RESEARCH COMMUNICATION

Educational Intervention to Improve Breast Health Knowledge among Women in Jordan

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Abstract

Background: Breast cancer is the most common cancer among women in Jordan and on average 70% of the cases present at advanced stages. The aim of this study was to assess the effectiveness of a public educational campaign conducted by the Jordan Breast Cancer Program to improve breast health knowledge among Jordanian women and to relate their knowledge to breast health practices. Methods: The campaign was conducted in five governorates in Jordan with a total of 105 public group lectures about breast cancer focusing on early detection. The total number of participants was 2,554 women with a median age of 37 years (range: 15-73 years). Median number of women per lecture was 24 (range: 9-38). Before the lectures, the women answered a structured questionnaire about their knowledge and practices. After the intervention 2,418 of them filled a post-test questionnaire with the same content. Correct answers on the 15 knowledge questions yielded a maximum score of 15. Determinants of breast health practices were identified using multivariable logistic regression analysis. Results: The mean knowledge score increased significantly from 10.9 in the pre-test to 13.5 in the post-test ($p<0.001$). The percentage with a minimum of 14 correct answers to the 15 questions increased from 18 to 63% ($p<0.001$). Adequate breast health practices were generally low but increased significantly with increasing age and attendance at a previous lecture on breast cancer. Breast health practices were also higher among married women and housewives, and significantly associated with older age and greater breast health knowledge ($p<0.001$). Conclusions: Group educational lectures appeared effective for improving breast health knowledge among Jordanian women. However, even with the noticeable level of knowledge at the baseline, there were low breast health practices among the study participants. This necessitates further in-depth research to explore womens experiences and socio-cultural barriers to breast health seeking behaviour in Jordan.

Keywords: Jordan - breast cancer - early detection - educational intervention - knowledge

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Background

Breast cancer is the most common cancer and the leading cause of cancer mortality among women worldwide. Globally breast cancer constitutes 23% of all women cancers (Parkin et al., 2002) and 10 % of all newly diagnosed cancer cases (Bray et al., 2004). Low- and middle-income countries (LMIC) carry the burden of almost half of the breast cancer cases worldwide (Ferlay et al., 2002). In 2004 there were 519,000 breast cancer deaths worldwide (WHO, 2009). In LMIC, despite lower breast cancer risk, case-fatality rates are high due to weak health systems, late detection, and inadequate treatment (Parkin et al., 2002; Bray et al., 2004; Igene, 2008).

Breast cancer is the most common cancer among women in Jordan. In 2005, breast cancer accounted for 36% of all female cancer cases. It is also the most common cancer overall, constituting 19% of the cancer cases in the kingdom. On average 70% of the breast cancer cases in Jordan present at advanced stages (Stages III-IV). The highest incidence is in the 40-49 year age group, which has social and economical consequences since these women both have the responsibility of the care of their families and are at the peak of their careers (Ministry of Health Jordan, 2005).

Given the level of knowledge about the benefits of early detection and timely treatment of breast cancer, it is not clear to what extent or why women do not access breast health services in Jordan. Women thus die unnecessarily from a disease that can be treated if detected at an early stage. Based on research conducted by the American Cancer Association, the five-year survival rate is 100%

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when breast cancer is detected in the earliest stages (0-I) before the woman develops any signs or symptoms. Moreover, treatment options are more effective and less costly when the disease is in early stages (0-II) before the cancer cells invade the nearby tissues or organs (American Cancer Association, 2009).

In 2007 the Jordan Breast Cancer Program (JBCP) was launched to orchestrate the national synergy of all the stakeholders in the health sector to ensure the provision of quality breast health services in Jordan. The JBCP is a nation-wide initiative for the development of infrastructure needed for early detection of breast cancer, national guidelines, accreditation programs, building the capacity of health care providers and promoting early detection through educational campaigns and outreach. The King Hussein Foundation (KHCF) and Centre (KHCC) have been tasked with the leadership of JBCP (Jordan Breast Cancer Program, 2008).

Many theoretical models overlap regarding the importance of knowledge and self-efficacy as determinants of behavioural change. Based on the Revised Health Belief Model (RHBM), perceived seriousness and susceptibility to breast cancer influence perceived threat. Similarly, perceived benefits from early detection and perceived barriers to screening influence breast health seeking behaviour. In addition, general health motivation, self efficacy and confidence of the ability to successfully perform breast health practices enhance breast health seeking behaviours (Rosenstock, 1990). Likewise, the Social Cognitive Theory (SCT) suggests that women with high self-efficacy, who believe that positive outcomes will result from their breast health seeking behaviour, will most likely comply with periodic breast health care examinations, while social norms influence both cognition and behaviour (Bandura, 1986; 2004).

This study aims to assess the effectiveness of a public educational campaign conducted by the JBCP to improve breast health knowledge among Jordanian women and to study the association between knowledge and breast health practices.

Materials and Methods

Study setting

Jordan had in 2007 a population of 5.7 millions (48.5% females). The estimated number of women aged 15 years or more was 1.7 millions: 678,258 in the governorate of Amman, 313,110 in Irbid, 259,245 in Zarqa, 116,109 in Balqa, and 52,542 in Jarash. These five governorates constitute 83% of the kingdom population (Department of Statistics Jordan, 2007).

Study participants

Between the 1st and 31st of October 2008 the JBCP conducted 105 educational lectures with a median of 24 (Range: 9-38) female participants per lecture: 46 lectures

Table 1. Percentage of Women with 0-8, 9-13 and 13-15 Correct Answers on the Knowledge Score Before (Pre-Test) and After (Post-Test) Participation in the Group Lecture

Characteristic	No of correct answers at pre-test			p-value	No of correct answers at post-test			p-value
	0-8	9 -13	14-15		0-8	9-13	14-15	
Governorate:				<0.001				<0.001
Amman (n=1119)	16	63	21		3.0	35	62	
Zarqa (n=181)	19	76	4.4		0.9	48	52	
Balqa (n=490)	6.5	74	20		2.7	40	57	
Irbid (n=703)	32	54	14		2.2	26	72	
Jarash (n=61)	4.9	69	26		1.6	46	52	
Age group (years):				<0.001				0.038
-19 (n=155)	33	57	9.7		3.8	37	59	
20-29 (n=535)	25	57	18		3.6	30	66	
30-39 (n=703)	18	64	18		1.7	34	64	
40-49 (n=656)	13	66	21		1.2	33	66	
50- (n=331)	17	68	15		4.3	35	61	
Marital status:				<0.001				0.11
Single (n=569)	29	56	15		3.3	30	67	
Married (n=1515)	17	63	20		1.8	34	64	
Divorced or widowed (n=305)	15	72	13		2.5	34	63	
Work status:				<0.001				0.24
House wife (n=1569)	19	67	14		2.2	35	63	
Government (n=325)	12	61	27		3.7	34	62	
Private (n=205)	10	46	44		1.6	28	70	
Other (n=321)	30	61	9.7		2.8	30	67	
BSE practice:				<0.001				0.023
No (n=1646)	24	62	14		2.7	31	66	
Yes (n=791)	9.4	65	26		1.3	36	63	
CBE practice:				<0.001				0.11
No (n=1954)	22	62	16		2.5	32	66	
Yes (n=472)	6.6	68	25		1.5	37	62	
Previous mammogram:				<0.001				0.14
No (n=2253)	20	63	17		2.3	33	65	
Yes (n=184)	5.4	71	24		1.7	39	59	
Previous lectures:				<0.001				0.037
No (n=1790)	23	61	16		2.4	31	66	
Yes (n=605)	8.3	70	22		2.2	37	61	
Total (n=2554)	19	64	18		2.6	34	63	

in Amman, 28 in Irbid, 20 in Balqa, 8 in Zarqa and 3 in Jarash. In total, 2554 women responded voluntarily to advertisements about these lectures issued by their local community primary health care centres, women organizations and municipalities. The median age of the women was 37 years (Range: 15-73).

Measure instrument

A pre- and post-test questionnaire was developed by the JBCP communication team and reviewed by the oncologists at the King Hussein Cancer Centre (KHCC). The questionnaires were validated and adjusted by JBCP based on two pilot lectures in Amman and Balqa with 20 participants each. The pre-test questionnaire included three sections: socio-demographic characteristics, breast health practices and participation in any previous lecture about breast cancer, and 15 knowledge statements to be answered true or false.

Educational intervention

Directly after answering the pre-test, 2554 participants attended an educational lecture on breast health and breast cancer. All the lecturers were women nurses, midwives or primary health care physicians trained and certified by the JBCP as community breast health trainers. The lectures comprised two 45 minutes sessions and were presented in an informal way following adult learning methodologies. Women had the chance to interact, ask questions and share their experiences.

The lecturers used a standardized, culturally sensitive presentation that included the following topics: what is breast cancer, why discuss breast cancer, breast cancer statistics in Jordan, the Middle East and globally, breast cancer risk factors, signs and symptoms, benefits of early detection, breast self examination (BSE) training, how breast cancer is diagnosed, clinical breast examination (CBE) and mammography, breast health national guidelines, treatment options and patients support group activities in Jordan. Directly after the lecture 2418 (95%) of the participants filled a post-test that included the same breast health knowledge questions as in the pre-test.

Ethical issues

The ethical approval of this study was granted from the Jordan Ministry of Health (MoH). The participants were informed about the purpose of the study, the voluntary nature of their participation and their right to access the findings. Confidentiality was ensured and a verbal consent was sought from all participants.

Statistical methods

The 15 breast health knowledge questions were coded as correct or incorrect and each correct answer was given the weight of one point. Number of correct answers were summarised and categorized into three levels: ≤8, 9-13, and 14-15. Due to ethical reasons it was not possible to use any personal identification in the questionnaires, thus the pre- and post-test questionnaires had to be analysed as two separate surveys. The association between background characteristics and the knowledge score and breast health practice was analysed using chi-square test and the difference between the proportion of correct answers in the pre- and post-test was analysed using Student's t-test. Multiple logistic regression analysis was performed to estimate the impact of covariates on the dependent variables ever practiced BSE, ever done a CBE and ever done a mammogram. Data analysis was carried out using SPSS 16. The level of statistical significance was set at 0.05.

Results

Knowledge scores

The mean knowledge score increased significantly from 10.9 in the pre-test to 13.5 in the post test ($p<0.001$) (see Tables 1 and 2).

Table 2. Percent Correct Answers on the 11 True and 4 False Knowledge Statements Before (Pre-Test) and after (Post-Test) Participating in the Group Lecture. The Percentage Correct Answers Increased Significantly between Pre- And Post-Test for All 15 Statements ($p<0.01$)

Statement /Question	Percent correct answers	
	Pre-test (n=2554)	Post-test (n=2418)
True:		
Breast cancer can be cured	84	98
Breast cancer risk increases with older age	52	85
Breast cancer cure rate depends on its stage at detection	86	97
Breast feeding protects from breast cancer	72	88
There is an association between obesity and breast cancer	54	86
When a women feels any abnormal changes in her breasts she should go to see her doctor	83	97
Practicing a monthly breast self examination help in early detection of breast cancer	87	97
During breast self examination you need to examine the underarm	82	96
All women are advised to seek clinical breast examination starting from age 20	76	81
At ages 40-50, mammogram should be done once every two years even if the previous mammogram results were normal	83	93
After the age of 50 mammogram should be done once every year even if the previous mammogram results were normal	83	95
False:		
All breast lumps are cancer	49	88
All nipples secretions are normal regardless of the colour	75	85
Breast cancer is always associated with severe pain	58	80
Having breast cancer means mastectomy	62	81

Table 3. Bivariate and Multiple Logistic Regression Analysis of Likelihood of ever Practised Breast-Self Examination (BSE). (Cases=Practised BSE; Controls=Never Practised), ever having had a Clinical Breast Examination (CBE) (Cases=Had CBE; Controls=Have not had CBE), and ever had a Mammogram (Cases=Had a Mammogram; Controls=Have not had a Mammogram). Odds Ratio (OR) and 95% Confidence Intervals (CI)

Characteristics	Categories	Number of		Bivariate analysis		Multiple logistic regression	
		Cases	Referents	OR	95% CI	OR	95% CI
Breast self examination:							
Governate	Amman	577	1351	1		1	
	Zarqa	100	187	1.3	0.96-1.6	1.1	0.81-1.5
	Balqa	308	531	1.4	1.1-1.6	1.2	0.95-1.4
	Irbid	560	899	1.5	1.3-1.7	1.9	1.6-2.2
	Jarash	65	53	2.9	2.0-4.2	3.9	2.5-6.0
Age (years)	-29	299	1009	1		1	
	30-39	487	846	1.9	1.6-2.3	1.5	1.2-1.8
	40-49	541	647	2.8	2.4-3.4	2.1	1.7-2.6
	50-	213	350	2.1	1.7-2.5	1.7	1.3-2.2
Marital status	Single	250	841	1		1	
	Married	1071	1685	2.1	1.8-2.5	1.4	1.1-1.7
	Divorced/Widowed	226	333	2.3	1.8-2.8	1.3	0.95-1.7
Work status	Other employment	117	520	1		1	
	Private employee	128	249	2.7	2.1-3.3	1.9	1.5-2.5
	Government employee	228	302	3.4	2.6-4.4	2.9	2.1-4.0
	Housewife	1071	1792	2.3	1.7-3.1	2.3	1.7-3.2
Attended previous lecture	No	924	2292	1		1	
	Yes	635	607	2.6	2.3-3.0	2.8	2.4-3.2
Clinical breast examination:							
Governate	Amman	379	1524	1		1	
	Zarqa	58	228	1.0	0.75-1.4	1.0	0.73-1.5
	Balqa	190	642	1.2	0.98-1.4	1.1	0.84-1.3
	Irbid	220	1229	0.72	0.60-0.86	0.95	0.77-1.2
	Jarash	22	93	0.95	0.59-1.5	1.3	0.72-2.2
Age (years)	-29	109	1186	1		1	
	30-39	243	1075	2.5	1.9-3.1	1.6	1.2-2.0
	40-49	334	849	4.3	3.4-5.4	2.5	1.9-3.3
	50-	134	419	3.5	2.6-4.6	2.1	1.5-2.9
Marital status	Single	58	1018	1		1	
	Married	628	2106	5.2	4.0-6.9	3.5	2.5-5.0
	Divorced/Widowed	142	412	6.0	4.4-8.4	3.4	2.3-5.1
Work status	Other employment	38	592	1		1	
	Private employee	91	277	4.3	3.1-6.1	1.7	1.1-2.5
	Government employee	91	436	3.3	2.2-4.8	1.8	1.1-2.8
	Housewife	618	2221	5.1	3.4-7.7	3.9	2.4-6.2
Attended previous lecture	No	435	2761	1		1	
	Yes	407	823	3.1	2.7-3.7	2.9	2.4-3.5
Mammogram:							
Governate	Amman	173	1755	1		1	
	Zarqa	20	267	0.76	0.47-1.2	0.81	0.47-1.4
	Balqa	74	772	0.97	0.73-1.3	0.87	0.63-1.2
	Irbid	90	1367	0.67	0.51-0.87	0.85	0.63-1.2
	Jarash	6	112	0.54	0.24-1.3	0.56	0.20-1.6
Age (years)	-29	35	1274	1		1	
	30-39	96	1237	2.8	1.9-4.2	2.7	1.7-4.3
	40-49	123	1073	4.2	2.8-6.1	3.8	2.4-6.2
	50-	81	480	6.1	4.1-9.3	5.8	3.5-9.7
Marital status	Single	31	1055	1		1	
	Married	240	2525	3.2	2.2-4.7	1.6	0.97-2.5
	Divorced/Widowed	66	498	4.5	2.9-7.0	1.9	1.1-3.4
Work status	Other employment	24	608	1		1	
	Private employee	43	329	2.4	1.5-3.6	0.89	0.54-1.5
	Government employee	36	495	1.8	1.1-3.1	1.0	0.55-1.8
	Housewife	245	2629	3.3	2.0-5.6	2.2	1.2-3.9
Attended previous lecture	No	173	3055	1		1	
	Yes	175	1071	2.9	2.3-3.6	2.6	2.0-3.3

In the pre-test there was a significant association between knowledge score level and governorate, age group, marital status, work status, attending previous lectures about breast cancer, BSE practice, and having had a previous CBE and mammogram ($p<0.001$) (Table 1). Table 2 shows the percent correct answers of the 11

true and 4 false statements at the pre- and post-test by background characteristics. The median percent correct answers for the 15 knowledge statements were 76% (Range: 49%-87%) and 88% (Range: 80%-98%) at pre- and post-test respectively. The proportion of correct answers increased significantly between the pre- and post-test for all 15 knowledge scores ($p<0.001$).

Breast health practices

Previously attendance to a lecture on breast cancer more than doubled the likelihood for ever practised BSE, ever having had a CBE or a mammogram (Table 3). The likelihood for ever practised BSE and ever had a CBE also increased for married and widowed/divorced as compared with single, and for government officers, privately employed and housewives as compared with other employees. However, the likelihood for ever had a mammogram was elevated only for divorced/widowed (OR=1.9; 95%CI: 1.1-3.4) and housewives (OR=2.2; 95%CI: 1.2-3.9). As expected the likelihood for breast health practices also increased by increasing age. Finally the likelihood for ever practised BSE was significantly higher in Irbid (OR=1.9; 95% CI: 1.6-2.2) and Jarash (OR=3.9; 95% CI: 2.5-6.0) as compared with Amman.

Discussion

Before the lecture breast health knowledge was significantly higher among older women, those who had attended previous lectures about breast cancer and those who had previous experience of practising BSE, CBE and mammography. Moreover, breast health practices were generally low but increased significantly by increasing age and increasing level of breast health knowledge. The lowest rate of breast health practise was found among women not attending previous lectures and in single women. After the lecture there was a significant improvement in breast health knowledge among the study participants.

The findings of this study are consistent with what Petro-Nustas and Mikhail (2002) found when they adapted Champions Revised Health Belief Model Scale (Mikhail and Petro-Nustas, 2001) to test a random sample of 519 females aged 18-59 in Jordan. Although 67% of the participants heard about BSE, only 26% of them reported practicing BSE in the previous 12 months, 7% stated that they performed BSE on a regular monthly basis, 9% reported performing BSE every 2-3 months, 5% once every 6 months and 6% once a year. A total of 73% of the participants indicated that they had never performed a BSE. In addition, older age was a significant predictor of BSE practice. The same scale (Champion and Scott, 1997; Champion, 1999; Mikhail and Petro-Nustas, 2001) was used to assess the beliefs of 72 Jordanian women aged 15 to 69 years about mammography screening and the results showed that older age was associated with their current mammography practice (Petro-Nustas, 2001).

The low breast health practices in our study could be related to embarrassment or perceived fear of mastectomy and misconceptions about the high risk of fatality. Petro-Nustas (2001) assessed the beliefs of a convenience sample of 59 young Jordanian women aged 18 to 45 years towards mammography. Although 76% of the participants agreed about the benefits of mammography, half of them identified fear from discovering breast cancer as the main barrier to mammography, 25% perceived mammogram as an embarrassing procedure and 30% stated cost as a barrier.

Health beliefs are culture sensitive and context related (Harrison et al., 1992). A thorough understanding of Arabic women's health beliefs is necessary for designing interventions to change their breast health seeking behaviour (Azaiza and Cohen, 2006; Cohen and Azaiza, 2008). Breast cancer is also a gender sensitive illness with emotional gravity since it affects a body organ that is symbolic of femininity and motherhood. One reason for low breast health practices among single women in this study might be that they perceive breast exposure with discomfort and embarrassment (Petro-Nustas, 2001). Several studies have shown that most women prefer female health providers, especially for sex-sensitive examinations (Kelly, 1980; Fennema 1990; Ahmad et al., 2001). In relation to religious beliefs, Montazeri et al., (2003) studied the beliefs of 410 Muslim women in Tehran regarding screening modalities of breast cancer and found that 90% did not perceive that BSE practice was against their Islamic beliefs, 58% preferred to be examined by a female physician, 47% said that CBE by a male physician was not against their Islamic beliefs.

We have found no studies about the influence of gender power relations on women breast health seeking behaviour in Jordan. However, Middle East societies are traditionally conservative and women health practices might be controlled by male family members (WHO Eastern Mediterranean Region, 2007), who might be unaware of or disfavour breast cancer screening. Petro-Nustas and Al-Qutob (2002) studied birth spacing in Jordan and found that despite discussing the subject with the wife, the final decision regarding using contraceptives was taken by the husband.

We showed that BSE and CBE practices were significantly higher in Jarash, which might be related to higher perceived self-efficacy among Jarash participants. This could be related to the fact that all the female primary health providers in Jarash were trained on breast health counselling and CBE in early 2008 by the MoH Department of Non-communicable Diseases in collaboration with JBCP. Leslie et al. (2003) found that even highly educated women lack knowledge about breast cancer and age specific recommendations for screening. He suggested that practitioners must continue to council and update women about breast cancer to reinforce their breast cancer-screening practices. In addition, he recommended that providers should improve their rates of performing CBE with physical examinations.

This study showed a significant association between breast health knowledge and practices, which is consistent with the RHBM and SCT, as higher breast health knowledge may increase the woman's perceived risk and susceptibility to breast cancer, while enhancing her perceived self-efficacy and benefits of screening. Consequently, this may influence women breast health

practices. In a study by Valdez et al., (2002), a total of 1197 Latina women were randomly assigned to a control or educational intervention about breast cancer. Women in the intervention group exhibited significantly higher knowledge scores in the post-test than the pre-test with the highest increase among never-screened women. The intervention also increased the likelihood of women seeking information about a mammogram.

A study by Hall et al., (2007) found that multifaceted culturally sensitive and linguistically appropriate breast cancer educational interventions can improve women breast health knowledge and reduce their perceived barriers to early detection and screening. It has been shown that incorporating multifaceted educational interventions within multiple intervention strategies led to higher mammography screening (Baily et al., 2005; Masi et al., 2007).

This study is limited by the lack of control group and the non-random sample. Women who responded to the advertisement about the lectures could be those who perceived that they were at higher risk. However, there is consistency between our findings and previous studies in Jordan. In addition, the large sample of women from five governorates may strengthen the argument for a representative sample and the possibility of generalizing our findings to some extent.

Another limitation of this study is that it was not possible to link the pre-test questionnaire to the post-test questionnaire due to the fact that the questionnaires were filled in anonymously. Accordingly, we could not estimate the individual performance. Moreover, the breast health practices questions were very general and did not probe about the regularity and frequency of practice.

Finally, this study does not give any information about how much of the acquired knowledge is retained in the long term and the relation between the improved knowledge and breast health behaviour. However, conducting the post-test directly after the lecture minimized the influence of confounders. Furthermore, perceived self-efficacy to perform breast health practices is strongly related to perceived knowledge and not actual knowledge (Egbert and Parrott, 2001). This means that breast health knowledge is necessary but not sufficient for changing breast health seeking behaviour, and that educational interventions must be effective in improving the actual knowledge level and in convincing women that they know what to do, how to do it and why to do it.

In conclusion, we have shown that culturally appropriate group educational lectures were effective in improving breast health knowledge among Jordanian women. However, despite the considerable level of knowledge at the baseline there were low breast health practices among the study participants, although BSE, CBE and mammography had been actively promoted by JBCP for early detection of breast cancer since one year before the campaign. This calls for further in-depth research to explore Jordanian women's experiences and socio-cultural barriers to breast health seeking behaviour which can serve as a basis for improving the national information and educational efforts.

Competing interests

The authors declare that they have no competing interests.

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