ORIGINAL ARTICLE

Knowledge, awareness, and practices concerning breast cancer among Kuwaiti female school teachers

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Abstract *Background:* Breast cancer is by far the most frequent cancer of women. However the preventive measures for such problem are probably less than expected.
Objectives: The objectives of this study are to assess the breast cancer knowledge and awareness and factors associated with the practice of breast self examination (BSE) among female teachers.
Methods: This study is a cross-sectional survey of teachers working in schools in Al-Jahra, governorate. A sample of twenty schools was selected randomly by the stratified sampling method from all schools of the selected governorate that included primary, intermediate and secondary schools. All ever married Kuwaiti female teachers working in the selected schools were asked to fill a self-administered questionnaire to investigate their knowledge about the risk factors of breast cancer, their awareness and screening behaviors. Data were collected from 421 female teachers with 87.5% response rate.

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Results: The results of the study showed that 67.5% of the participants declared that they had information about breast cancer and their sources of information were mainly health professionals/workers (98.2%), friends/neighbors (83.5%), TV/Radio (76.0%) and printed materials (60.2%). Of the participants, 18.5% reported positive family history of breast cancer, 49.9% did not know how to practice BSE, 29.0% knew the procedure but never applied it. Moreover, 81.9% has no breast examination by health professionals and 85.7% did not know what the mammography is. The factors that may have an impact on acquiring satisfactory level of knowledge were, women older than 40 years, married, user of contraceptive pills, with a history of child death. *Conclusions:* The study points to the insufficient knowledge of female teachers about breast cancer and identified the negative influence of low knowledge on the practice of BSE.

1. Introduction

Breast cancer is by far the most frequent cancer of women (23% of all cancers), ranking second overall when both sexes are considered together. It is the leading cause of cancer mortality in women and constitutes 14% of female cancer deaths.[1] Incidence rates are increasing in most countries, and the changes are usually greatest where rates were previously low.[2] In Saudi Arabia, while it had once been presumed that the incidence of breast cancer was low; more recent data have indicated that it is a significant disease in this community, as elsewhere in the world.[3,4].

The pattern of breast cancer in Arab countries is very disturbing.[3,5,6] For Kuwaiti females breast cancer had the highest incidence among Kuwaiti population (15 cases/100,000 populations), it increased by 3 folds (50 cases/100,000 populations) over the last 33 years.[7] The impression among Arab physicians dealing with breast cancer is that it presents at an earlier age and at a more advanced stage as compared to western countries. However, the statistical data to support this impression are remarkably scarce.[8]

The risk of breast cancer increases with age. The primary factors that increase the risk of breast cancer in women include certain inherited genetic mutations, a personal or family history of breast cancer, and biopsy-confirmed hyperplasia.[9] Since breast cancer is a progressive disease, small tumors are more likely to be at an early stage and their early detection is more likely to have more successful treatment and a better prognosis.[10] The three screening tests usually considered for early detection are clinical breast examination (CBE), X-ray mammography, and breast self examination (BSE).[11,12] In industrial countries breast cancer mortality is declining where screening mammography is the standard for care.[13] BSE is appealing as a patient-centered, non-invasive screening procedure that allows women to become comfortable with their own bodies.[14]

Regular performance of BSE does not mean that the breast cancer is necessarily self detected. BSE increases body awareness, so that there is heightened awareness of changes that may be detected during BSE or at some other time.[1] Although, the American Cancer Society recommended in 2003 that women beginning in their 20s should be told about the benefits and limitations of BSE, this procedure is not considered the best method for early detection but the best option for interval screening among women of all ages.[15]

The importance of knowledge of these risk factors and the need for every woman to be aware of the need for surveillance on her breasts and the various ways to do this cannot be over emphasized. The poor knowledge and wrong beliefs about cancer breast prevention among women are responsible for a negative perception of the curability of a cancer detected early and of the efficacy of the screening tests.[16] Studies that detect the awareness of breast cancer and the practice of BSE among Arab women were few and pointed to a lack in breast cancer knowledge of females.[17–20]

Since teachers play an effective role in communication and motivation of young students, assessment of their knowledge, attitudes and behaviors is essential to reduce the risk of breast cancer among future young generations. However, the practice of any of these screening methods is dependent on the awareness about breast cancer. If this knowledge is poor among those who should teach others, there will be difficulty in promoting these life saving methods. Therefore, this study was designed to evaluate the knowledge, attitude and practice of breast cancer screening among female teachers. This study aimed to determine breast cancer related knowledge, awareness, risk factors and screening behaviors among Kuwaiti female teachers in order to introduce the best intervention plans.

2. Methodology

2.1. Setting

The studied population consisted of the ever married Kuwaiti female teachers working in the females' primary, intermediate and secondary schools in Al-Jahra governotate, Kuwait. This study is a cross-sectional survey that was conducted from October 2009 to May 2010. Assuming that about 50% of women lack knowledge about breast cancer risk factors and screening methods with absolute precision of 5%, the required sample size was estimated to be 481 women (considering the confidence limits to be 95%). After adding 10% for non-response, it turned out to be 530. The number of teachers expected to be studied in each school was estimated to be about 25. Data were collected from 421 female teachers with 87.5% response rate. In Each selected school, all ever married female teachers were invited to participate in the study.

2.2. Data collection

A predesigned self-administered questionnaire was used to collect the information from the teachers. The questionnaire was derived from other published studies dealing with the same topic as well as from our own experience.[21–25] It included ques-

tions related to personal data and history of related health events. It also investigated the knowledge and awareness of teachers regarding breast cancer and their practice of screening procedures. The data collection process was made by the investigators themselves. An Arabic version of the data collection form was used. The structured English form was first translated into Arabic by an author. This version was revised and translated back to English by another author and compared with the original form to ascertain the precision of translation.

Knowledge about the risk of breast cancer was assessed by questionnaire items. These items included having had breast cancer once before, late age at first pregnancy, early onset of menstruation, having had a breast biopsy, having a family history of breast cancer, advanced age and late onset of menopause in addition to five items recently identified, namely breast feeding, exposure to radiation, hormonal treatment, high fat diet and obesity.

The knowledge of women about the common screening methods (mammography, clinical breast examination and breast self examination) was assessed by asking three questions. The source of knowledge was detected by asking the participant to define a source of her knowledge about breast cancer; it was permissible to give more than one source.

A pilot study was carried out on 30 female teachers (not included in the final study). This study was formulated with the following objectives: test the clarity of the questions, test the validity and applicability of the study tools, accommodate the aim of the work to actual feasibility, identify the difficulties that may be faced during the application, as well as study all the procedures and activities of the administrative aspects. Also, the time of completing the questionnaire was estimated during this pilot study to be 10 min. The necessary modifications according to the results obtained were done, so some statements were reworded. Also, the structure of the questionnaire sheet was reformatted to facilitate data collection.

A positive answer was assigned one point, whereas a negative answer was given zero. Percent score was calculated for the total knowledge score as "sum of score multiplied by 100/number of answered questions". The median value of the percentage score of all the participants was 63.6%. Using this median value as a cut off point, participants were classified into groups: low level group (with scores less than the median) and satisfactory level group (with scores equal or higher than the median).

All the necessary approvals for carrying out the research were obtained. The Ethical Committee of the Kuwaiti Ministry of Health approved the research. A written format explaining the purpose of the research was prepared to be signed by the teachers. In order to maintain confidentiality, questionnaires were made anonymous.

2.3. Data analysis

The Statistical Package for Social Sciences (SPSS-17) was used for data processing. Simple descriptive statistics were used (mean ± standard deviation for quantitative variables, and frequency with percentage distribution for categorized variables). To find out the most important factors considered as predictors of having satisfactory knowledge, a logistic regression analysis was used. A model was developed using all factors suspected to be associated with satisfactory knowledge level.

The association between the studied variables and level of outcome of interest were expressed in terms of odds ratios (OR) together with 95% confidence intervals (95% CIs). All the explanatory variables included in the logistic model were categorized into two or more levels (R = reference category): Age groups: $< 30^R$, 30–39, $\geqslant 40$; Marital status: divorced or widow^R, married; Duration of marriage: 1–5^R, 6–10, 11–15, 16–20 $\geqslant$ 20; Husband education: less than secondary^R, secondary, university; Husband work: none^R, governmental, private, student; Number of children: 0^R, 1–2, 3–4, $\geqslant$5; Regularity of menstruation: no^R, yes; Stop of menstruation: no^R, yes; History of abortion: no^R, yes; History of child death: no^R, yes; Methods of contraceptives: none^R, pills, others; Family/friend history of breast cancer: no^R, yes. A 5% level is chosen as a level of significant in all statistical significance tests.

3. Results

Four hundred twenty-eight female teachers agreed to participate in the study and returned back the filled questionnaires. Of them, only seven cases were never married, who were excluded from the analysis. Table 1 shows general characteristics of study population. Participants in this study were 421 ever married Kuwaiti female teachers working in primary, intermediate and secondary schools in Jahra governorate in Kuwait. Their mean age was 33.4 ± 5.3 years (ranged between 21 and 58 years). Most participants (85.7%) were aged less than 40 years and were married (95.2%) or ever married (4.8). More than two-thirds of the participants were married for more than 5 years (71.7%). Most of husbands had secondary or university education (79.3%) and had governmental work (82.9%). Two-thirds (64.8%) of the participants have three children or more, and only 7.8% have no children. The majority (81.7%) has regular menstruation, 2.9% mentioned that their menstruation stopped, 40.9% had history of abortion, 8.8% had history of child death, and 47.3% were using pills as contraceptive method. About two-thirds (67.5%) of the participants had information about breast cancer. The source of information for those was mainly from health professionals/workers (98.2%), friends/neighborhood constituted 83.5%, TV/Radio 76.0% and 60.2% from printed media (books/brochures/magazines). The same table revealed that 18.5% reported positive family history of breast cancer with different proportion among the family members and friends.

Participants' knowledge regarding the symptoms and signs of breast cancer were inquired about. The percentages of those who answered correctly for each items were presented in Table 2. The percentages were 88.8% for the presence of breast mass, 83.6% for enlargement of neighboring lymph nodes, 73.9% for abnormal enlargement of breast, 68.9% for bloody discharge from nipple, 66.3% for breast pain, 64.6% asymmetric sagging in breast. Only 47.0% answered correctly the questions about nipple retraction, and 42.8% about breast skin retraction. Table 2 also revealed that, when asked about variables that may affect the probability of breast cancer, more than three quarters of teachers (78.6%) answered correctly about the effect of breast feeding, 63.7% about the effect of smoking, 54.2% about family history of breast cancer, 51.1% about the effect of hormone replacement therapy, 50.1% about the effect of using alcohol. However, only 35.4% answered correctly about

Table 1 General characteristics of participants.

Variables	No	%
Age groups		
< 30	120	28.5
30–39	241	57.2
⩾40	60	14.3
Marital status		
Divorced or widowed	20	4.8
Married	401	95.2
Duration of marriage		
1–5	119	28.3
6–10	125	29.7
11–15	107	25.4
16–20	45	10.7
⩾20	25	5.9
Husband education		
Less than secondary	87	20.7
Secondary	141	33.5
University	193	45.8
Husband work		
None	17	4.0
Governmental	349	82.9
Private	52	12.4
Student	3	0.7
Number of children		
0	33	7.8
1–2	111	26.4
3–4	150	37.0
⩾5	117	27.8
Regularity of menstruation		
No	77	18.3
Yes	344	81.7
Stop of menstruation		
No	409	97.1
Yes	12	2.9
History of abortion		
No	249	59.1
Yes	172	40.9
History of child death		
No	384	91.2
Yes	37	8.8
Methods of contraceptive use		
None	138	32.8
Pills	199	47.3
Others	84	20.0
Information about breast cancer		
No	137	32.5
Yes	284	67.5
Family/friends history of breast cancer		
No	343	81.5
Yes	78	18.5
Total	421	100.0

the effect of aging. Other risk factors were recognized by less than one quarter of participants. Least recognized risk factors were menarche age and having benign breast disease.

Table 3 illustrated participants' knowledge and the frequency of application of breast examination. About one half (49.9%) of the teachers declared that they do not know how to practice BSE, 29.0% of them knew the procedure but never applied it, 14.0% applied it when they remembered, the remaining 7.1% of the participants applied the technique either on weekly, monthly or yearly basis. Moreover, 81.9% had no breast examination by health professionals and 85.7% did not know what is mammography.

Table 4 revealed participants' opinions about reasons of starting to perform BSE monthly. About two thirds (61.3%) of women reported that they can started if they became fear of breast cancer, 29.2% if there is a pain and 24% if they felt a mass, nearly equal proportions reported that they can started if they heard from the media or according to doctor's advice, (17.6% and 17.3% respectively). When asked about reasons for non practicing BSE monthly, participants' answers included lack of knowledge about BSE and its value (43.5%), absence of breast complaints (33.0%), forgetfulness (26.1%), fear of finding a lump (20.9%) and dislike to touch breasts (13.3%).

Table 5 presents factors that may have an impact on acquiring satisfactory knowledge about breast cancer. Among these variables, older age (40 years and over) was significantly related to higher knowledge level (OR = 1.5 & 95% CI: 1.2–3.9). Married women showed significant better knowledge level than Divorced or widow (OR = 3.3 & 95% CI: 1.1–9.7). Teachers with history of contraceptive pills were at higher knowledge score than non-users (OR = 1.3 & 95% CI: 1.1–2.4). Similarly, women with history of child death showed significant better knowledge level than others (OR = 1.9 & 95% CI: 1.3–3.9). Other variables; showed no significant association with knowledge level.

4. Discussion

The average age at the presentation of breast cancer in Arab countries appears to be a decade earlier than in Western countries. If this is true, this has important implications for screening and cancer management strategies in these countries, including the ideal age at which to begin screening. Adoption of Western guidelines "without critical amendment" in planning breast cancer programs will waste the resources without achieving desired outcomes. Determination of the true frequency and age of onset of breast cancer in Arab women should be an important research priority.[8]

In the present study, respondents answered correctly that the commonest symptom of breast cancer is a breast mass. Even though, 17.7% of respondents believed that the mass expected to be malignant when it is usually of large size and often time visible. In a similar study carried out among female school teachers in Lagos, only 53.3% knew correctly that a mass was the commonest recognized symptom of breast cancer.[26] In another study among a Nigerian population, only 33% of the population studied knew that a breast lump could be a warning sign of breast cancer.[27]

In the present study, 68.9% of the participants answered correctly when they asked about bloody discharge from nipple, 83.6% about enlargement of neighboring lymph nodes 73.9% abnormal enlargement of breast, 66.3% about breast pain, 64.6% about asymmetric sagging in breast, only 47.0% answered correctly the questions about nipple retraction, and 42.8% about breast skin retraction. Similarly, in the study

Table 2 Percentage of participants having correct knowledge about items related to signs, symptoms and risk factors of breast cancer.

Items	No	%
Symptoms and signs of breast cancer		
Bloody discharge from nipple	290	68.9
Asymmetric sagging in breast	272	64.6
Breast mass	374	88.8
Breast pain	279	66.3
Enlargement of neighboring lymph nodes	352	83.6
Breast skin retraction	180	42.8
Abnormal arm swelling	188	44.7
Nipple retraction	198	47.0
Discoloration of breast	259	61.5
Abnormal enlargement of breast	311	73.9
Ovarian pain	259	61.5
Factors affecting the probability of breast cancer		
Aging	149	35.4
Nulliparity	108	25.7
Age of first delivery above 30	80	19.0
Pregnancy at early age	84	20.0
Menopause age above 50	88	20.9
Age of menarche under 11	16	3.8
Counter-lateral cancer formation in breast cancer patients	153	36.3
Family history of cancer	228	54.2
Obesity	138	32.8
Oral contraceptives	161	38.2
Breast feeding	331	78.6
Alcohol drink	211	50.1
Smoking	268	63.7
Radiation exposure	188	44.7
Having benign breast disease	35	8.3
Hormone replacement therapy	215	51.1
Sunlight exposure	184	43.7
Consumption of fatty foods	157	37.3
Consumption of spicy foods	121	28.7
Personal hygiene	108	25.7
Total	421	100.0

carried out by Haji-Mahmoodi et al.,[28] only 27% knew that pain is not a cardinal feature of breast cancer. Other studies have also reported similar findings.[29,30] These wrong informations or assumptions about breast lumps may account for some of the reasons why some of our patients present late to hospital.[29–32] In the study on why patients with breast cancer present late for management, several studies found that majority of the patients has a wrong perception of malignant diseases of the breast, particularly the early symptoms of breast cancer.[33–37]

In terms of associated risk factors for breast cancer, only 36.3% of the respondents knew that breast cancer affecting one breast is a risk factor for developing breast cancer of the other breast. About one half (54.2%) respondents knew that a positive family history of breast cancer is a risk factor, while only 32.8% knew that obesity is also an implicated risk factor. Most of the respondents interviewed in this study did not know the association between breast cancer and early menarche (3.8%), late menopause (20.9%), use of oral contraceptives (38.2%), increasing age of patient, women that do not breast-feed (78.6%) and age at first child birth (19.0%). However,

some studies have shown that the incidence of breast cancer is said to be slightly higher in persons that have first degree relatives with a history of breast cancer, persons that have early menarche and late menopause and those that use oral contraceptives, persons do not breast feed and those women having their first birth after age 35 or nulliparous women. The incidence is also increased with increasing age of the patient, smoking, obesity, physical inactivity, radiation exposure, intake of alcohol and high fat diet.[26,29,36] Thus further health education on associated risk factors and protective factors is desirable. This may influence the attitudes, practices and lifestyle of our patient positively. In a study done by Adebamowo et al.,[36] it was observed that patients with positive family history tend to present early for management. In the present study, 36.3% of the respondents knew that breast cancer could spread to the contralateral breast. In addition, 35.7% of the respondents believes that breast cancer is usually limited to the breasts, and that it does not spread to other parts of the body, while 59.7% knew correctly that breast cancer can spread to other parts of the body. Other studies on the knowledge about breast cancer have reported similar findings.[38,39]

Another major factor why we experience late presentation of breast cancer is that most women do not carry out breast self examination and they do not also take advantage of the screening role of mammography. It is either that they have never heard of breast self examination or they do not know how to carry it out.[38–40] It is also possible that they can carry out BSE, but the motivation to carry it out is absent. In the present study, 49.9% of the respondents have never heard about BSE, while 29.0% of them knew the procedure but never applied it, but only 14.0% applied it when they remembered, the remaining 7.1% of the participants applied the technique either in weekly, monthly or yearly basis. Several studies on BSE have reported similar findings.[40–44] This may be as a result of poor health education in our society. In a study done among secondary school teachers, only about 25% had adequate knowledge of breast self examination.[42] The implication therefore is that 75% of such a group of teachers cannot impact on their students the importance of BSE. Freeman et al.[45] also emphasized the need for adolescents to be properly taught the routine of BSE as this will greatly influence their practice as they grow older. A related study showed that some nurses do not appreciate the importance of BSE and the need for CBE.[42] The implication of all of these is that there is the need for proper orientation about breast cancer among the various caregivers which in turn is expected to boost the level of awareness in the society.

The knowledge of the use of mammography as a screening tool for early detection of breast cancer was found to be poor among our respondents. Only 14.3% of the respondents have heard about screening mammography. A similar finding was reported by Okobia et al.[46] Health education about the benefits of mammography screening should be encouraged.

Women's limited knowledge about breast cancer has been identified elsewhere in developed and under developing countries.[40,47,48]

Participants showed poor understanding of major breast cancer risk factors. The most identified risk factors were non breast feeding and hormonal treatment, which might reflect the religious culture that encourages, breast feeding and natural methods of birth control. Several misconceptions concerning women opinions about the reasons of starting and barriers

Table 3 Knowledge and frequency of breast examination among the Participants.

Method of examination	No	%
Frequency of practicing BSE		
I do not know how	210	49.9
Yes I know, but never applied	122	29.0
Yes I apply whenever it comes my mind	59	14.0
Yes I apply once a week	4	1.0
Yes I apply once a month	8	1.9
Yes I apply every 2–4 month	4	1.0
Yes I apply every 5–6 month	8	1.9
Yes I apply every 7–11 month	1	0.2
Yes I apply once a year	4	1.0
Other	1	0.2
Breast examination by health professionals		
No	345	81.9
Yes as I had a breast problem	47	11.2
Yes yearly	12	2.9
Others	17	4.0
Mammography		
I have no knowledge	361	85.7
I have knowledge but never did	38	9.0
Yes yearly	8	1.9
Yes/2 years	6	1.4
Others	8	1.9
Total	421	100.0

Table 4 Participant' opinions about reasons of starting and barriers for practicing breast self-examination monthly.

Participants' opinion	No	%
Reasons of starting to perform breast self-examination monthly		
Fear of breast cancer	258	61.3
Media	74	17.6
Doctor's advice	73	17.3
Breast pain	123	29.2
Advice of a health worker	21	5.0
Nipple discharge	48	11.4
The feeling of a mass	101	24.0
Breast cancer in the family	57	13.5
Encouraged by a friend	40	9.5
Others	13	3.1
Barriers for practicing breast self-examination monthly		
Lack of knowledge (about BSE and its value)	183	43.5
Dislike to touch breasts	56	13.3
Fear/worry to find a lump	88	20.9
No time for BSE	52	12.4
Forgetfulness	110	26.1
No breast complaints	139	33.0
Culture and health beliefs	13	3.1
Unavailability of specialized centers	47	11.2
Absence of lump during previous examination	30	7.1
Under estimate the problem of breast cancer	48	11.4
Others	9	2.1
Total	421	100.0

Table 5 Factors affecting level of knowledge among participants, results of multiple logistic regression analysis.

Variables	OR	95% CI
Age groups		
< 30[R]	1.0	–
30–39	1.0	0.5–1.8
≥ 40	1.5	1.2–3.9
Marital status		
Divorced or widow[R]	1	–
Married	3.3	1.1–9.7
History of child death		
No[R]	1	–
Yes	1.9	1.3–3.9
Methods of contraceptives		
None[R]	1.0	–
Pills	1.3	1.1–2.4
Others	1.6	0.8–3.0

R = Reference category. OR = Odds ratio. CI = Confidence intervals.
Variables in the equation: age, marital status, duration of marriage, husband education, husband work, number of children, regularity of menstruation, stop of menstruation, history of abortion, history of child death, methods of contraceptives, family history of cancer.

with beliefs of women in other societies with different cultures such as the Philippines, Korea and Australia.[49,50]

Among the predictors of satisfactory knowledge level in this study, older age, marriage, history of child death, and use of contraceptive pills were the strongest significant variable. Association of breast cancer knowledge with these variables has been identified in other studies. Data from the National American Survey on cancer risk revealed poor knowledge among the poorest and least educated women.[48] Similar findings were reported among Hispanic women.[51] Many factors were significantly responsible for a better knowledge level. Participants aged 40 years and over showed the best level of knowledge. However, many studies pointed to the negative association of knowledge scores with age.[52–54] The age of participants in this study is considered fairly young (33.4 ± 5.3 years) which coincides with the literature. This variation could be attributed to the health education activities of local organizations that were directed to school teachers as well as female organizations.[55]

5. Conclusions

The study points to the insufficient knowledge of female teachers about breast cancer and identified the negative influence of low knowledge on the practice of BSE. Accordingly, relevant educational programs, based on a national base, to improve the knowledge level of women regarding breast cancer are needed. There is very urgent need for regular update courses for health workers concerning breast cancer education including screening methods.

References

1. Parkin DM, Bray F, Ferlay J, Pisani P. Global Cancer Statistics, 2002. *CA Cancer J Clin* 2005;**55**:74–108.
2. Akhtar SS, Reyes LM. Cancer in Al-Qassim, Saudi Arabia: a retrospective study (1987–1995). *Ann Saudi Med* 1997;**17**(6): 595–600.

for practicing BSE monthly have been mentioned in this study as fear of breast cancer, lack of knowledge about BSE and its value, no breast complaints, forgetfulness. This is consistent

3. Amr SS, Sa'di ARM, Ilahi F, Sheikh SS. The spectrum of breast diseases in Saudi Arab females: a 26-year pathological survey at Dhahran Health Center. *Ann Saudi Med* 1995;**15**:125–32.

4. Ministry of Health National Cancer Registry. Cancer Incidence Report-Saudi Arabia – 1999–2000. 3840/22. Date: 6/9/1422H. Riyadh: King Fahad National Library; May, 2004. ISSN:1658-0559.

5. Mansoor I. Profile of female breast lesions in Saudi Arabia. *J Pak Med Assoc* 2001;**51**(7):243–7.

6. Chiedozi LC, El-Hag IA, Kollur SM. Breast diseases in the Northern region of Saudi Arabia. *Saudi Med J* 2003;**24**(6):623–7.

7. Elbasmi A, Al-Asfour A, Al-Nesf Y, Al-Awadi A. Cancer in Kuwait: magnitude of the problem. *Gulf J Oncol* 2010;**1**(8):7–14.

8. Najjar H, Easson A. Age at diagnosis of breast cancer in Arab nations. *Int J Surg* 2010;**8**(6):448–52.

9. American Cancer Society. Cancer facts and figures; 2005 < http://www.cancer.org > .

10. Tabár L, Duffy SW, Vitak B, Chen HH, Prevost TC. The natural history of breast carcinoma: what have we learned from screening? *Cancer* 1999;**86**:449–62.

11. Sherma CD, Hossfeld DK. Breast cancer in manual of oncology. Bosch FX International Union against cancer. Middle East 5th ed. Berlin Heidelberg/USA: Springer Verlag; 1990. p. 257–76.

12. Siahpush M, Singh GK. Sociodemographic predictors of pap test receipt, currency and knowledge among Australian women. *Prev Med* 2002;**35**(4):362–8.

13. Reynolds T. Declining breast cancer mortality: what behind it? *J. Natl Cancer Inst* 1999;**91**:750–3.

14. Vainio H, Bianchini F. *Breast cancer screening: International Agency for Research on Cancer (IARC) handbooks of cancer prevention* vol. 7. Lyon (France): IARC Press; 2002.

15. Austoker J. Breast self examination. *BMJ* 2003;**326**:1–2.

16. Smith RA, Saslow D, Sawyer KA, Burke W, Costanza ME, Evans WP, et al. American Cancer Society guidelines for breast cancer screening: update 2003. *CA Cancer J Clin* 2003;**53**:141–69.

17. Sung JF, Blumenthal DS, Coates RJ, Alema-Mensah E. Knowledge, beliefs, attitudes, and screening among inner-city African American women. *J Natl Med Assoc* 1997;**89**(6):405–11.

18. Ibrahim EM, Al-Idrissi HY, Al-Khadra AH, Kurashi NY, Al-Jishi FM, Saied I, et al. Women's knowledge of and attitude toward breast cancer in a developing country: implications for program interventions – results based on interviewing 500 women in Saudi Arabia. *J Cancer Educ* 1991;**6**(2):73–81.

19. Milaat WA. Knowledge of secondary school female students on breast cancer and breast self-examination in Jeddah, Saudi Arabia. *East Mediterr Health J* 2000;**6**(2–3):338–44.

20. Alsaif AA. Breast self-examination among Saudi female nursing students in Saudi Arabia. *Saudi Med J* 2004;**25**(11):1574–8.

21. Elsie KM, Gonzaga MA, Francis B, Michael KG, Rebecca N, Rosemary BK, et al. Current knowledge, attitudes and practices of women on breast cancer and mammography at Mulago Hospital. *Pan Afr Med J* 2010;**5**:9–22.

22. Rosmawati NH. The usage and knowledge of mammography among women in sub-urban area in Terengganu, Malaysia. *Asian Pac J Cancer Prev* 2010;**11**(3):767–71.

23. Sreedharan J, Muttappallymyalil J, Venkatramana M, Thomas M. Breast self-examination: knowledge and practice among nurses in United Arab Emirates. *Asian Pac J Cancer Prev* 2010;**11**(3):651–4.

24. Osime OC, Okojie O, Aigbekaen ET, Aigbekaen IJ. Knowledge attitude and practice about breast cancer among civil servants in Benin City, Nigeria. *Ann Afr Med* 2008;**7**(4):192–7.

25. Smith SW, Atkin C, Skubisz CM, Nazione S, Stohl C. The impact of personal and/or close relationship experience on memorable messages about breast cancer and the perceived speech acts of the sender. *J Cancer Educ* 2009;**24**(2):129–34.

26. Odusanya OO. Breast cancer: knowledge, attitudes and practices of female school teachers in Lagos. *Nigeria Breast J* 2001;**7**:171–5.

27. Uche EE. Cancer awareness among a Nigeria population. *Trop Doct* 1999;**29**:39–40.

28. Haji-Mahmoodi M, Montazeri A, Jarvandi S, Ebrahim M, Haghighat S, Harirchi I. Breast self examination: knowledge, attitudes and practices among female health care workers in Tehran, Iran. *Breast J* 2002;**8**:222–5.

29. Adebamowo CA, Ajayi OO. Breast cancer in Nigeria. *West Afr J Med* 2000;**19**:179–91.

30. Visvanathan R. Breast cancer in Nigeria women. *Br J Surg* 1993;**80**:126–9.

31. Grunfield EA, Ramirez AJ, Hunter MS, Richards MA. Women's knowledge and beliefs regarding breast cancer. *Br J Cancer* 2002;**86**:1373–8.

32. Katz RC, Meyers K, Walls J. Cancer awareness and self-examination practices in young man and women. *J Behar Med* 1995;**18**:377–84.

33. Ikpatt OF, Kuopoo I, Ndoma-Egbe R, Collen Y. Breast cancer in Nigeria and Finland: epidemiological, clinical and histological comparison. *Anticancer Res* 2002;**22**:3005–12.

34. Okobia MN, Osime U. Clinicopathological study of carcinoma of the breast in Benin city. *Afr J Reprod Health* 2001;**5**:56–62.

35. Ohanaka CE, Ofoegbu RO. The pattern of surgical cancers in Nigeria: the Benin experience. *Trop Doct* 2002;**32**:38–9.

36. Adebamowo CA, Adekunle OO. Case controlled study of the epidemiological risk factors of breast cancer in Nigeria. *Br J Surg* 1999;**86**:665–8.

37. Salleh MR. The consultation of traditional healers by Malay patients. *Med J Malaysia* 1989;**44**:3–13.

38. Adderly-Kelly B, Green PM. Breast cancer education, self efficacy and screening in older African American women. *J Natl Black Nurses Assoc* 1997;**9**:45–57.

39. Rutledge DN, Barseric KA, Knobf MT, Book-binder M. Breast cancer detection: knowledge, attitude and behaviour of women from Pennsylvania. *Oncol Nurs Forum* 2001;**28**:1032–40.

40. Abdel-Fattah M, Zaki A, Bassili A, Shazly M, Tognoni G. Breast self examination practice and its impact on breast cancer diagnosis in Alexandria, Egypt. *East Mediterr Health J* 2000;**6**:34–40.

41. Hassan I, Onakek EE, Mabogunje AO. Breast cancer in Nigeria. *J R Coll Surg Edinb* 1992;**37**:159–61.

42. Odusanya OO, Tayo OO. Breast cancer knowledge, attitudes and practice among nurses in Lagos, Nigeria. *Acta Oncol* 2001;**40**:844–8.

43. Drakshyani Devi K, Venkata Ramaiah P. Teachers knowledge as practice of breast self examination. *Indian J Med Sci* 1994;**48**:284–7.

44. Hall LS. Breast self examination: use of a visual reminder to increase practice. *AAOHN J* 1992;**40**:186–92.

45. Freeman AG, Scott C, Waxman A, Arcona S. What do adolescent females know about breast cancer and prevention? *Pediatr Adolesc Gynecol* 2002;**13**:96–8.

46. Okobia MN, Bunker CH, Okonofua F, Osime U. Knowledge, attitude and practice of Nigerian women towards breast cancer: a cross-sectional study. *World J Surg Oncol* 2006;**4**:11–6.

47. Leslie NS, Deiriggi P, Gross S, DuRant E, Smith C, Veshnesky JG. Knowledge, attitudes, and practices surrounding breast cancer screening in educated Appalachian women. *Oncol Nurs Forum* 2003;**30**(4):659–67.

48. Breslow RA, Sorkin JD, Frey CM, Kessler LG. Americans' knowledge of cancer risk and survival. *Prev Med* 1997;**26**:170–7.

49. Maxwell AE, Bastani R, Warda US. Misconceptions and mammography use among Filipino-and Korean–American women. *Ethnicity Disease* 1998;**8**:377–84.

50. Paul C, Barratt A, Redman S, Cockburn J, Lowe J. Knowledge and perceptions about breast cancer incidence, fatality and risk among Australian women. *Aust N Z J Public Health* 1999;**23**(4):396–400.

51. Ramirez AG, Suarez L, Laufman L, Barroso C, Chalela P. Hispanic women's breast and cervical cancer knowledge, attitudes, and screening behaviors. *Am J Health Promot* 2000;**14**(5):292–300.

52. Suarez L, Roche RA, Nichols D, Simpson DM. Knowledge, behavior, and fears concerning breast and cervical cancer among older low-income Mexican–American women. *Am J Prev Med* 1997;**13**(2):137–42.

53. Dolan NC, Lee AM, McDermott MM. Age related differences in breast carcinoma knowledge, beliefs, and perceived risk among women visiting an academic general medicine practice. *Cancer* 1997;**80**(3):413–20.

54. Chamot E, Perneger TV. Men's and women's knowledge and perceptions of breast cancer and mammography screening. *Prev Med* 2002;**34**(3):380–5.

55. Mickey RM, Vezina JL, Worden JK, Warner SL. Breast screening behavior and interactions with health care providers among lower income women. *Med Care* 1997;**35**:1204–11.