RESEARCH ARTICLE

The Results of a Breast Cancer Screening Camp at a District Level in Rural India

Neha Reddy[1], Tilu Ninan[2], Laszlo Tabar[3], Therese Bevers[2]*

Abstract

Background: Breast cancer in developing countries is on the rise. There are currently no guidelines to screen women at risk in India. Since mammography in the western world is a well-accepted screening tool to prevent late presentation of breast cancer and improve mortality, it is intuitive to adopt mammography as a screening tool of choice. However, it is expensive and fraught with logistical issues in developing countries like India. Materials and Methods: Our breast cancer screening camp was done at a local district hospital in India after approval from the director and administrators. After initial training of local health care workers, a one-day camp was held. Clinical breast examination, mammograms, as well as diagnostic evaluation with ultrasound and fine needle aspiration biopsy were utilized. Results: Out of total 68 women screened only 2 women with previous history of breast cancer were diagnosed with breast cancer recurrence. None of the women in other groups were diagnosed with breast cancer despite suspicious lesions either on clinical exam, mammogram or ultrasound. Most suspicious lesions were fibroadenomas. The average cost of screening women who underwent mammography, ultrasound and fine needle aspiration was $30 dollars, whereas it was $16 in women who had simple clinical breast examination. Conclusions: Local camps act as catalysts for women to seek medical attention or discuss with local health care workers concerns of discovering new lumps or developing breast symptoms. Our camp did diagnose recurrence of breast cancer in two previously treated breast cancer patients, who were promptly referred to a regional cancer hospital. Further studies are needed in countries like India to identify the best screening tool to decrease the presentation of breast cancer in advanced stages and to reduce mortality.

Keywords: Breast cancer screening - breast cancer in India - optimal approach in India

Asian Pacific J Cancer Prev, **13 (12)**, 6067-6072

Introduction

Breast cancer has overtaken cervical cancer as the most common cancer in India (Murthy et al., 2007; Yeole and Kurkure, 2008). Breast cancer screening is an important component of health maintenance and has contributed to the decline in breast cancer mortality in developed countries (Tabar et al., 1985; 2003). While Europe and North America are debating the right age to initiate mammographic screening, India, South East Asia, and the Middle East are trying to raise awareness and establish the most feasible screening methods for the early detection of breast cancer. Many factors contribute to the lack of awareness about the availability of breast cancer screening. In one study done in Saudi Arabia, in the primary health care center, it was noted that nurses lack general epidemiological knowledge on breast cancer and breast cancer risk factors. About 81% of the nurses had not had a clinical breast examination and only 14% had had a mammogram. The mean age of the nurses was 36.9 years. This study reflects that there is a need to provide continuing nursing education programs for primary health care center nurses to improve their breast cancer knowledge and practice (Yousuf et al., 2012).

A population-based study in Iran by Harirchi et al showed that literacy was an important contributing factor for breast cancer prevention behavior. They concluded that to improve women's health and breast cancer outcomes, one needed to provide equal educational opportunities for women (Harirchi et al., 2012). In a study of women aged 40 and older in Taiwan it was shown that the use of breast cancer screening modalities was relatively low. The majority of the women in this study had never had mammograms or ultrasounds in the past five years. The common barriers noted were "no time", "forgetfulness", "too cumbersome", "laziness" and the perception of not needing to get screening (Wu et al., 2012). Similarly, in a cross-sectional Malaysian study, while the majority knew about mammography (68%), only 15% had a mammography once in their lives and only 2% had a mammogram every 2 or 3 years. It further showed that age, regular medical check-up and knowledge about mammography testing were statistically associated with practice of mammography among the general population

*[1]Northwestern University, Evanston, IL, [2]The University of Texas, MD Anderson Cancer Center, Houston, TX, [3]Department of Radiology, University of Uppsala School of Medicine, Sweden *For correspondence: tbevers@mdanderson.org*

in Malaysia. Lack of time, lack of knowledge, not knowing where to go for the test, and fear of the test result were the most noted barriers (Al-Naggar and Bobryshev, 2012). In India, there were similar results when a cross-sectional study was conducted in a hospital in Mumbai. The study examined the knowledge of breast cancer risk factors, protective factors, and the knowledge and practice of breast self examination (BSE). In this study by Ahuja, only 52% of the population had breast cancer awareness although 95% of the women claimed to have heard about breast cancer. Further, the knowledge of breast cancer was significantly associated with younger age group, women belonging to a higher income group, and people with a higher literacy rate, and women bearing a fewer number of children. About 38% of women had never heard of BSE (Ahuja, 2010).

Incidence of breast cancer in India

According to a study by the International Agency for Research on Cancer (IARC), there will be approximately 250,000 new cases annually of breast cancer in India by 2015. At present, India reports around 100,000 new cases annually according to the Indian Council of Medical Research (ICMR). About 30,000 women die from breast cancer in India annually. According to the ICMR, 1 out of 22 women in India is diagnosed with breast cancer (Murthy et al., 1990; Bagchi, 2008). Breast cancer is emerging as the leading cancer in women in India. A large number of risk factors have been identified for breast cancer such as late age at first pregnancy (greater than 30 years), single child, and late age at menopause. Physical activity is found to be protective for breast cancer. The sudden change towards affluent life styles has reduced the physical activity to a minimum. Breast Cancer in India: Less than 3% of Indian women undergo screening for breast cancer (Agarwal and Ramakant, 2008). The age at diagnosis of breast cancer in India is about ten years lower than the age in the western world. It is around 43-46 years in Indian women compared to 53-57 years in western women (Saxena et al. 2005). The reason for the early occurrence is not known (Claus, 1990),

India established a cancer control program in 1975 (Sutnick et al., 1982). The program emphasized primary and secondary prevention of cancer with improvement in infrastructure, education and screening camps. This program has been implemented in about 29 regional cancer centers across the country and has introduced programs that include screening and detection through the District Cancer Control Program. However the efforts are not uniform and the spread of awareness of screening and warning signs of cancer is limited at best.

There is no data on the number of camps organized by this program or the effectiveness of such camps. The funding for such programs predominantly comes from the central government with very few public-private initiatives. There is no data published on the camps conducted in India. Hence it is difficult to know the outcomes of screening camps in India. Some argue the feasibility of a mammographic screening program in India, given the poor infrastructure and the cost involved (Dinshaw et al., 2005). Tata Memorial Cancer Center in Mumbai, India is conducting a large prospective clinical trial studying Health Education Programs (HEP) and clinical breast examination (CBE) vs. Education alone in over an 8 year surveillance period in women across slums of Mumbai, in collaboration with the National Cancer Institute (NCI) in the United States. Recruitment occurs until 2015 for a total of 151,538 women. The compliance to screening rate in a group that received both education and clinical breast examination is about 71% to date (Dinshaw et al., 2007).

The goal of our camp was two-fold

a) To provide voluntary community service while raising awareness and diagnosing breast cancer in a resource challenged rural area of India

b) To pilot test an economically feasible and high impact model in order to set up similar camps in other places in India and other developing countries

Materials and Methods

Description of the camp

The camp was held on August 16, 2010 at Pragathi Hospital in the district headquarters of Nizamabad, in the state of Andhra Pradesh in India. The population of the district (comparable to a region of a state in the U.S.) is 2.5 million, with 36 Talukas (equivalent to a county) and 922 villages.

In order to have the maximum impact, we have collaborated with the local Women's Non-Governmental Organization called Inner Wheel Club. It is an international organization, involved in promoting friendship, encouraging ideas of personal service, and fostering international understanding. Our camp started with the initial training of female community health activists called Accredited Social Health Activist (ASHA) workers (MOHFW, 2005). They were chosen due to the familiarity with the local culture and demographics. The ASHA workers are employed by the Government, selected from the local population and act as an interface between the community and the primary health system. Before the camp, ASHA workers have been instructed to identify breast symptoms such as breast lumps, pain and discharge from the nipple as well as risk factors such as family history of breast cancer. Women with any of the symptoms or risk factors were encouraged to pre-register for the camp.

Further recruitment of women was done through advertisement on the local TV channel and the local newspaper. The hospital also opened a special counter for women to register two weeks before the camp. Some women also registered on the day of the camp. In addition many women from the nursing school and members of the Inner Wheel Club also underwent screening voluntarily. The target population included women over the age of 40, women with family history of breast cancer, women with previous history of breast cancer, and women with breast symptoms. Women 20-39 years of age who requested a screening underwent a clinical breast examination. If a suspicious lump was detected clinically, they received a recommendation for a mammogram, and/or ultrasound,

followed by fine needle aspiration biopsy as deemed necessary.

We hoped to have 100 people attend the camp. The camp was set up inside the hospital in a hall with four private booths. A nursing student staffed each of the booths. There were a total of 10 student nurses, 4 volunteers and 3 physicians. The hospital administration volunteered their facilities and nursing students to help with triaging and preliminary history taking. Three physicians, including a medical oncologist, a radiation oncologist and a surgical oncologist, staffed the camp. After obtaining an informed consent, screening started with history taking by the nursing students. After the history was obtained, women were directed to physicians for clinical breast examination. After reviewing the clinical history, physicians performed a thorough clinical breast examination. All the women above 40 years of age received a recommendation for a mammogram, and women with suspicious lumps had mammogram and an ultrasound. All women with suspicious lesions on mammogram and ultrasound were sent for fine needle aspiration biopsy.

In the afternoon session of the camp, we conducted an educational session highlighting breast cancer symptoms and techniques of self-breast examination. This educational session was attended by nursing students, women from the Inner Wheel Club and the hospital staff. This was conducted by a breast cancer survivor with physicians acting as back up for expertise. The attendees were made aware of early clinical signs of breast cancer and techniques available to detect breast lumps. We emphasized the urgent need to spread awareness among women in their villages.

Results

Of the 68 women attending the camp, 25 (37%) were above age 40 and 43 (63%) were below age 40. The demographics of age, occupation and income were noted. Most of the women were between the ages of 20-49, younger than normally seen in screening population (Figure 1). This may be due to the inclusion of women needing diagnostic evaluation of symptoms. Many of the participants were homemakers and beedi workers, including 5 nursing students and 5 members of the Inner Wheel Club (Figure 2). Most of the women were in lower socio-economic classes (Figure 3). The symptoms (Figure 4) varied from pain, lump in the breast, and nipple discharge.

The 3 cohorts of women who attended the camp were

1) Screening- 28 (41%). 2) Surveillance for women with a past history of breast cancer- 2 (3%). 3) Diagnostic for women with breast symptoms- 38 (56%)

Women above 40 years of age

Out of the 25 women above age 40, twelve had breast symptoms with 3 complained of breast pain, 8 complained of a palpable breast lump, and one woman had both lump and pain (Figure 4). All 25 of these women were recommended for mammogram, however only 16 women in this age group opted for a mammogram. Of

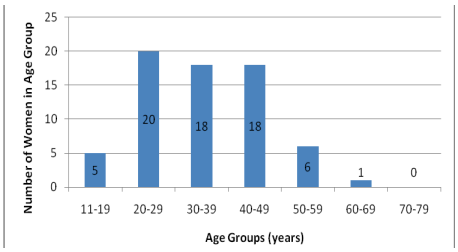

Figure 1. Age Distribution

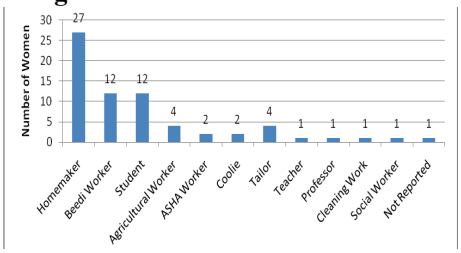

Figure 2. Occupation

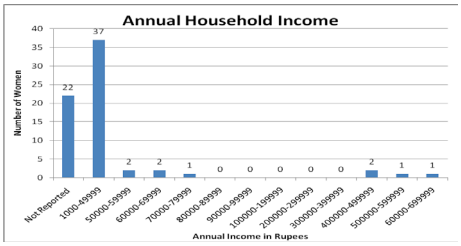

Figure 3. Annual Household Income. 1 US Dollar≈Rupees 50

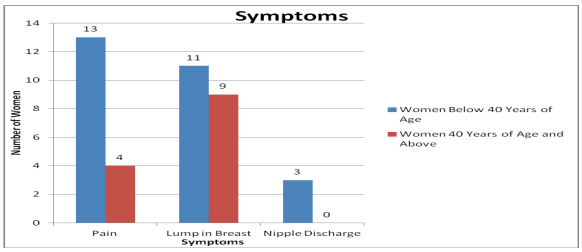

Figure 4. Symptoms

Figure 1. Cost Analysis

Item	Cost ($)
Advertisement	100
ASHA workers training	100
Booth set up	100
Catering	300
Transportation of staff	500
Mammograms	360
Ultrasound	396
FNAB	120
Handling and transportation of specimen	50

*Total = $2000 approx and approximately $30 per person

the 9 women who refused mammogram, 3 opted for only ultrasound instead. All 4 women of a total of 25 women who were recommended for fine needle aspiration biopsy (FNAB) did undergo biopsy. Two patients who were suspicious for malignancy on mammogram and ultrasound were confirmed the diagnosis of cancer upon fine needle aspiration biopsy. These two women were previously diagnosed with breast cancer had undergone curative treatment. The other two patients who underwent FNAB were found to have benign lesions.

Women below 40 years of age

Out of the 43 women below age 40, 27 had breast

symptoms (13 women complained of pain, 11 women complained of lump, and 3 had nipple discharge) (Figure 4). On clinical breast examination, 29 of the 43 women had no clinical findings of breast lumps and 14 women had suspicious palpable masses. These 14 women underwent mammogram as well as ultrasound. On mammogram and ultrasound, 12 of the 14 women were diagnosed with fibroadenomas, and 2 were diagnosed with suspicious radiologic findings. These 2 women underwent FNAB and were diagnosed as benign; hence none of the women below age 40 were diagnosed with a malignancy.

The total cost for the camp was calculated. The cost items included advertisement, training ASHA workers, team transportation, lunch, mammograms, ultrasound, biopsy, and other expenditure (Table 1). The average cost per patient was about $30, mammogram and ultrasound being the major cost. Total cost for the camp was approximately $2000. The average cost without mammogram, ultrasound and fine needle aspiration biopsy would have been reduced to $16.

Discussion

Breast cancer is the leading cause of cancer in women in the western world (ACS, 2009), and is emerging as the leading cancer in women in India. Breast cancer screening in women has helped detect cancer in early stages. There are a number of screening techniques available (Smith et al., 2003), but the only screening method that has been shown to be effective in reducing mortality is mammogram done in women age of 40 years and older. Mammographic screening is advocated in all the European and North American countries, albeit at different ages of initiation and with differing screening intervals. But recently, an article by Bleyer and Welch on the effect of three decades of breast cancer screening and incidence revealed that despite substantial increase in a number of cases of early breast cancer detected, screening mammography has only marginally reduced the rate at which women present with advanced cancer (Bleyer and Welch, 2012).

Mammographic screening has never been studied in the Indian context. Some argue the feasibility of mammogram in India, given the poor infrastructure and the cost involved (Kalache, 1990). According to the microsimulation screening analysis done by Lamberts Okonkwo et al. (2008) from the Netherlands, biennial clinical breast examination done in women between 40 and 60 years of age would reduce mortality by 26 % and increase the number of life years gained (Okonkwo et al., 2008). But this is questioned by Moss (2008) in the editorial citing lack of evidence for clinical breast examination, as well as a lack of infrastructure, and socio-cultural influences on compliance in India (Moss, 2008).

India is at a crossroads and needs urgent steps to introduce appropriate screening methods to reduce breast cancer presentations in late stages and reduce mortality. There are a number of barriers to breast cancer screening in India. Myths about breast cancer, such as infection and other causes result in a delay in seeking medical attention. There is a lack of funds, knowledge and expertise. Breast cancer in India often presents in late stages, when treatment can only be palliative. Lack of health care facilities, long distances, lack of transportation combined with poor income leads to under diagnosis. There is perception that increased breast cancer incidence in India is mainly due to lifestyle changes in an urban population, but the incidence of breast cancer in rural populations may also be on the rise with improved education (Swaminathan et al., 2009).

India has a national Cancer Control Program, which strongly advocates for cancer screening camps at the district level. There are limited funds allocated to conduct such camps. Screening camps are mostly done in the cities by Non-Governmental Agencies. There are currently no guidelines for the optimal breast cancer screening methods in India. A number of experts indicate that mammogram is expensive and not practical for the Indian population and that education and awareness may be a first step in the right direction.

The local health care workers and nurses disseminated information about the camp. We were fortunate enough to be able to raise funds to pay for the whole camp, including all the tests. The main focus of our camp was raising awareness. Based on the women who came, we were able to gauge the interest level. Generally, younger, educated women were more interested in our camp.

We identified a local radiologist to perform and interpret both mammograms and ultrasound examinations. The camp was completed on time as planned. We did run into some logistical issues in terms of scheduling and timely interpretation of mammograms, since we had only one radiologist to handle the load of mammograms and ultrasounds. Performing 30 mammograms as well as ultrasounds on the same day was a monumental task in terms of logistics. All the women above 40 were sent for mammogram, but women with suspicious lumps were sent for mammogram as well as ultrasound.

The ultrasound test was done in addition to mammogram to characterize the breast lesions and assist in localizing the areas for biopsy. The fine needle aspiration biopsy was done in patients who had suspicious lumps either on clinical exam, mammogram or on ultrasound. The biopsies were done on the same day.

The lesions that were highly suspicious for breast cancer clinically as well as radiologically were confirmed positive with biopsy. However other lesions were suspicious clinically, but appeared benign on mammogram and ultrasound. In our cohort, mammogram and ultrasound did not diagnose any new cancer in patients who did not exhibit suspicious findings upon clinical breast examination. But our sample was extremely small, so such a result is not surprising and may not demonstrate the true value of mammography in the Indian population.

This model is not feasible in most places in India given the financial resources. The majority of our cohort fell within the upper lower class status based on Kuppuswamy socio-economic status classification system, which scores based on occupation, education and the per capita income per month of the head of household (Mishra and Singh, 2003).

Each mammogram will cost about $12. The total cost for our camp was approximately $2000, bringing it to $30 per person. This can be cost prohibitive in most

places in India. However if mammogram, ultrasound and FNAB are done in only high-risk cases or in women with suspicious breast lesions and if local physicians and health care workers are trained, the cost per person can be easily reduced to half. Once the local team is trained to conduct such camps, the cost can be further reduced to under $5 per woman screened. The cost of the camp may vary depending on the region and the cost of interventions. However, despite the camp being free, women did not fully utilize the resources.

If mammograms are not offered in the camp, there will be little motivation and incentive to attend the camp. Hence mammograms should be offered for high-risk patients, thereby justifying the cost as well as to attract patients and health care workers to the camp. In India, radiological imaging is considered as an advanced tool to diagnose medical conditions. But for most women, intense education, raising awareness, regular self-breast examination and yearly clinical breast examination may be more cost effective at this stage.

This may be supported by the interim results from an ongoing study by Tata Memorial Hospital, Mumbai (13). This study however is not comparing women with and without mammograms. The study realizes the limitations of the resources available and offers an alternative approach to the rising problem of breast cancer. This conclusion may be overly simplistic, but may be practical and suitable for resource challenged countries like India. They noted high compliance rates and have already noticed a decrease in late stage presentations. In another cluster randomized controlled trial, Sankaranarayanan et al. are investigating if three rounds of triennial clinical breast examination in 115,652 healthy women between 30 and 69 years of age in the Trivandrum district will reduce the incidence of advanced disease and reduce breast cancer mortality. The age-standardized incidence rates for early-stage (stage IIA or lower) breast cancer were 18.8 and 8.1 per 100,000 women and for advanced-stage (stage IIB or higher) breast cancer were 19.6 and 21.7 per 100,000 women, in the intervention and control groups, respectively (Sankaranarayanan et al., 2011).

Despite our limitations, we were able to energize the local community in terms of raising awareness on the symptoms of breast cancer and an emphasis of the importance of regular clinical breast examination. The inclusion of mammograms might have motivated women to register for the camp, but there is an urgent need for conducting educational programs at the grassroots level to train local physicians, nurses, and local health care community workers. We need to conduct regular breast cancer awareness months for the women in the community. These educational programs may have major impact in raising awareness, and may help women to be aware of symptoms, do regular self examination, undergo clinical breast exams and seek medical help when appropriate. This method may also be applied to the urban population. In urban areas there are many more opportunities and venues to raise awareness and thus may have a greater impact in this setting. The use of television, news media, electronic platforms, and films should be encouraged. As a next phase, mammograms may be routinely introduced as appropriate.

Acknowledgements

Dr Lakshma Reddy, Director of Pragathi Hospital for hosting the camp Inner Wheel Club of Nizamabad for coordinating the camp. Dr Pratap Thammineni and Dr Srinivas Reddy for their time and expertise. Mrs. Padmaja Datt for conducting a self-breast examination educational session.

References

Agarwal G, Ramakant P (2008). Breast cancer care in India: the current scenario and the challenges for the future. *Breast Care*, **3**, 21-7.

Ahuja S, Chakrabarti N (2010). To determine the level of knowledge regarding breast cancer and to increase awareness about breast cancer screening practices among a group of women in a tertiary care hospital in Mumbia, India. *Int J Public Hlth*, **1**, 1.

Al-Naggar R, Bobryshev Y (2012). Practice and barriers of mammography among Malaysian women in the general population. *Asian Pac J Cancer Prev*, **8**, 3595-600.

American Cancer Society (2009). Breast Cancer Facts and Figures 2009–2010. 1-30. http://womenshealth.gov/health-topics/a-z-topic/details.cfm?pid=11279

Bagchi S (2008). Breast Cancer rises in India. *CMAJ*, **179**, 27.

Bleyer A, Welch H (2012). Effect of three decades of screening mammography on breast-cancer incidence. *The New England J Med*, **367**, 1998-2005.

Claus EB, Rish N, Thomson WD (1990). Age at onset as an indicator of familial risk of breast cancer. *Am J Epidemiol*, **131**, 961-72.

Dinshaw K, Mishra G, Shastri S (2007). Determinants of compliance in a cluster randomised controlled trial on screening of breast and cervix cancer in Mumbai, India. 1. Compliance to screening. *Oncology*, **73**, 154-61.

Dinshaw KA, Shastri SS, Patil SS (2005). Cancer control programme in india: challenges for the New Millennium. *Hlth Administrator*, **17**, 10-3.

Harirchi I, Azary S, Montazeri A, et al. (2012). Literacy and Breast Cancer Prevention: a Population-Based Study from Iran. *Asian Pac J Cancer Prev*, **8**, 3927-30.

Kalache A (1990). Risk factors for breast cancer, with special reference to developing countries. *Hlth Policy Plan*, **5**, 1-22.

Lamberts OQ, Draisma G, der Kinderen A, Brown ML, de Koning HJ (2010). Breast cancer screening policies in developing countries: a cost-effectiveness analysis for India. *J Natl Cancer Inst*, **100**, 1290-300.

Ministry Of Health and Family Welfare (mohfw). (2010). National Rural Health Mission: 2005-2010: http://mohfw.nic.in/NRHM/asha.htm.

Mishra D, Singh H: Kuppuswamy (2003). Socioeconomic social scale- a revision. *Indian J Pediatr*, **70**, 273-4.

Moss S (2008). Screening for breast cancer in India—Is it an appropriate strategy? *J Natl Cancer Inst*, **100**, 1270-1.

Murthy NS, Agarwal UK, Chaudhry K, Saxena S (2007). A study on time trends in incidence of breast cancer - Indian scenario. *Eur J Cancer Care*, **16**, 185-6.

Murthy NS, Juneja A, Sehgal A, Luthra UK (1990). Cancer projection by the turn of century. *Indian J Cancer*, **27**, 74-82.

Sankaranarayanan R, Ramadas K, Thara S, et al (2011). Clinical breast examination: preliminary results from a cluster randomized controlled trial in India. *J Natl Cancer Inst*,

19, 1476-80.
Smith RA, Saslow D, Sawyer KA, et al (2003). American cancer society guidelines for breast cancer screening. *CA Cancer J Clin*, **53**,141-69.
Saxena S, Rekhi B, Bansal A, et al (2005). Clinico-morphological patterns of breast cancer including family history in a New Delhi hospital, India-a cross-sectional study. *World J Surg Oncol*, **3**, 67.
Sutnick AI, Saunders JF, Puchkov YI (1982). Cancer control in India: a multinational approach involving the USA and the USSR. *Am J Public Hlth*, **72**, 14-717.
Swaminathan R, Selvakumaran R, Vinodha J, et al (2009). Education and cancer incidence in a rural population in south India. *Cancer Epidemiol*, **33**, 89-93.
Tabar L, Fagerberg CJG, Gad A, et al (1985). Reduction in mortality from breast cancer after mass screening with mammogram. Randomised trial from the breast cancer screening working group of the Swedish national board of health and welfare. *Lancet*, **1**, 829-32.
Tabar L, Yen MF, Vitak B, et al (2003). Mammogram service screening and mortality in breast cancer patients: 20-year follow-up before and after introduction of screening. *Lancet*, **361**, 1405-10.
Wu TY, Chung S, Yeh MC, et al. (2012). Understanding breast cancer screening practices in taiwan: a country with universal health care. *Asian Pac J Cancer Prev*, **9**, 4289-94.
Yeole BB, Kurkure AP (2003). An epidemiological assessment of increasing incidence and trends in breast cancer in Mumbai and other sites in India, during the last two decades. *Asian Pac J Cancer Prev*, **4**, 51-6.
Yousuf SA, Al Amoudi SM, Nicolas W, Banjar HE, Salem SM (2012). Do Saudi nurses in primary health care centres have breast cancer knowledge to promote breast cancer awareness? *Asian Pac J Cancer Prev*, **9**, 4459-64.