# Women with abnormal screening mammography lost to follow-up
## An experience from Taiwan

Chia-Sheng Kuo (MD, MPH)[a,b], Guan-Ru Chen (MD)[a], Shou-Hung Hung (MD)[a], Yi-Lien Liu (MD, DrPH)[d], Kuo-Chin Huang (MD, PhD)[e,f], Shao-Yi Cheng (MD, MSc, DrPH)[c,e,*]

## Abstract

Breast cancer has the highest incidence among all cancers for women in Taiwan. The current screening policy in Taiwan suggested a biennial mammography for all women 40 to 69 years of age. A recommendation for additional testing is recommended for women with a BI-RADS result of 0 or 4; a request made via postal mail. Approximately 20% of high-risk patients do not receive additional follow-up. Therefore, we aimed to explore the causes of these patients being lost to follow-up, despite an abnormal mammogram. Two questionnaires were designed separately according to the conceptual framework of the Health Belief Model. Study participants, women who received a screening mammography at the National Taiwan University Hospital in 2011 with a BI-RAD of 0 or 4, were interviewed via telephone. The dependent variable was receipt of follow-up or not. The analyses were performed by using $\chi^2$ tests and logistic regression models. In total, 528 women were enrolled in the study: 51.2% in BI-RADS 0 group and 56.6% in BI-RADS 4, respectively. In the BI-RADS 0 group, those patients who received a follow-up examination cited the most likely causes to be physician suggestion, health implications, and concerns regarding breast cancer. Patients who did not receive a follow-up examination cited a lack of time and a perception of good personal health as primary reasons. In the BI-RADS 4 group, those patients who received a follow-up examination cited the physician's recommendation and a recognition of the importance of follow-up examinations. Patients who did not receive a follow-up examination cited having received follow-up at another hospital and a desire for a second opinion. In the BI-RADS 0 group, multivariate analysis showed that patients with higher scores in the "perceived benefits" domain were statistically more likely to receive a follow-up examination. There was no significant difference in perceived threats, perceived barriers, action cues, or self-efficacy between groups. We conclude that additional education to raise breast cancer awareness in the general public and healthcare providers will be needed to improve the rate of follow-up examinations after an abnormal screening mammogram.

**Abbreviations:** BI-RADS = Breast Imaging-Reporting and Data System, BRCA = Breast Cancer Gene, TP 53 = Tumor Protein 53.

**Keywords:** breast cancer, follow-up, health belief model, mammography, screening

## 1. Introduction

Breast cancer remains one of the most serious diseases in women worldwide. The incidence of breast cancer has increased in recent years, becoming a huge burden to the global healthcare system.

According to GLOBOCAN, 1.7 million women were diagnosed with breast cancer in 2012.[1] The incidence has increased by more than 20% between 2008 and 2012, and the mortality has also increased by 14%. Breast cancer was also the most common cause of female cancer mortality, resulting in about five hundred thousand deaths in 2012. The incidence and mortality increased both in developed and developing countries, possibly due to a shift of lifestyle in the population toward industrialized countries.[2,3]

Mammography is the most common tool used worldwide for breast cancer screening, although some studies have questioned the accuracy and cost-effectiveness.[4–7] Screening policies vary by country, in United Kingdom for example it is recommended that women aged 47 to 73 years without risk factors such as family history of breast cancer, BRCA1 mutation, BRCA 2 mutation, or TP 53 mutation receive a mammogram every 3 years.[8] In Singapore, the screening policy suggests a mammogram every 2 years for women aged greater than 40 years.[9] In contrast, there is no formal policy for breast cancer screening in Japan.

In Taiwan, breast cancer has the highest incidence among all cancers in women. According to the Health Promotion Administration, Ministry of Health and Welfare in Taiwan, the incidence of breast cancer in 2012 was 65.9/100,000 population,[10] which was highest among Asian countries.[11] The mortality rate of breast cancer of Taiwan in 2012 was 11.9/100,000 population,[10] which was also high among Eastern

Asia.[11] The screening policy in Taiwan, since 2002, has recommended a biennial mammogram for women aged 45 to 69 years and age 40 to 44 years in women with a family history of breast cancer. A recommendation for additional testing is recommended for women with a BI-RADS result of 0 or 4; a request made via postal mail. According to the Health Promotion Administration, Ministry of Health and Welfare in Taiwan, about 690,000 women received a screening mammography in 2013, with a screening rate of 36%.[10] However, only 82% of patients with a BI-RADS of 0 or 4 received a follow-up examination, leaving 18% of women with a high risk of breast cancer lost to follow-up.[12] Therefore, it is paramount to increase the follow-up rate in women with an abnormal screening mammogram for early detection of breast cancer.

Several studies have proposed methodology to promote screening mammography. In a meta-analysis enrolling 43 studies, behavioral interventions were found to increase the screening rate for screening mammograms by 13.2% compared with usual care[13]; this study concluded that theory-based education such as the health belief model could increase screening rates by 23.6%. Another meta-analysis explored the effectiveness of interventions designed to increase mammography use and reported that all types of interventions targeted at physicians or providers were effective, and interventions targeting both patients and providers were not significantly better than those targeting providers only.[14] Multiple approaches such as behavioral and cognitive combined approaches were also found to be no more effective than a single approach. Another meta-analysis, assessing the effectiveness of patient-targeted interventions in increasing mammography use, concluded that both inreach and outreach approaches were similarly effective.[15] Community health worker interventions were also found to improve screening mammography rates.[16] Regarding the studies that applied the health belief model,[17] 1 study in Turkey discovered that susceptibility, seriousness, motivation, and mammography benefit scores were higher among those with mammography, but the mammography barrier scores were higher among those without mammography.[18] A study conducted in Greece suggested that women who perceived fewer benefits and more barriers to mammography screening, and who have more negative emotional representations of breast cancer or no private health insurance coverage were more likely to have no screening mammography.[19] Based on these above studies, behavioral interventions, theory-based education, and interventions targeted at physicians or providers were effective to promote screening.

As for repeat mammography, there were some studies reviewing interventions for promoting repeat breast cancer screening.[20–26] However, none of the studies focused on the causes of loss to follow-up in women with abnormal screening mammography results. Knowing the causes of loss to follow-up in women with abnormal screening mammography results is crucial for breast cancer prevention. Therefore, we designed this study to explore the causes of women lost to follow-up despite abnormal screening mammography.

## 2. Methods

### 2.1. Study participants

Our targeted population was women who underwent screening mammography at National Taiwan University Hospital in 2011 with a BI-RADS result of 0 or 4. All study participants provided informed consent during telephone interviews, and those refusing

interviews were excluded. The study protocol was approved by the institutional review board of National Taiwan University Hospital under No. 201305021RINC.

### 2.2. Questionnaires design

We chose the health belief model as our conceptual framework because it is one of the commonly used models when analyzing health-related behaviors of intrapersonal level.[17] Two kinds of questionnaires were designed for patients with BI-RADS 0 and BI-RADS 4 respectively, according to the conceptual framework of health belief model. The Breast Cancer Perceptions Scale consisted of 13 items that measured perceptions about threat (conceived by susceptibility and severity), benefit, barriers, action cues, and self-efficacy. For face validity, evaluation was performed by a breast surgeon, a radiologist specialized in mammography interpretation, an experienced breast sonography technician, and 3 family physicians. The expert validities of both questionnaires were good. We also evaluated the reliability of both questionnaires by calculating Cronbach alpha. The result of the questionnaire was 0.38 to 0.6 for BI-RADS 0, and 0.6 to 0.8 for BI-RADS 4. The internal consistency was acceptable to good.

Perceived threats were evaluated using 4 questionnaire items and included worrying about getting breast cancer, agreeing with breast cancer as life-threatening, agreeing with the possibility of becoming a burden for family, and agreeing with impaired quality of life after having breast cancer. Perceived benefits were indicated by 2 questionnaire items, including agreeing with medical costs reduction if early detection, and agreeing with better survival rates if early detection. Perceived barriers were evaluated using 2 questionnaire items, including agreeing with receiving follow-up as troublesome, and agreeing with more medical cost if receiving follow-up. Four types of action cues, including physician's or nurse's recommendations, possible signs of breast cancer, breast cancer history of friends or relatives, and cancer history of any known person, were also measured. Self-efficacy was evaluated using 1 questionnaire item, which asked respondents to assess whether they had the ability to improve their own health. In each questionnaire item, respondents scored 2 if answering "yes," scored 1 if answering "do not know," and scored 0 if answering "no." The total scores for each domain were then divided into 2 categories (low and high levels) by median level.

### 2.3. Telephone interview

Eight nurses completed all telephone interviews after oral informed consents were received from participants. Before the telephone interviews, all nurses underwent a training class on how to complete the questionnaires by following standardized procedures; therefore, ensuring consistency between interviewers. Interviews were discontinued if the participants refused or were unable to complete the interviews. All the interviews were completed between June 1, 2013 and June 30, 2013.

### 2.4. Statistical analysis

Demographic data were summarized as total numbers and percentages by categorical variables. Differences between categorical variables were compared using $\chi^2$ tests and Fisher exact tests. The questionnaires were categorized into 5 domains, including perceived threats, perceived benefits, perceived barriers, action cues, and self-efficacy. Each domain consisted of 1 to

4 questions, and logistic regression analyses were performed to explore the factors affecting follow-up. The dependent variable was receiving follow-up or not. Independent variables were age, education level, marriage status, living location, economic status, exercise, ethnicity and 5 domains of health belief model. Statistical analyses were performed using SAS version 9.3 (SAS Institute Inc, Cary, NC).

## 3. Results

### 3.1. Study participants

In total, 1031 patients were enrolled in our study and 528 of them completed the questionnaires, including 494 from BI-RADS 0 group and 34 from BI-RADS 4 group. The completion rate was 51.21% for BI-RADS 0 and 56.67% for BI-RADS 4, respectively. The most likely reasons for not completing the questionnaire included not answering the phone calls (n = 232) and refusing to answer the questionnaire (n = 164).

In the BI-RADS 0 group, 88.87% (n = 439) of patients reported receiving a follow-up mammogram, while 11.13% (n = 55) of patients did not. There was no significant difference in age, education, marriage status, occupation, residence, and economic status between those patients who received a follow-up mammogram and those who were lost to follow-up (Table 1). The only difference between groups was the percentage of patients who participated in regular exercise, which was lower in patients who received a follow-up mammogram versus those who were lost to follow-up (P = 0.04).

As for the BI-RADS 4 group, a total of 34 patients were enrolled. Among these patients, 23 patients reported having received a diagnostic biopsy, while 11 patients did not.

### 3.2. Causes of receiving follow-up or not

In the BI-RADS 0 group the most likely cause of receiving a follow-up mammogram was "suggestion from the doctor," which was reported by 40.70% of patients in this group. Other causes included "considering follow-up important for health" (24.03%), "worrying about having breast cancer" (20.39%), "explanations and encouragement from nurses or other paramedical staffs" (11.59%), and "having symptoms" (9.23%). The most likely cause of patients being lost to follow-up was "having no time" (22.58%). Other causes included "thinking personal health is good and unnecessary to receive follow-up" (20.97%), "receiving follow-up at other hospitals" (11.29%), and "planning to receive follow-up at other hospitals." These results are summarized in Table 2.

As for the BI-RADS 4 group, the most likely cause of receiving a follow-up biopsy was "suggestion from the doctor" (52.17 %.) Other causes included "considering follow-up important for personal health" (21.74%), "having symptoms" (8.7%), "explanations and encouragement from nurses or other paramedical staffs" (8.7%), and "receiving education about breast cancer previously" (8.7%). The causes of patients being lost to follow-up included "receiving biopsy at other hospitals" (18.18%), "planning to receive biopsy at other hospitals" (18.18%), "feeling worried about and afraid of the biopsy"

## Table 1

**Demographic data of study participants.**

| BI-RADS groups | BI-RADS 0 Receiving follow-up n = 439 | Lost to follow-up n = 55 | P value | BI-RADS 4 Receiving follow-up n = 23 | Lost to follow-up n = 11 | P value |
|---|---|---|---|---|---|---|
| Age | | | | | | |
| ≤55 | 217 (49.43%) | 28 (50.91%) | 0.84 | 14 (60.87%) | 5 (45.45%) | 0.47 |
| ≥56 | 222 (50.57%) | 27 (49.09%) | | 9 (39.13%) | 6 (54.55%) | |
| Educational background | | | | | | |
| ≤senior high school | 97 (22.10%) | 11 (20.00%) | 0.72 | 8 (34.78%) | 5 (45.45%) | 0.71 |
| ≥university | 342 (77.90%) | 44 (80.00%) | | 15 (65.22%) | 6 (54.55%) | |
| Marriage status | | | | | | |
| Married | 354 (80.64%) | 45 (81.82%) | 0.83 | 21 (91.3%) | 9 (81.82%) | 0.58 |
| Single/widow | 85 (19.36%) | 10 (18.18%) | | 2 (8.7%) | 2 (18.18%) | |
| Occupation | | | | | | |
| None | 15 (3.42%) | 2 (3.64%) | 0.93 | 6 (26.09%) | 3 (27.27%) | 1 |
| Yes | 424 (96.58%) | 53 (96.36%) | | 17 (73.91%) | 8 (72.73%) | |
| Residence | | | | | | |
| Urban | 432 (98.41%) | 52 (94.55%) | 0.06 | 21 (91.3%) | 10 (90.91%) | 1 |
| Suburban | 7 (1.59%) | 3 (5.45%) | | 2 (8.7%) | 1 (9.09%) | |
| Economic status | | | | | | |
| Good | 430 (97.95%) | 53 (96.36%) | 0.45 | 22 (95.65%) | 11 (100%) | 1 |
| Average or poor | 9 (2.05%) | 2 (3.64%) | | 1 (4.35%) | 0 (0) | |
| Habit of regular exercise | | | | | | |
| None | 199 (45.33%) | 17 (30.91%) | 0.04[*] | 11 (47.83%) | 6 (54.55%) | 0.71 |
| Yes | 240 (54.67%) | 38 (69.09%) | | 12 (52.17%) | 5 (45.45%) | |
| Race | | | | | | |
| HAKKA | 34 (7.74%) | 5 (9.09%) | 0.79 | 4 (17.39%) | 0 (0) | 0.31 |
| Ming | 320 (72.89%) | 42 (76.36%) | | 15 (65.22%) | 8 (72.73%) | |
| Mainlander | 79 (18.00%) | 7 (12.73%) | | 4 (17.39%) | 3 (27.27%) | |
| Others[†] | 6 (1.37%) | 1 (1.82%) | | — | — | |

BI-RADS = Breast Imaging-Reporting and Data System.

[*] P value <0.05, statistical significance.

[†] Aborigines or new inhabitants.

**Table 2**

**Causes for receiving or lost to follow-up in the BI-RADS 0 group.**

| N | % | | Domain |
|---|---|---|---|
| Causes of receiving follow-up (n = 466) | | | |
| 199 | 42.70 | Suggestion from doctor | Action cues |
| 112 | 24.03 | Considering follow-up important for health | Perceived benefits |
| 95 | 20.39 | Worrying about having breast cancer | Perceived threats |
| 54 | 11.59 | Explanations and encouragement from nurses or other paramedical staffs | Action cues |
| 43 | 9.23 | Having symptoms, including palpable mass, pain, or nipple discharge | Perceived threats |
| 17 | 3.65 | Support/encouragement from families or friends | Action cues |
| 15 | 3.22 | Having family history | Perceived threats |
| 3 | 0.64 | Receiving education about breast cancer previously | Perceived threats |
| 1 | 0.21 | Considering convenient with screening mammography cars in the community | Action cues |
| Causes of lost to follow-up (n = 62) | | | |
| 14 | 22.58 | Having no time | Perceived barriers |
| 13 | 20.97 | Thinking personal health is good and unnecessary to receive follow-up | Perceived threats |
| 7 | 11.29 | Receiving follow-up at other hospitals | N/A |
| 4 | 6.45 | Planning to receive follow-up at other hospitals | Perceived barriers |
| 3 | 4.84 | Feeling follow-up exam troublesome | Perceived barriers |
| 2 | 3.23 | Inconvenient traffic | Perceived barriers |
| 1 | 1.61 | More exams, more anxious | Perceived barriers |
| 1 | 1.61 | Refusing to face the problem | Self-efficacy |
| 1 | 1.61 | Having known fibrocysts or benign breast lesions previously | Perceived threats |
| 0 | 0.00 | Worrying about the follow-up exams | Perceived barriers |
| 0 | 0.00 | No family or friend accompany | Self-efficacy |
| 0 | 0.00 | Not believing in the accuracy of mammography | Perceived benefits |

BI-RADS = Breast Imaging-Reporting and Data System.

(9.09%), "thinking biopsy troublesome" (9.09%), "refusing to face the problem" (9.09%), and "wrong recommendations from the physician" (9.09%). Results are summarized in Table 3.

### 3.3. Multivariate analysis

In the BI-RADS 0 group, patients with higher scores in the "perceived benefits" domain were statistically more willing to receive a follow-up mammogram. By contrast, there was no significant difference in perceived threats, perceived barriers, action cues, or self-efficacy. As for the BI-RADS 4 group,

multivariate analysis was not performed due to limited number of study participants. Results of multivariate analyses are listed in Table 4.

### 3.4. Discussion and conclusions

To our knowledge, this is the first study to adopt the health belief model to explore the causes of patients being lost to follow-up despite abnormal screening mammography results. Many studies have discussed the factors and interventions associated with increased repeat mammography,[20–26] but none has specifically

**Table 3**

**Causes of receiving biopsies and lost to follow-up in the BI-RADS 4 group.**

| N | % | | Domain |
|---|---|---|---|
| Causes of receiving biopsy (n = 23) | | | |
| 12 | 52.17 | Suggestion from doctor | Action cues |
| 5 | 21.74 | Considering follow-up important for personal health | Perceived benefits |
| 2 | 8.70 | Having symptoms, including palpable mass, pain, or nipple discharge | Perceived threats |
| 2 | 8.70 | Explanations and encouragement from nurses or other paramedical staffs | Action cues |
| 2 | 8.70 | Receiving education about breast cancer previously | Perceived threats |
| 1 | 4.35 | Support/encouragement from families or friends | Action cues |
| Causes of lost to follow-up (n = 11) | | | |
| 2 | 18.18 | Receiving biopsies at other hospitals | N/A |
| 2 | 18.18 | Planning to receive biopsies at other hospitals | Perceived barriers |
| 1 | 9.09 | Feeling worried about and afraid of the biopsy | Perceived barriers |
| 1 | 9.09 | Thinking biopsy troublesome | Perceived barrier |
| 1 | 9.09 | Refusing to face the problem | Self-efficacy |
| 1 | 9.09 | Wrong recommendations from the physician (suggesting breast echo for follow-up, and no need for biopsy) | Perceived threats |
| 1 | 3.23 | thinking personal health is good and unnecessary to receive further exams | Perceived threats |

BI-RADS = Breast Imaging-Reporting and Data System.

**Table 4**

Multivariate analysis of the factors influencing patients' willingness to receive follow-up in the BI-RADS 0 group.

| | Odds ratio | 95% CI |
|---|---|---|
| Perceived threats | | |
| Weak | Reference | |
| Strong | 1.58 | 0.87–2.87 |
| Perceived benefits | | |
| Weak | Reference | |
| Strong | 2.30 | 1.11–4.78[*] |
| Perceived barriers | | |
| Weak | Reference | |
| Strong | 0.89 | 0.48–1.65 |
| Action cues | | |
| Weak | Reference | |
| Strong | 0.88 | 0.47–1.63 |
| Self-efficacy | | |
| Weak | Reference | |
| Strong | 1.14 | 0.52–2.53 |

BI-RADS = Breast Imaging-Reporting and Data System, CI = confidence interval.
[*] Statistically significant.

focused on the causes of patients being lost to follow-up. There are similarities and differences between previous studies and ours. A telephone interview study that compared the differences between on-schedule, off-schedule, and those who were never screened, concluded that off-schedule women compared with on-schedule women were more likely to never have had a clinical breast examination within 12 months after a baseline telephone interview, to be ambivalent about screening mammography, to be confused about screening guidelines, and to have never been advised by a physician to get a mammogram.[21] These causes were mostly related to perceived benefits, which were compatible with our study. Another study explored the factors associated with annual-interval mammography for women aged 40 to 49 years; results showed that factors related to nonadherence included the lack of knowledge/not thinking mammograms are needed, the cost, being too busy, and forgetting to make/keep appointments.[22] Likewise, in our study, the most likely causes of loss to follow-up in BI-RADS 0 group were having no time and thinking themselves as healthy. Our study also disclosed that suggestions from the physicians were of great importance. Furthermore, another randomized controlled study found the use of the health belief model and theory of planned behavior constructs in clinical practice may be helpful to promote continued screening among Iranian women.[23]

Regarding the differences between our studies and others, one national-level study in the United States that investigated the correlates of repeat mammography in women aged 45 to 75 years demonstrated that access to care variable combining insurance coverage and regular source of care were the strongest socio-demographic correlates.[24] These factors were associated with perceived barriers, which were different from our study. However, the National Health Insurance coverage of general population in Taiwan is greater than 90%, which might decrease the barriers of health care accessibility. Another study disclosed that correlates of lower repeat mammography rates in women aged 55 to 79 years were insurance status, no usual source of care, being a smoker, age 65 to 79 years, being Asian with no English proficiency, never married, and having lower absolute risk for breast cancer[25]; however, the applications of the findings were limited due to inconsistencies between unadjusted and multivariable adjusted results. A systematic review and meta-

analysis that focused on the effects of interventions for promoting repeat breast cancer screening with mammography, claimed that reminder-only intervention strategies were more effective than alternate strategies.[20] Nevertheless, the observed heterogeneity among studies in the systematic review limited the application of the results. Another randomized controlled trial found that mailing thank-you cards, newsletters, and reminders could increase repeat mammography rates at 15, 18, and 24 months after study initiation compared with no mailings.[26] Mailing reminders, compared with no mailings, could improve the repeat mammography rates at 15 months, and there were no significant differences across study groups at 13 months. The reminder methods mainly focused on the domains of cues to action. However, the effects were not visible until at least 15 months after the qualifying mammogram, which left at-risk patients unrecognized for more than 1 year. Therefore, which intervention-based domain of health belief model was more effective remained inconclusive.

Possible explanations for these discrepancies were as follows. First, the National Health Insurance coverage of the general population in Taiwan is more than 90%, which is different from the studies in the United States. Second, the access to health care is also fair in Taiwan, which improved the domain of action cues. Lastly, in Taiwan, women with BI-RADS 0 and BI-RADS 4 were already asked to receive follow-up via postal mail; in other words, the reminder strategies have been undertaken, so the causes about action cues might be diminished.

There were some possible limitations in our study. First, our study participants were enrolled in 1 single medical center, which might influence the application of the results. Second, although the telephone interviewers have received training courses before the study, there might be some interviewer bias. Lastly, the number of study participants with BI-RADS 4 screening mammography results was limited, so multivariable analysis could not be performed for adjusting possible confounders.

We concluded that physician suggestion was the most important factor affecting the rate of follow-up in women with abnormal screening mammography results, both in BI-RADS 0 and BI-RADS 4 populations. In BI-RADS 0 population, perceived benefits was the domain of the most importance. Additional education regarding breast cancer awareness to the general public and medical personal will be important to improve abnormal screening mammography follow-up rates.

## References

[1] International Agency for Research on Cancer. 2012. GLOBOCAN 2012: Estimated Cancer Incidence, Mortality, and Prevalence Worldwide in 2012. [ONLINE] Available at: http://globocan.iarc.fr/Default.aspx. [Accessed April 12, 2016].

[2] McKenzie F, Ferrari P, Freisling H, et al. Healthy lifestyle and risk of breast cancer among postmenopausal women in the European Prospective Investigation into Cancer and Nutrition cohort study. Int J Cancer 2015;136:2640–8.

[3] de Glas NA, Fontein DB, Bastiaannet E, et al. Physical activity and survival of postmenopausal, hormone receptor-positive breast cancer patients: results of the Tamoxifen Exemestane Adjuvant Multicenter Lifestyle study. Cancer 2014;120:2847–54.

[4] Gotzsche PC, Jorgensen KJ. Screening for breast cancer with mammography. Cochrane Database Syst Rev 2013;6:CD001877.

[5] Moss SM, Nystrom L, Jonsson H, et al. The impact of mammographic screening on breast cancer mortality in Europe: a review of trend studies. J Med Screening 2012;19(suppl 1):26–32.

[6] Gotzsche PC, Olsen O. Is screening for breast cancer with mammography justifiable? Lancet 2000;355:129–34.

[7] Kerlikowske K, Grady D, Rubin SM, et al. Efficacy of screening mammography. A meta-analysis. JAMA 1995;273:149–54.

[8] Health Promotion Board. 2010. BreastScreen Singapore. [ONLINE] Available at: http://www.hpb.gov.sg/HOPPortal/health-article/3324. [Accessed April 12, 2016].

[9] Health Promotion Board, 2010 BreastScreen Singapore. [ONLINE] Available at: http://www.hpb.gov.sg /HOPPortal/health-article/3324. [Accessed April 12, 2016].

[10] Health Promotion Administration, Ministry of Health and Welfare. 2015. Breast Cancer Screening. [ONLINE] Available at: http://www.hpa.gov.tw/BHPNet/Web/HealthTopic/. [Accessed April 12, 2016].

[11] Youlden DR, Cramb SM, Yip CH, et al. Incidence and mortality of female breast cancer in the Asia-Pacific region. Cancer Biol Med 2014;11:101–5.

[12] Kerlikowske K, Cook AJ, Buist DS, et al. Breast cancer risk by breast density, menopause, and postmenopausal hormone therapy use. J Clin Oncol 2010;28:3830–7.

[13] Yabroff KR, Mandelblatt JS. Interventions targeted toward patients to increase mammography use. Cancer Epidemiol Biomarkers Prev 1999;8:749–57.

[14] Mandelblatt JS, Yabroff KR. Effectiveness of interventions designed to increase mammography use: a meta-analysis of provider-targeted strategies. Cancer Epidemiol Biomarkers Prev 1999;8:759–67.

[15] Yabroff KR, O'Malley A, Mangan P, et al. Inreach and outreach interventions to improve mammography use. J Am Med Womens Assoc 2001;56:166–73.

[16] Wells KJ, Luque JS, Miladinovic B, et al. Do community health worker interventions improve rates of screening mammography in the United States? A systematic review. Cancer Epidemiol Biomarkers Prev 2011;20:1580–98.

[17] Janz NK, Becker MH. The health belief model: a decade later. Health Educ Q 1984;11:1–47.

[18] Baysal HY, Polat H. Determination of the breast cancer risk levels and health beliefs of women with and without previous mammography in the eastern part of Turkey. Asian Pac J Cancer Prev 2012;13:5213–7.

[19] Anagnostopoulos F, Dimitrakaki C, Fitzsimmons D, et al. Health beliefs and illness perceptions as related to mammography uptake in randomly selected women in Greece. J Clin Psychol Med Settings 2012;19:147–64.

[20] Vernon SW, McQueen A, Tiro JA, et al. Interventions to promote repeat breast cancer screening with mammography: a systematic review and meta-analysis. J Natl Cancer Inst 2010;102:1023–39.

[21] Halabi S, Skinner CS, Samsa GP, et al. Factors associated with repeat mammography screening. J Fam Pract 2000;49:1104–2.

[22] Gierisch JM, O'Neill SC, Rimer BK, et al. Factors associated with annual-interval mammography for women in their 40s. Cancer Epidemiol 2009;33:72–8.

[23] Taymoori P, Molina Y, Roshani D. Effects of a randomized controlled trial to increase repeat mammography screening in Iranian women. Cancer Nurs 2015;38:289–97.

[24] Rakowski W, Meissner H, Vernon SW, et al. Correlates of repeat and recent mammography for women ages 45 to 75 in the 2002 to 2003 Health Information National Trends Survey (HINTS 2003). Cancer Epidemiol Biomarkers Prev 2006;15:2093–101.

[25] Rakowski W, Wyn R, Breen N, et al. Prevalence and correlates of recent and repeat mammography among California women ages 55–79. Cancer Epidemiol 2010;34:168–77.

[26] Partin MR, Slater JS, Caplan L. Randomized controlled trial of a repeat mammography intervention: effect of adherence definitions on results. Prev Med 2005;41:734–40.