Self Examination of the Breast for Early Detection of Breast Cancer:  
The Role of Medical Students in the Faculty of Medicine - University of Gezira – Sudan

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Abstract

Background: In Sudan, breast cancer is the most common type of cancer accounting for 34.5% of all female cancers. Optimal chances for surviving breast cancer in women is by detecting it early, either by breast self examination (BSE), clinical breast examination by health staff or by mammography. BSE has an important role in the early detection of disease and hence its management as it enables women to detect breast lumps of less than 1.0 cm in diameter.

Methods: The existing knowledge, attitude and practices (KAP) of 200 students and 340 women about BSE were assessed. Students were trained as part of their undergraduate training on how to perform BSE and how to teach women. They conducted training of women in their assigned families. KAP of students and women was again assessed at the end of the study.

Results: In the pre-test, 66.5% of students have heard about BSE, 8.0% rated BSE as very important and only 7.2% used to practice it. After the intervention, the last figures rose to 100% and 73.9% successively. Prior to study, only 12.0% of women have heard about BSE. By the end of the students’ intervention, 90.5% of the women adhered to regular monthly BSE. No lump was detected by a student, while 4 women were referred by students for self-detected breast lumps. All received care at Wad Medani Teaching Hospital.

Conclusion: The study revealed that medical students, through relevant curricula had a significant effect on the knowledge, practices and attitudes of women in the community regarding early detection of breast cancer by regular BSE

Key words: cancer, breast self examination, Gezira university

Introduction

Breast cancer represents a major cause of morbidity and mortality in the world. It is estimated that each year one quarter of a million women die of this disease throughout the world. It is also the most common malignancy that occurs in women and its risk factors are still poorly understood. In Sudan, breast cancer is by far the most common type of cancer. It accounts for 34.5% of all female cancers (Hidayatalla, 1969). The relatively high prevalence rate (85%) of advanced breast cancer in women presenting to the Radiation and Isotopes Hospital in Khartoum (the first of two oncology centers in Sudan) is alarming [1]

However, optimal chances for surviving breast cancer in women is by detecting it early; either by breast self examination (BSE) conducted by a woman herself, clinical breast examination by health staff or by mammography [2]. BSE has enabled women to detect breast lumps of less than 1.0 cm in diameter. So, widespread use of BSE practice, could have an important role in the early detection of disease, and hence, its management. This is specially so, as we do not have adequate understanding of its causes to enable us to develop any method of primary prevention. In spite of significant improvements in the treatment of breast cancer, we still have not developed treatment programs to cure all cases. So, early detection remains as the prime measure for controlling the problem.

Easy access and availability of screening services, has important effects on screening uptake especially in remote and rural areas [3].

Context: The Faculty of Medicine, University of Gezira (FMUJG) has adopted since its establishment in 1975 a Community – Oriented Medical Education
(COME) programme, and put forward, as a main objective, the participation in solving priority health problems in the Sudanese community. A module that satisfies the community – orientation of FMUG is "Primary Health Care Center Practice and Family Medicine" (PHCCP&FM). It is one of the main courses that utilize FMUG innovative educational strategies: community-based education (CBE), problem-solving approach and integration of basic, clinical, and socio-behavioral sciences. PHCCP&FM is a longitudinal programme conducted in four phases over four successive semesters, beginning at the fourth semester. Its main aim is to enable students to play an active role in the delivery of primary health care (PHC) at the level of the family and to ensure continuation of health services at the health center. In this module, students work in groups of 12-15 in the health centers in Wad Medani town. They are trained by participating in the delivery of health services through working with the different health personnel in the center.

As part of their training in the module, each student is assigned a family in the catchment area of the centre, where he/she receives training. The aim of the family attachment is to assist in solving the health and related needs of different family members, and to educate the family to apply feasible preventive measures against priority health threats. Each semester, the module is usually offered to 2-3 batches of students, (400-600 in number), who are distributed to the same number of families. To address the important health issue of breast cancer, this initiative was undertaken by utilizing family visits during PHCCP&FM.

The objectives of this study are to raise the competence of medical students towards the issue of breast cancer: magnitude of the problem in Sudan, incriminated risk factors and the role of BSE as a cost-effective screening method; deliver through them health education to families, and to assess the outcomes of the intervention as measured by the change in the knowledge, attitude and practices of students and women in the families regarding BSE.

**Materials and Method**

**Study area:** The study was conducted in Wad Medani town, Gezira state, Central Sudan. The town has a total population of around 100,000, served by 34 health centers. Medical students from FMUG were trained in 15 of those centers.

**Study design:** This is a longitudinal interventional study, conducted during the period November 2002 to March 2003.

**Study populations**

1. Students in semester seven in FMUG who were implementing phase four of the module PHCCP & FM.

2. Women in families assigned to be visited by students (During the family attachment). Families were selected according to a cluster random sampling method: each group of families served by a health center where students were trained was considered as a cluster. A simple random sample of families was selected in each cluster.

The study consisted of three phases:

**Phase one: Training of students:** One batch of students (n=200) were involved in the study. The students at the beginning of the study filled a pre-tested questionnaire. Its aim was to elicit student’s awareness about BSE and its role; source of information; prevalence rate of the practice of BSE. Outcome of regular BSE (a lump detected or not), together with past and family history (in first degree relatives: mother or sister) of breast lumps, (in case of students with self-detected breast lumps) were assessed at the end of the study. All 200 students were trained as part of the module PHCCP&FM. The content of the training included: epidemiology, prevention (including early detection) and the correct method of performing BSE.
Teaching methods included: lecture / discussion (two hours), video presentation (half an hour), demonstration and clinical training on breast models in the basic skill laboratory (two hours) and on the use of Information, Education, and communication (IEC) material (two hours). IEC material consisted of leaflets, pamphlets and booklets with photographs and drawings to demonstrate the different BSE steps.

Assessment of students was done through pre and post tests, clinical assessment and end-of-module examination.

**Phase two: Students intervention:** The students in all families visited by them filled another pre-tested questionnaire. The respondents were women in those families. The aim of that survey was to determine the knowledge, attitude and practices (KAP) of the women regarding breast cancer and the role of BSE. Assessed KAP included: risk factors, prevention and the role of BSE. Outcome of regular BSE (a lump detected or not), past and family history (in first degree relatives: mother or sister) of breast lumps was assessed at the end of the study period in women with self-detected lumps only.

At families' level, students conducted the following tasks after collection of previously mentioned baseline data:

- Orientation of families (women and men) about the problem of breast cancer and the role of regular BSE.
- Teaching women the correct method of BSE (see Box 1)
- Asking women to perform BSE during the visit. All women visited by female students were assisted by them when performing BSE in the first visit.
- Collecting data from women who were able to detect a breast lump (about social, demographic and related personal or family history).
- Advising women to continue performing regular (monthly) BSE.

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**Box 1. Breast Self Examination (BSE)**

**Self examination for early diagnosis**

- Should be done once in a month, regularly, to be able to observe the breast in its normal shape & hence detect any abnormal development.
- BSE is preferably done once a month, 2-3 days after the menstrual period, after disappearance of breast congestion.

**Areas to be covered by BSE**

- From the collarbone (top) to the bra line (bottom)
- From midway between the breasts to an imaginary line down from the middle of the armpit.

**Feeling the breasts**

- Use the pads of 4 fingers.
- Work in small circles (about 5 cm. Across)
- Do not use fingertips
- At each spot you touch, you should use two pressures:
  - Feel lightly, use the flat of your fingers to make the first circle with a light pressure firm enough to make a slight "dent" in your skin
  - Feel firmly, at the same spot, make a second circle pressing quite firmly, so you can feel deeper into the tissues of your breasts (most women can feel their ribs with this firm pressure)

**Methods of BSE**

- Always imagine a clock face on your breast.
- Working in seven circles, begin at the midnight position at the outside edges of your breast slowly circle inwards. Cover the whole breast area, finishing with your nipple.
- Check your nipple. Behind your nipple there should be a little hollow.
- Then check right up into the armpit & then to the collar bone.
- For women with small breasts, "examination in the shower" is excellent. Women with large breasts usually find it easier to lie down while examining their breasts.
- In the shower: put one hand behind your head & feel the breast with the other hand, using small circular motions. Then, place your other hand behind your head & examine the other breast.
- Lying down: place a pillow or towel under your right shoulder, put your right hand behind your head, using your left hand check your right breast using small circular motions. Then place your other hand behind your head, put the pillow or towel under your left shoulder & check your other breast in the same way.
- Check your breasts in front of a mirror to detect changes in shape or size or for any dimpling or puckering of the skin or alteration to the nipple.

**Check the breast in 3 positions:**

- Arms at the sides
- Arms raised above the head
- Placing the hands on the hips & pressing in & down firmly to tighten the chest muscles. Examine the area behind the nipple, the armpit & collarbone.
- Advising women to continue performing the practice monthly after the menstrual period in case of women in childbearing age.
- Reinforcement and continuous support was provided by the students during subsequent family visits.
- Referring women who detected a breast lump to the breast clinic in Wad Medani Teaching Hospital to receive free health service. It is to be noted that facilities were created for collaboration between the departments of community medicine, surgery and pathology to provide free management to women referred by the students with self-detected breast problems.

**Phase three: Evaluation of the students’ intervention.** The intervention was evaluated at the end of the semester by filling the same questionnaires previously filled by students and women respondents. The concerned students referred any woman with a self-detected lump to Wad Medani Teaching Hospital, to receive care from FMUG staff in a specialized breast clinic.

Data was analyzed using the statistical package for social sciences (SPSS). The result of the interventions was tested using the test of difference between percentages. Reliability of the students’ intervention was ensured through continuous, close monitoring of their activities in the families, by faculties from the department of Community Medicine and field supervisors (administrative university staff).

**Limitations of the study**

A major limitation of the study was that the students themselves conducted both pre- and post assessment of women in the community.

**Results**

**Students’ assessment**

The total number of students, who participated in the study, was 200: 108 (54.0%) females and 92 (46.0%) males. Only 133 students (66.5%), have heard about BSE, 69 (51.8%) were females while 64 (48.2%) were males. The source of information to the 133 students was as follows: faculty staff during teaching activities, (92, 69.1%), colleagues (14, 10.5%), media (20, 15.0%), internet, and other sources (7, 5.1%). In the pre-test, only 16/200 (8.0%) students rated the practice of BSE as very important. The figure rose to 131 (60.5%) in the post-test. Table (1), shows the results of the students’ pre and post assessment in BSE.

The end-of-module examination included a question, regarding risk factors of breast cancer, and description of the correct steps to perform BSE. 178 (86%) of the 200 students involved in the study, scored more than 80%, and the rest (14%), scored between 70%-80%.

<table>
<thead>
<tr>
<th>Assessed areas in BSE</th>
<th>Students</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Correct 3 risk factors of ca breast</td>
<td>Pre-test</td>
<td>67(33.5%)</td>
<td>147(87.0%)</td>
</tr>
<tr>
<td>Role in early detection of ca breast</td>
<td>Pre-test</td>
<td>66(33.0%)</td>
<td>180(94.5%)</td>
</tr>
<tr>
<td>Correct timing</td>
<td>Pre-test</td>
<td>14(7.0%)</td>
<td>173(86.5%)</td>
</tr>
<tr>
<td>Correct positions</td>
<td>Pre-test</td>
<td>41(20.5%)</td>
<td>174(73.5%)</td>
</tr>
<tr>
<td>Correct steps &amp; technique</td>
<td>Pre-test</td>
<td>26(13.0%)</td>
<td>151(75.5%)</td>
</tr>
<tr>
<td>Importance of examining the nipple</td>
<td>Pre-test</td>
<td>98(49.0%)</td>
<td>141(65.2%)</td>
</tr>
</tbody>
</table>

X² = 91.672  Df = 5  P-value = 0.0000

The initial attitude of female students towards future adherence to BSE was unsatisfactory. Only 33 (47.8%), of the students who heard about BSE stated their commitment to perform BSE regularly. After the intervention, the response of all 69 (100%), female students turned to be favorable. The initial prevalence of BSE among the 69 female students was only 5 (7.2%). After training, students who practically adhered to the monthly practice of BSE for three successive months were 51 (73.9%). Female students reported no breast lump during the study period.

Only 2 (2.8%) female students had past history of breast lumps that were discovered incidentally and they were both fibro adenomas. 42 (60.8%) students had family history of breast lumps (in mothers and
sisters). All 42 students were among the good compliers (those who continued to perform BSE for 3 successive months).

**Women assessment**

The total number of families visited by students was 200. The woman surveyed and later educated by students were 340. At the beginning of the students' intervention, only 41 (12.0%) women have heard about BSE (table 2).

<table>
<thead>
<tr>
<th>Assessed areas in BSE</th>
<th>Women in families</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correct 3 risk factors of ca breast</td>
<td>Pre-test</td>
</tr>
<tr>
<td>role in early detection of ca breast</td>
<td>39 (11.1%)</td>
</tr>
<tr>
<td>Knowledge about Correct timing</td>
<td>18 (5.2%)</td>
</tr>
<tr>
<td>Correct steps and technique</td>
<td>Not assessed</td>
</tr>
</tbody>
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\chi^2 = 24.313 \quad D.f = 2 \quad P-value = 0.0000
\]

A total of 22 (6.4%) women performed BSE only once during the study period. Those who performed it two times were 112 (33.1%), while those who adhered to regular monthly BSE were 206 (60.5%).

By the end of the study, four women with self-detected breast lumps were referred by students. All received care at Wad Medani Teaching Hospital. Two of them were diagnosed as fibro adenoma and the other two as carcinoma of the breast. As a result of this study, the epidemiology of breast cancer, prevention and early detection through BSE was introduced into the content areas of the module PHCCP&FM.

**Discussion**

This initiative was intended to introduce medical students, as part of their training in community medicine, to basic knowledge and skills that enables them to assist in the early detection of breast cancer. The logic behind this initiative has three dimensions. first: the relevance of the curricula of medical schools, and the orientation of such curricula towards addressing priority health problems. Community – oriented education is defined as a type of training of health personnel that focuses on both population groups and individuals, and that takes into account the health needs of the community concerned (First meeting of the Network of the Community – Oriented Educational Institutions for Health Sciences, 1979) [4]. Prevalence of breast cancer as shown by data of specialized centers in Khartoum and Wad Medani is on the increase and the majority of cases present in late incurable stages. Moreover, this is the most prevalent type of cancer among attendants of these centers [11]. Breast cancer, being one of the priority non-communicable diseases in Sudan must be addressed by curricula of medical schools and moreover, the educational institutes of different health professionals so as to ensure the relevance of such curricula. According to Fulop (1985), the quality and quantity of health manpower has to be planned in response to the specific needs of the national health systems, and through these to the health needs and demands of the population [5].

As stated in the course document, the aim of the family attachment in this course is not only to improve the quality of service provided, but also to specifically intervene at the "iatrogenic gap" between the family where health problems can be detected early, and the health system, where active intervention with social and therapeutic management is instituted. Students' intervention described in this study is a contribution towards the achievement of this goal.

Community – based education (CDE) is defined as a means of achieving educational relevance to community needs and, consequently, as a way of implementing a community-oriented educational programme [4]. This was achieved in this study through the use of family attachment for the delivery of education regarding BSE to families. The second dimension stresses screening of women for early detection of breast lumps as the only available method for secondary prevention, especially that primary prevention is not yet feasible in spite of
increasing knowledge of incriminated risk factors. In North America the vast majority of breast cancers (about 80%) are initially discovered by women themselves. Of the screening methods available, the one most widely used is breast self examination (BSE) [2]. Moreover, it was realized that there is little risk of breast cancer associated with radiation exposure from annual mammography in women over the age of 35 years. Also, there are some indications that exposure of young women may pose a risk for those in a genetically sensitive subgroup [6]. Of all methods used for early detection of breast cancer, BSE is the easiest, least expensive and efficient in discovering tumors at a more clinically treatable earlier stage [7-11].

Sensitivity of BSE was tested under laboratory conditions in a study in which lifelike breast models of silicone were developed in conformity with physical measures of real breast tissue. Breast modularity or normal lumpiness was simulated to approximate the normal and diseased states of the breast. Using these specialized models, the researchers learned that the smallest simulated lump that could be routinely felt by women was 2 mm [2]. Several retrospective studies have found a positive correlation between the practice of BSE and early detection of breast cancer as determined by tumor size and pathological stage [7, 9] as well as positive correlation between BSE practice and prolonged survival [12].

Results of the study showed a statistically significant difference between the KAP related to BSE in the pre- and post tests of the two study groups (students and women in assigned families). In the students group the prevalence of BSE rose from 7.2% to 73.9% which reflects appreciation of students to the importance of BSE and their commitment to it, which may be a predictor to their future adherence and emphasis of BSE in their clinical practice after graduation. In the women group, the rise of the percentage practicing regular BSE were 21.1% (2 times) and 48.5% (3 times). The difference is incomparable to results of similar surveys where a minority of women (only 18% - 36%) completed monthly BSE (Opinion Research Corporation). The higher difference in our study could be explained by the follow up visits by students to the targeted women (as part of the family attachment). That provided a good opportunity for the students (educators) to provide necessary reinforcement and support to the women.

The third dimension of the study is the important issue of sustainability of students training and intervention in families. Efforts should be applied to ensure good organization, implementation, assessment and evaluation of both activities. This addresses: resources (inputs) used; organization and implementation steps and methods used (process) students and programme; assessment and evaluation (outputs and outcome).

Feasibility and sustainability of the intervention could be guaranteed as it was implemented within available FMUG resources. The intervention (among students and community) has been implemented within routinely planned activities of an ongoing educational program. Thus, no extra resources or organizational tasks were required from FMUG. Feedback obtained from students at the end of the module showed that their training in BSE, as part of the MIICP&FM module, was a good development in the teaching of preventive medicine in this course (87.9% of students). They also admitted that the new developments have assisted them to increase achievement of the module learning objectives.

Another factor to ensure sustainability was the fact that the intervention had utilized the same instructional methods routinely used (lecture/discussion and family visits). Newly introduced methods were clinical training of students using breast models in the basic skill lab and video
presentation. This in itself was very stimulating to students and reinforced the skill of BSE. All these factors contribute very much to the cost-effectiveness of this intervention and ensure its sustainability, especially that students would continue to provide follow up and reinforcement of the skill to families during all family visits, in all phases of the course. As shown in the results, students showed very high adherence to perform BSE in accordance with their rating of the practice as "very important" and their perception of its need to every woman. This was even more apparent in students with a family history of a breast problem, this being considered as a risk factor. In USA, relatives of breast cancer patients have surprisingly low rates of mammography use. An explanation for that could be differences in the comprehension of risk factors of breast cancer between the two population groups, an area that needs further research.

Conclusion
This study revealed that medical students, through relevant teaching of preventive medicine implemented in community based educational activities, had a significant effect on the knowledge, practices and attitudes of women in the community regarding early detection of breast cancer by regular BSE.

References