. Even though BSE alone may not be adequate for early detection of BC, it is considered as an important screening modality in developing countries because it is one of the simplest, non-invasive, and cheap methods to conduct screening for BC [10-13]. Performing regular BSE helps women become more aware of their breast structure and enables them to recognize any abnormal changes in their breasts [10, 11].

Several factors such as sociodemographic characteristics [10, 14-17], women's knowledge on BC, and breast cancer screening (BCS) have shown to be associated with the BSE uptake [17-19]. Additionally, previous studies based on the Health Belief Model (HBM) provide empirical evidence indicating women's beliefs and perceptions to influence BSE uptake [9, 14, 17, 20-23].

The purpose of this study is to determine the prevalence of BSE uptake and to identify the factors that are associated with the BSE uptake among Maldivian women in the Male' region of Maldives. The findings of the study will help all the relevant stakeholders to get an in-depth understanding in relation to the BSE uptake in the country. As BC is the most common cancer among females in the country, the need to implement mechanisms geared towards detecting the condition early and putting forward proper measures to address the problem is exceptionally important.

METHODOLOGY

Study Design and Sample

This cross-sectional study was carried out among a total of 600 female citizens in the Male' Region, Maldives, between December 2019 to February 2020. The stratified random sampling method was used for the selection of the study sample. All six wards of the Male' region were categorised as six stratums. For each of the six strata, census blocks (CB's) were allocated randomly according to the proportion of the population. Next, eleven households from each selected CB were selected, based on simple random sampling, and one eligible woman from the selected households were recruited. The inclusion criteria that were applied for the study were: female citizens aged 20-79 years, comprehend both spoken and written Dhivehi language, no history of BC or any other cancers, mentally fit and consent to participate in the study.

The sample size for this study was estimated by using the following formula:

$$n=\frac{(z_\alpha+z_\beta)^2(p_1(1-p_1)+p_2(1-p_2))}{(p_1-p_2)^2}$$

n= sample size estimation

Z_α= Confidence Level of 95%, α is 0.05 and the critical value is 1.96

Z_β= power of 80%, β is 0.2 and the critical value is 0.84

P_1 and P_2 is based on the study conducted by Dahlui et al (2012) where;

P_1= 10.4 (proportion of working women who have had a mammogram ever) and

P_2= 16.6 (proportion of non-working women who have had a mammogram ever).

To address the effect of subject attrition, the sample size was increased by 20%.

The study obtained ethical approval from the ethics committee of Management and Science University, Malaysia and Health Research Committee, Ministry of Health, Maldives.

Instrument

Data was collected through a validated and reliable interviewer-administered questionnaire which comprised of five sections: 1) Socio-demographic characteristics and family health history of the participants. 2) Sources of BC and BCS information. 3) Participants' knowledge on BC (signs and symptoms, risk factors) and early detection of BC. This section was evaluated through a questionnaire by Parsa et al (2008). Responses were measured using "true", "false" and "I don't know", where respondents were given one point for a correct answer and zero for an incorrect answer or if they do not know. 4) Participants' beliefs on BC and BCS. This section was evaluated by a modified, reliable, and validated tool adapted from Champion's revised health belief model scales (CHBMS) [24]. It comprised of self-reported measures, on the six constructs of the HBM: susceptibility to BC, the seriousness of BC, benefits of BSE, barriers to BSE, self-efficacy (confidence), and cues to action (health motivation). All items contained 5 response choices that were measured using a Likert scale ranging from "strongly disagree" (1 point) to "Strongly agree" (5 points). All subscales were positively associated with screening except for the barriers. Construct validity and reliability of the adapted CHBMS were tested by Parsa et al (2008) and found to be acceptable. 5) Participants BSE uptake. This was assessed by self-reported measures on BSE performance, frequency, timing, the reasons for the unwillingness to the uptake as well as the intention for future uptake. The questionnaire was pretested among 60 women and the reliability was confirmed based on Cronbach Alpha values. The Cronbach's alpha values for total knowledge on BC and BCS as well as total beliefs scales (CHBMS) were 0.901 and 0.826 respectively.

Statistical Analysis

Data analysis was carried out using IBM Statistical Package for Social Sciences (SPSS) version 25. Descriptive and inferential statistical analysis were carried out in the study. Independent t-test and Chi-square tests were performed to determine the factors associated with BSE uptake. Logistic regression analysis was conducted to identify which variables significantly predicted BSE uptake. The level of significance was set at <0.05 for all tests.

RESULTS

Sociodemographic Characteristics, Family Health History and BC and BCS Information

The study respondent's mean age was 39.43±12.62 years. Most of them (75.50%) were married. About 30.20% of the respondents attained a secondary school level of education, whereas 33.60% achieved A' levels and above. More than half of them (67.50%) were unemployed while 32.50% were employed. The mean monthly income and household monthly income was Maldivian Rufiyaa (MVR) 11,213.05±9663.53 and 30,064.80±19,491.62 respectively (1 US $= 15.42 MVR). About 11.30% of the respondents had private health insurance.

A small percentage of respondents indicated ever being diagnosed with a disease or condition(s) related to the breast (7.70%) and having a family history of BC (6.80%). About

82.70%, 54.80%, and 63.30% of the respondents had heard about BC, BCS, and BSE respectively. The major sources of BC information indicated by the study respondents were the internet and television with 46.20% and 44.00% respectively.

BSE Uptake

About half (50.80%), reported ever having performed BSE. Of those who performed, only 22.00% had done it on a regular monthly basis, while most women reported that they perform BSE sometimes. Regarding when BSE was done, only 28.50% of women reported they perform BSE 1-2 days after the period had stopped. Taking into contemplation, the number of times BSE was done in the previous year, 51.50%, 26.60%, and 22.00% had performed BSE less than 4 times, 5-8 times, and more than 9 times respectively. The reasons indicated by the study respondents for not doing BSE were: do not have a need for it (68.80%), lack of knowledge on BSE (24.40%), not knowing how to do it (20.30%), being too busy (5.40%), forgetting about it (4.10%), and takes a long time to do it (0.30%). Approximately 61.00% of the study respondents expressed that they intend to do regular BSE in the future.

Factors Associated with the BSE Uptake

Sociodemographic, Family Health History and BC and BCS Information with BSE Uptake

As shown in table 1 and 2, the variables, age (p-value=0.002), educational level (p-value<0.001), employment status (p-value=0.003), regular medical check-up (p-value=0.022), ever heard about BC (p-value<0.001), ever heard about BCS (p-value<0.001), ever heard about BSE (p-value<0.001), ever heard about CBE (p-value<0.001), ever heard about Mammogram (p-value<0.001), ever had a CBE done (p-value<0.001), and ever had a Mammogram done (p-value<0.001), were statistically significant and found to be associated to influence the BSE uptake. The other socio-demographic and health history variables, which are: monthly income, monthly household income, marital status, insurance status, ever diagnosed for any breast disease/conditions, and family history of BC, depict non-significant p-values indicating that there is no mean difference among the two groups.

Knowledge and Beliefs (CHBMS) on BC and BCS with BSE Uptake

The relationship and comparison between BSE uptake (those who had performed BSE versus those who had not performed BSE) with knowledge and beliefs (CHBMS) on BC and BCS are unveiled in table 3. Significant mean difference among the two groups were observed for knowledge on symptoms of BC (p-value<0.001), risk factors of BC (p-value<0.001), early detection of BC (p-value<0.001), benefits of BSE (p-value<0.001), barriers to BSE (p-value<0.001), self-efficacy (p-value<0.001), and health motivation (p-value=0.022). No significant difference between the two groups was found for the susceptibility and the severity sub-scales.

Significant Predictors for BSE Uptake

Table 4 depicts the logistic regression model for the predictors of BSE uptake. The variables which were found to be associated with the BSE uptake, as well as those based on the HBM theory were included in the regression analysis. The strongest predictor for BSE uptake was having heard about BSE, signifying that women who have heard about BSE were two times more likely to perform BSE than those who have not heard about it (OR=2.342, 95% CI:1.326-4.137). Moreover, those women who had heard about BC (OR=2.069, 95% CI: 1.081-3.959) and CBE (OR=1.946, 95% CI: 1.117-3.390) were more likely to perform BSE than those who have not heard about it. Furthermore, those who had more insight on early detection of BC (OR=1.077, 95% CI: 1.011-1.148) were more likely to perform BSE than those who lack the specific knowledge. In relation to beliefs on BC and BCS variables, those women who have more confidence in their ability to perform screening (OR=1.112, 95% CI: 1.076-1.150), those who perceive that BC is a serious disease, or having the disease would have severe consequences (OR=1.062, 95% CI: 1.010-1.116), were more likely to perform BSE than those who lack the confidence and such beliefs. In addition, those who perceive greater barriers to BSE (OR=0.900, 95% CI: 0.846-0.958) were less likely to perform BSE than those women who lack the belief.

Table 1: Association Between Sociodemographic, Family Health History, and BC and BCS Information Variables with BSE Uptake

Characteristics	Statistics		
	BSE done (n=192)	BSE not done (n=272)	
	n (%)	n (%)	p-value
Marital status			
Currently married	239 (52.80)	214 (47.20)	0.098
Currently not married	66 (44.90)	81 (55.10)	
Educational level			
Lower level	168 (42.20)	230 (57.80)	**<0.001***
Higher level	137 (67.80)	65 (32.20)	
Employment status			
Employed	116 (59.50)	79 (40.50)	**0.003***
Unemployed	189 (46.70)	216 (53.30)	
Insurance status (Private)			
Yes	42 (61.80)	26 (38.20)	0.056
No	263 (49.40)	269 (50.60)	
Ever diagnosed for any breast disease			
Yes	27 (58.70)	19 (41.30)	0.267
No	278 (50.20)	276 (49.80)	
Family history of BC			
Yes	24 (58.50)	17 (41.50)	0.307
No	281 (50.30)	278 (49.70)	
Regular medical check-up			
Yes	117 (57.40)	87 (42.60)	**0.022***
No	188 (47.50)	208 (52.50)	
Ever heard about BC			
Yes	283 (57.10)	213 (42.90)	**<0.001***
No	22 (21.20)	82 (78.80)	
Ever heard about BCS			
Yes	219 (66.60)	110 (33.40)	**<0.001***
No	86 (31.70)	185 (68.30)	
Ever heard about BSE			
Yes	258 (67.90)	122 (32.10)	**<0.001***
No	47 (21.40)	173 (78.60)	
Ever heard about CBE			
Yes	197 (72.70)	74 (27.30)	**<0.001***
No	108 (32.80)	221 (67.20)	
Ever heard about Mammogram			
Yes	172 (66.40)	87 (33.60)	**<0.001***
No	133 (39.00)	208 (61.00)	
Ever had a CBE			
Yes	127 (66.10)	65 (33.90)	**<0.001***
No	108 (39.70)	164 (60.30)	
Ever had a Mammogram			
Yes	51 (57.30)	38 (42.70)	**<0.001***
No	57 (33.50)	113 (66.50)	

Bold: Significance at level p-value<0.05*

Table 2: Association Between Sociodemographic, Family Health History, and BC and BCS Information Variables with BSE Uptake

Characteristics	Statistics				
	Mean	Std.Dev	Mean Difference	t	p-value
Age					
BSE done (n=305)	37.85	11.52	3.222	3.140	**0.002***
BSE not done (n=295)	41.07	13.49			
Monthly income					
BSE done (n=171)	11821.40	9782.50	-1351.404	-1.228	0.220
BSE not done (n=140)	10470.00	9498.13			
Monthly household income					
BSE done (n=305)	30728.26	19976.03	-1349.415	-0.848	0.397
BSE not done (n=295)	29378.85	18987.30			

Bold: Significance at level p-value<0.05*

Table 3: Knowledge and Beliefs (CHBMS) on BC and BCS Between Those Who Performed BSE and Those Who Had Not Performed BSE

Variables			
	BSE done (n=305)	BSE not done (n=295)	
	Mean±SD	Mean±SD	p-value
Knowledge			
Symptoms of BC	5.22 ± 2.07	3.74 ± 2.26	**<0.001***
Risk factors of BC	6.79 ± 2.44	5.30 ± 2.83	**<0.001***
Early detection of BC	12.85 ± 3.31	10.13 ± 4.66	**<0.001***
Total knowledge	24.86 ± 5.88	19.17 ± 8.13	<0.001
Beliefs (CHBMS)			
Susceptibility to BC	12.67 ± 3.31	13.00 ± 3.37	0.234
Severity of BC	23.35 ± 4.40	23.25 ± 4.52	0.783
Benefits of BSE	24.26 ± 2.88	23.27 ± 3.18	**<0.001***
Barriers towards BSE	14.48 ± 3.21	16.65 ± 3.92	**<0.001***
Self-efficacy (Confidence)	38.44 ± 6.31	32.00 ± 7.33	**<0.001***
Cues to Action (Health motivation)	22.94 ± 2.87	22.42 ± 2.71	**0.022***
Total beliefs	201.93 ± 14.33	196.80 ± 16.76	<0.001

Bold: Significance at level p-value<0.05*

DISCUSSION

The findings of this study indicate low regular BSE uptake rates among Maldivian women. More than half (63.30%) of the respondents had heard about BSE. However, only 22.00% of them performed it regularly. Similar to the present study findings, regular performance of BSE were reported as 21.10% among Saudi women [22], 18.00% among university students in Saudi [13], 24.60% among university students in Iran [17], 26.00% among undergraduate students in Malaysia [10], 18.60% among women in Turkey [25], 25.00% among undergraduate students in Nigeria [26], 20.00% among rural women in India [27] and 25.50% among female health personnel in Kathmandu [11]. In contrast, better regular performance of BSE rates than the present study were reported in studies, with 41.40% among women in Delhi, India [28], 62.80% among women in Malaysia [29], 37.10% among university students in Malaysia [30], 47.90% among women in Sri Lanka [31], 41.50% female academicians in Turkey [32], 42.90% among health professionals in Turkey [20] and 39.00% among women in Taiwan [33]. Nevertheless, these studies too indicate the need for the improvement of BSE uptake.

This study determined statistically significant associations between the variables: age, education level, employment status, regular medical check-ups, ever heard about BC, ever heard about BCS, ever heard about BSE, ever heard about CBE, ever heard about mammography screening, ever had a CBE done and ever had a Mammogram done with BSE uptake. These findings are in line with previous studies [15-17, 25, 27] that also found a statistically significant association with educational level and BSE uptake. Likewise, studies have also found the variables age [10, 15, 16, 27, 32] and ever heard about BSE [34] to be associated with BSE uptake. Additionally, parallel to our findings,

previous studies [17, 25, 32] found no significant relationship between family history of BC and BSE uptake. Contrary to our findings, however, some studies found family history of BC [26, 27, 35, 36], marital status [10, 16, 34, 37] and trained by a doctor to do BSE [10] to have significant associations with the BSE performance.

In the present study, a significant association was found between women's knowledge on BC and BCS with BSE uptake. This finding agrees with the previous studies [17, 22, 26, 27, 34, 36, 38]. Concerning the women's beliefs on BC and BCS, a significant difference was observed in this study for the subdimensions: benefits of BSE, barriers to BSE, self-efficacy, and health motivation. Comparable to our findings, other studies have also found significant associations between perceived benefits of BSE [17, 20-23, 25, 39], perceived barriers to BSE [20, 22, 25, 34], self-efficacy [17, 20, 21, 23, 25, 34, 39] and health motivation [20, 22, 25, 34] with BSE uptake. However, in contrast to our findings, some studies also observed statistically significant associations between the severity of BC [17, 20] and susceptibility of BC [20] with BSE uptake.

Table 4: Logistic Regression Analysis for Predicting Likelihood of BSE Uptake

Variables	B	S.E.	Wald	p-value	OR	95% CI
Socio-demographic, health history, and BC and BCS information						
Age	-0.017	0.011	2.362	0.124	0.984	0.963-1.005
Educational level	0.453	0.261	3.019	0.082	1.573	0.944-2.621
Employment status	-0.026	0.246	0.011	0.915	0.974	0.602-1.577
Regular medical check-up	0.172	0.243	0.499	0.480	1.188	0.737-1.914
Ever heard about BC	0.727	0.331	4.824	**0.028***	2.069	1.081-3.959
Ever heard about BCS	-0.197	0.291	0.458	0.498	0.821	0.465-1.452
Ever heard about BSE	0.851	0.290	8.598	**0.003***	2.342	1.326-4.137
Ever heard about CBE	0.666	0.283	5.526	**0.019***	1.946	1.117-3.390
Ever heard about mammography screening	-0.223	0.257	0.756	0.385	0.800	0.484-1.323
Knowledge on BC and BCS						
Symptoms of BC	0.072	0.055	1.760	0.185	1.075	0.966-1.196
Risk factors of BC	0.014	0.048	0.079	0.778	1.014	0.922-1.115
Early detection of BC	0.074	0.032	5.247	**0.022***	1.077	1.011-1.148
Beliefs on BC and BCS (CHBMS)						
Susceptibility to BC	-0.027	0.033	0.665	0.415	0.973	0.912-1.039
Severity of BC	0.060	0.025	5.513	**0.019***	1.062	1.010-1.116
Benefits of BSE	0.005	0.039	0.018	0.893	1.005	0.932-1.085
Barriers towards BSE	-0.105	0.032	10.945	**0.001***	0.900	0.846-0.958
Self-efficacy (Confidence)	0.106	0.017	39.567	**<0.001***	1.112	1.076-1.150
Cues to Action (Health motivation)	-0.024	0.041	0.347	0.556	0.976	0.900-1.058

Chi-square for Omnibus test is 252.955, with significance level of <0.001, df= 18, Nagelkerke R^2=0.459, Cox & Snell R^2=0.344. The Chi-square value for the Hosmer-Lemeshow Goodness of Fit test is 7.201, with a significance level of 0.515. Bold: Significance at level p-value<0.05.*

The regression model indicated that as women's awareness and knowledge on BC and early detection of BC increased, so did their performance of BSE. In addition, as HBM suggests, BSE uptake levels were increased with the increase in women's perceptions that BC is a serious disease with severe consequences, as well as with the increase in women's confidence to perform BSE. Moreover, when women perceive fewer barriers in relation to the required preventive action, their BSE performance increased. This finding is also in agreement with findings of previous studies [10, 17, 22, 26, 30, 34, 40, 41] that found the participant's knowledge on BCS as a significant predictor for BSE uptake. In the same way, perceived self-efficacy [15, 17, 21-23, 32, 34, 38], perceived severity of BC [17], perceived barriers [15, 22, 23, 34, 38] and having heard about BSE [34, 42] was found as significant predictors for BSE uptake in previous studies. However, previous studies also determined age [15], educational level [17], married [34, 40], attending CBE [40], employed [22], family history of BC [22, 26, 30], susceptibility to BC [32], health motivation [32, 34], benefits of BSE [17, 21, 32] and skills taught by a doctor [10] as significant predictors for BSE uptake.

Nevertheless, there were some limitations to this study. Firstly, the study findings could not be generalized to all Maldivian women, as it was limited only to the population of the Male' region. Secondly, the BSE uptake was based on

self-reported responses, which may lead to overestimation or underestimation of the screening uptake.

CONCLUSIONS

Early detection of BC is crucial to reduce the morbidity and mortality from the disease. This study determined significant predictors for BSE uptake among Maldivian women in the Male' region. The findings indicated that there is a pressing need for continued education and behaviour modification intervention programs using theories and models to increase women's overall knowledge and awareness of BC and BCS and to modify the long-held incorrect cultural beliefs and misconceptions. In particular, the relevant authorities should play a proactive role in raising awareness of BC and BCS. Multiple effective strategies are needed for the management of the disease and to promote regular screening among Maldivian women.

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Competing interests
The authors declare no conflict of interest in this work.

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Authors' contributions
All authors read and approved the final manuscript.

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