

**Breast Cancer Screening Practices and Associated Factors
among Chinese-Australian Women Living in Sydney**

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STATEMENT OF AUTHENTICATION

I, LEI WANG, hereby declare that this submission is my own work and contains no material previously published or written by another person, except where acknowledged in the text. It does not contain any material that has been accepted for the award of another degree. The journal manuscript has not been published elsewhere.

Additionally, ethical approval was obtained from the University of Sydney Human Ethics Committee before the commencement of this study. Informed consent was gained from all participants involved in the study.

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Date: 30/10/2016

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THESIS ABSTRACT

Introduction/ Aims: As breast cancer is a primary health issue for women, early detection plays a leading role in reducing mortality from breast cancer in Australia. Little is known about how Chinese-Australian women engage in breast cancer screenings. This study aimed to investigate breast cancer screening practices among Chinese-Australian women and explore the factors associated with their screening participation.

Methods: This study used a cross-sectional and quantitative method. Convenience and snowball sampling were used to recruit 115 Chinese-Australian women living in Sydney (aged 35 years and older), through Chinese organizations and personal networks in Sydney. The data were collected by self-administered questionnaires between July and September 2016. Bivariate and multivariate analyses were used for data analysis.

Results: The majority of participants performed breast self-examinations (78.1%), had a clinical breast examinations (69.8%) and a mammograms (73.3%). Educational level was positively associated with performing a breast self-examination. Age, religion, employment status and length of residence were associated with having a clinical breast examination. Income was related to having a mammogram. Significant associations between knowledge of breast cancer, cancer-related beliefs, and screening participation were also found. The length of residence was the strongest predictor of having a clinical breast examination and a mammogram. The most common barrier to mammography screening was that doctors did not recommend it to participants.

Conclusions: This study highlights the breast cancer screening status of Chinese-Australian women and the factors related to their screening behaviours. The study findings can be used to develop tailored programs for Chinese-Australian women to promote their early detection of breast cancer.

SECTION 1: Literature Review

1. Introduction

1.1 Background to the Topic

Breast cancer is a major cause of illness and death for Australian women, which has become a priority health issue in Australia (Australian Institute of Health and Welfare [AIHW] & Cancer Australia, 2012). In 2016, it is estimated that 15,930 females will be newly diagnosed with breast cancer and 3,080 females will die from breast cancer in Australia (AIHW, 2014). With the constantly increasing incidence and mortality of breast cancer among Australian women, breast cancer has caused substantial economic and social burdens on individuals, families and the greater community (AIHW, 2014). Due to the considerable burdens of breast cancer, early detection has become a prominent focus in the Australian health system and a national breast-screening program has been established to reduce illness and death from breast cancer (Ahern et al., 2015).

However, migrant women are reported to be less likely to access the available breast health services as compared to Australian-born women (AIHW, 2014; Kwok et al., 2011a). For women aged 50-69 years, the report by the AIHW and the National Breast Cancer Centre (2006) indicated that women who speak a language at home other than English, had lower rates of participating in mammographic screening (43.7%) compared to English-speaking women (58.4%) in 2002–2003. Currently, there is limited literature exploring the screening practices of breast cancer among migrant women from non-English-speaking countries in Australia. The proposed

study will focus on Chinese women who migrated to Australia from Mainland China or Hong Kong, now living in Sydney. This is an extension of earlier research from the South East Asian migrant women's breast cancer project.

1.2 Aim of Literature Review

This literature review aims to provide background information about breast cancer in Australia and to explore what is known about breast cancer screening practice among migrant women in Australia, particularly among Chinese migrant women. The review will also summarise and critique the existing literature to identify the gap in knowledge regarding screening practices of Chinese-Australian women and to illustrate the importance of conducting the proposed study.

1.3 Search Strategy

A rigorous database search was undertaken to ensure all relevant literature was identified and included in this review. The following multiple databases were searched: CINAHL, PsycINFO, Medline, PubMed, Scopus, Web of Science and ScienceDirect. Key search terms used included breast cancer, breast neoplasms, breast cancer screening, screening, breast health practice, mammography, clinical breast examination, breast self-examination, immigrant women, migrant women, Chinese, Chinese–Australian women, Australia, Sydney, and the health belief model. In order to ensure that all relevant articles and publications were included in this review, the search was not limited to a specific timeframe; but was limited to English language

publications. Reference lists of identified documents were hand searched to identify additional publications that were missed through the database searches. Additionally, the search of Australian government health websites and the Australian Bureau of Statistics (ABS) was also undertaken to obtain the nationally relevant statistics and information (e.g. the statistics of Australia's migrant population, the national guidelines for breast cancer screening).

1.4 Theoretical Framework

The Health Belief Model (HBM) (Becker, 1974) was selected to guide the aims, hypotheses and design of this study. This model is a main conceptual framework to explain and predict a wide range of health-related behaviours (Becker, 1974, Janz & Becker, 1984). The model suggests that health behaviours are associated with the following six key factors (Johnson et al., 2008; Noroozi et al., 2011):

- Perceived susceptibility: a person's own perception about the likelihood of getting a diseases or condition;
- Perceived severity: a person's belief about the seriousness and consequences of a condition, such as pain, discomfort, loss of productivity, financial and family issues;
- Perceived benefits: a person's belief about the efficacy or positive aspects of health-related actions;
- Perceived barriers: a person's belief about the negative aspects of health-related actions, such as high costs, inconveniences, pain or discomfort;

- Cues to action: events or strategies that motivate actions either physically or environmentally;
- Self-efficacy: beliefs about a person's ability to achieve the behaviour required to produce the outcome.

Based on the HBM (see Figure 1), individuals are more likely to perform preventive health practices when they perceive themselves to be susceptible for a disease or condition, perceive the serious consequences of the disease or condition, perceive the benefits of actions related to health practice and perceive fewer barriers of taking the health-related actions (Abolfotouh et al., 2015; Wu et al., 2006). In addition to this, the modifying factors of HBM may also impact on the health-related behaviours and decision-making of individuals, including demographic factors such as age, sex, level of education and marital status and structural factors such as knowledge of the disease or condition (Noroozi et al., 2011). In the context of breast cancer, the HBM has been widely used to explore and examine beliefs related to the behaviours of breast cancer detection (Wu et al., 2006), including breast self-examination (BSE) (Noroozi et al., 2011), clinical breast examination (CBE) (Juon et al., 2002) and mammography (Wu et al., 2008; Pourat et al., 2010; Juon et al., 2002). Thus, the HBM was used as a theoretical framework to design the study and to guide the content of the study questionnaire for the purposes of understanding why Chinese-Australian women did or did not engage in the key breast cancer screening tests (BSE, CBE and mammography) and for examining any factors associated with their behaviours of breast cancer screening (Becker, 1974).

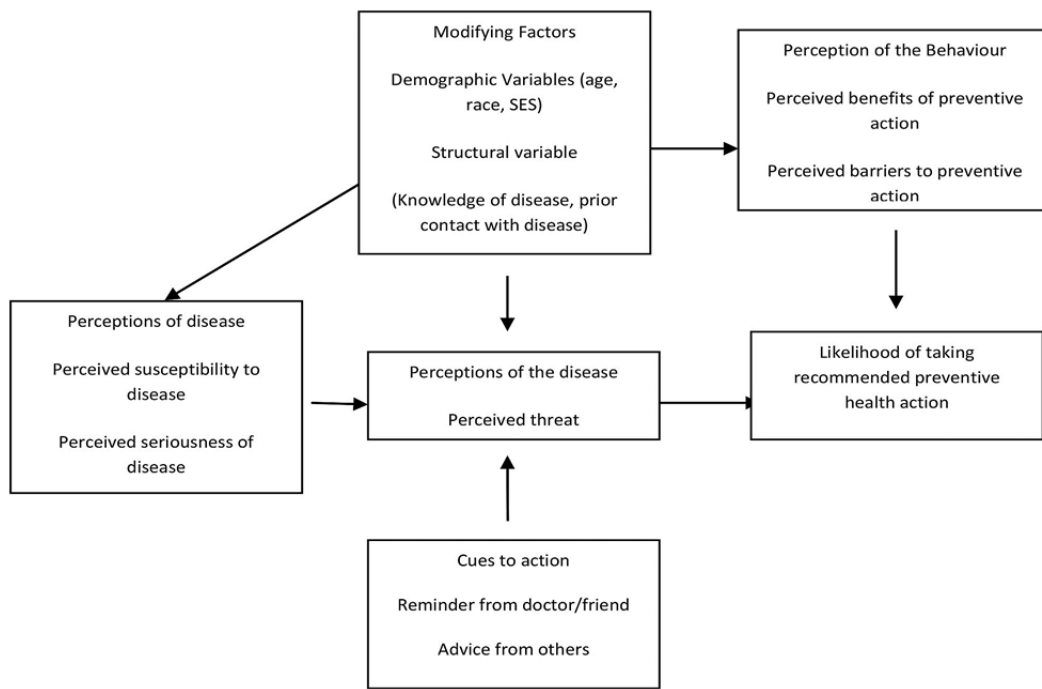


Figure 1. The Health Belief Model (Glanz et al., 2002)

2. Overview of Breast Cancer

Globally, breast cancer is the most prevalent cancer among women and has become a public health issue both in the developed and the developing world (World Health Organisation [WHO], 2016). Breast cancer is a tumour in which malignant cells form in the tissues of the breast and multiply (AIHW & Cancer Australia, 2012). These cells in the breast can grow in an uncontrolled way and have the possibility to spread to other parts of the body through the lymphatic or vascular systems (Cancer Council Australia, 2016; AIHW & Cancer Australia, 2012).

2.1 The different types and symptoms of breast cancer

According to the site of impact, breast cancer can be divided into non-invasive breast cancer (e.g. Ductal carcinoma in situ and Lobular carcinoma in situ) and

invasive breast cancer (e.g. invasive ductal carcinoma, invasive lobular carcinoma, Paget's disease of the nipple and inflammatory breast cancer) (Sharma et al., 2010). While there are different types of breast cancer, a lump in the breast is the most common presenting symptom of breast cancer and other presenting features include a lump under the armpit, a change in the size or shape of the breast, a change to the nipple (inversion, crusting, ulcer or redness), nipple discharge (clear or bloody), a change in the skin of the breast (redness, dimpling, a rash appearance), swelling in the breast or the armpit (lymph nodes) and unusual pain in the breast region (Cancer Council Australia, 2016; Sharma et al., 2010; Khan et al., 2013).

2.2 Risk factors of breast cancer

While the causes of breast cancer have not been fully understood, some known factors are associated with an increased risk of developing breast cancer, which includes: being a woman, increasing age, having a strong family history of breast cancer, having a breast condition (e.g. a personal history of breast cancer), hormonal factors (e.g. early menarche, late menopause, use of a combined hormone replacement therapy), child-bearing history (e.g. never breastfed, late first pregnancy), personal and lifestyle factors (e.g. higher socioeconomic status, taller height, excess weight and obesity, low physical activity, alcohol consumption and exposure to medical radiation) (Sharma et al., 2010; AIHW & Cancer Australia, 2012).

2.3 Prevention of breast cancer

Identifying and controlling the modifiable risk factors of breast cancer may reduce the incidence of breast cancer in the long run, such as encouraging a healthy lifestyle, promoting a healthy diet to control overweight or obesity, decreasing alcohol intake, and giving birth before the age of 30 (Khan et al., 2013; Cancer Australia, 2012). However, risk reduction may not always be practicable and may even prove ineffective in eliminating a majority of breast cancers (WHO, 2016; Khan et al., 2013). Therefore, early detection remains the cornerstone of controlling breast cancer, which allows the detection of breast cancer at very early stages for improving breast cancer outcome and survival (WHO, 2016).

There are three tests that are commonly used for screening to ensure the early detection of breast cancer, including breast self-examination (BSE), clinical breast examination (CBE) and mammography (Khalili & Shahnazi, 2010; Noroozi et al., 2011). Mammography involves an X-ray examination of the breast and is the main screening tool for breast cancer (AIHW & Cancer Australia, 2012; Elmore et al., 2005). Studies have proven the effectiveness of mammography screening in the reduction of mortality rates of breast cancer among women aged 40-74 (Humphrey et al., 2002; Elmore et al., 2005). Elmore et al (2005) reported that CBE is less effective in detecting breast cancer compared to mammography, but other studies indicate that the evidence of CBE in reducing breast cancer mortality is inadequate (Cancer Australia, 2015; Humphrey et al., 2002). While there is no evidence of the screening effectiveness of BSE, BSE is the simplest and the most cost-effective screening method for breast cancer, especially in rural areas and in economically poor regions

(Noroozi et al., 2011; Khalili & Shahnazi, 2010). BSE has also been recommended for increasing the awareness of breast cancer among women aged 20 years and over (Humphrey et al., 2002; Khalili & Shahnazi, 2010). The American Cancer Society recommends that females aged 40 years and older should have a mammogram and CBE annually and females aged 20 years and older should perform BSE monthly (Western Australian Clinical Oncology Group, 1998).

In addition to the three common screening tests, breast ultrasound is used for women with dense fibroglandular tissue when the detection rates of their mammography are low (Warrier et al., 2016). Magnetic resonance imaging (MRI) could also be used among people with very dense breast tissue and is commonly used as a supplement to mammography for women with a high risk of breast cancer (Cancer Council Australia, 2016; Warrier et al., 2016). If a suspicious area is found by MRI or breast examination, a breast biopsy is vital to diagnosing cancer before any surgical procedure (AIHW & Cancer Australia, 2012; Cancer Council Australia, 2016).

2.4 Treatment of breast cancer

Following a diagnosis of breast cancer, a multidisciplinary team involving a range of health professionals, will help people with breast cancer determine the best treatment options (Cancer Australia, 2012b). Surgery is usually the first-line treatment for most early breast cancers and involves removing part of the affected breast or the whole breast (Cancer Council Australia, 2016). Apart from surgery, radiotherapy,

chemotherapy, hormonal therapies, targeted therapies, clinical trials, complementary and alternative therapies, and/or recently nanotechnology as well as gene therapy, may also be included (Cancer Australia, 2012b; Cancer Council Australia, 2016; Sharma et al., 2010).

3. Breast Cancer in Australia

3.1 Prevalence and burden of illness in Australia

In 2011–2013, breast cancer is the most common invasive cancer and is the second leading cause of cancer death for women in Australia, but it is rare for men (AIHW & NBCC, 2006; AIHW, 2014). According to AIHW (2014), 14,465 women and 103 men were diagnosed with breast cancer in Australia in 2011. By 2015, it was projected that the incidence of breast cancer for females will be 22% higher than in 2006 (AIHW, 2009). In 2016, it is estimated that the risk of being diagnosed with breast cancer will be one in sixteen (one in eight females and one in 719 males) and the risk of dying from breast cancer will be one in 37 females before the age of 85 years (AIHW, 2014).

With the increasing incidence and mortality of breast cancer, substantial costs have been incurred, including direct health-care costs (e. g. medications, treatment, use of screening service), direct non-health-care costs (e. g. transportation, child care and home service), indirect costs (e. g. loss of productivity, income and years of life) and intangible costs (e. g. decreased quality of life) (AIHW and Cancer Australia, 2012). In the 2004-2005 financial year, it was estimated that the total allocated health

expenditure on breast cancer among women would be \$331 million which accounts for approximately 24% of the allocated health expenditure on all cancer for females in Australia (AIHW & Cancer Australia, 2012).

Moreover, as increasing age is one of the strongest risk factors for breast cancer, the incidence of breast cancer varies among Australian females by age group (Cancer Australia, 2012a). In 2008, Cancer Australia (2012a) reported that the incidence rate of breast cancer was the highest (more than 50%) among Australian women aged between 50 and 69 years whereas the lowest incidence rate of breast cancer (less than one in four) was among those aged less than 50 years.

3.2 Early Detection of Breast Cancer in Australia

Due to the high incidence and large burdens of breast cancer, early detection plays a crucial role in reducing morbidity and mortality from breast cancer in Australia (Peters & Cotton, 2015). Currently, early detection linked to appropriate treatment can significantly increase the survival of breast cancer and, in turn, it will improve women's health and reduce the costs related to breast cancer (Noroozi et al., 2011; Kwok et al., 2011a).

In Australia, two-yearly mammography was recommended for women aged 50–74 years without breast cancer symptoms, as more than 75% of breast cancers were found in women aged over 50 (Cancer Australia, 2015). Since 1991, Australia has established the BreastScreen Australia Program that provides free biennial mammographic screening for asymptomatic women aged 40 and over, and actively

targets women aged 50-69 years through mailed invitation (AIHW, 2014; Ahern et al., 2015). This national population-based screening program helps women detect unsuspected breast cancer and enables intervention at an early stage in order to reduce illness and death (AIHW & Cancer Australia, 2012). From 1 July 2013, the target age group of BreastScreen Australia was extended to women aged 50-74 years, while evidence regarding the benefit of screening mammography is strongest for women aged between 50-69 years (AIHW, 2016; Cancer Australia, 2012; Nickson et al., 2014). According to AIHW (2015), around 55% of women aged 50-69 participated in the BreastScreen Australia Program from 2011 to 2012 and from 2012 to 2013. AIHW (2016) also reported the participation rates for those aged 50-69 were lower among Aboriginal and Torres Strait Islander women (36%), women living in very remote areas (47%) and women from a culturally or linguistically diverse background (49%).

In addition to mammographic screening, the position statement on the early detection of breast cancer (Cancer Australia, 2015) stated that regular clinical breast examination might benefit women who are not attending routine mammograms. The position statement also emphasises that it is important for women of all ages to be aware of the normal look and feel of their breasts and to report any unusual breast changes, however, there is no evidence to promote the use of BSE.

4. Breast cancer practice in Australia among migrant women

As one of the major immigrant nations worldwide, Australia is a culturally and linguistically diverse nation with 28.2% of Australia's estimated resident population

to be born overseas according to statistics from June 2015 (Australian Bureau of Statistics [ABS] , 2016). Specifically, those people born in the United Kingdom (UK) remained the largest group of migrants nationally (5.1%), followed by New Zealand (2.6%), China (2.0%), India (1.8%) and the Philippines and Vietnam (both 1.0%) (ABS, 2016).

Research has indicated that most migrants enjoy good health and are generally more healthy than both the Australian-born population and the general population in their country of origin (AIHW & Cancer Australia, 2012; Anikeeva et al., 2010). In relation to breast cancer, women from many migrant groups have significantly lower incidences of breast cancer than Australian-born females including women born in North-East Asia, South-East Asia, Southern and Central Asia, and Southern and Eastern Europe (Grulich et al., 1995; McCredie et al., 1990; Andreeva et al., 2007; AIHW & Cancer Australia, 2012). The lowest age-standardised mortality rates have also been observed among women born in North-East Asia (12 deaths per 100,000 females) and South-East Asia (15 per 100,000 females) during the 2003 to 2007 time period (AIHW & Cancer Australia, 2012). Thus, the breast cancer practices of migrant women has a tendency to be overlooked in the literature due to their low incidence and mortality of breast cancer.

Studies focusing on breast cancer prevention practice in migrant groups have consistently reported that migrant females were less likely to participate in breast cancer screening than Australian-born females. Compared with Australian-born women, lower rates of mammography were found among migrant women throughout

Asia (in urban and regional areas), New Zealand, Oceania, and regional areas of West Europe (Weber et al., 2014); and migrants from East Asia, North Africa and the Middle East (Weber et al., 2009). Jirojwong and MacLennan (2003) also reported that migrant women from Thailand had a lower rate (25%) of performing regular breast self-examination than the general female Australian population (67%). In addition, low breast cancer screening uptake may be one of the reasons leading to migrant women presenting with more advanced breast cancer compared with Australian-born women (Anikeeva et al., 2010). However, breast cancer screening practices for migrant women still have not been widely investigated and further studies are needed to examine their low uptake of breast cancer screening.

5. Breast cancer practice in Australia among Chinese migrant women

5.1 Chinese migrants in Australia

According to the ABS (2010), the Chinese-born population increased twelvefold from 1981 to 2008. Over the last ten years, the Australian population who were born in China increased from 1.1% in 2005 to 2.0% in 2015, which made Chinese migrants the third largest group of those born overseas, and the largest non-English-speaking ethnic group in Australia (ABS, 2016; Kwok et al., 2006; Kwok et al., 2012b). The Federation of Ethnic Councils of Australia (FECCA) (2010) states that 33.1% of Chinese-Australian people have poor proficiency in spoken English, particularly for females aged 50-69 years. Between 1991 and 2001, the most commonly diagnosed cancer for Chinese migrant females and males was breast cancer and lung cancer

respectively (Supramaniam et al., 2006).

5.2 Chinese Migrant Women and Breast Cancer

International studies have reported that Chinese women have an increased risk of developing breast cancer following their resettlement in western countries; however, they are less likely to participate in breast cancer screening in the United States of America (USA), in the United Kingdom (UK), in Canada and Singapore (Kwok et al., 2006; Sadler et al., 2000; Wu et al., 2006). In Australia, breast cancer remains the leading cause of cancer death among Chinese women following migration (Kwok et al., 2006). While Chinese migrants have a lower incidence of breast cancer than Australian women, they have a higher incidence of breast cancer than Chinese women living in China (Supramaniam et al., 2006). Nevertheless, there are no national statistics regarding the screening participation rate of breast cancer among Chinese migrant women and very few research studies pay attention to the Chinese migrant group regarding their breast cancer health practice. For example, Dollis et al. (1993) indicated that Chinese immigrant females have a significantly lower participation rate of having breast examinations than Australian-born females.

A study conducted in 2008 in Sydney by Kwok and her colleagues (2012a) demonstrated that 22.1% of Chinese-Australian women aged 22-78 years had performed a BSE as recommended (monthly), and 35.4% of Chinese-Australian women aged 40 years and over had a CBE as recommended (annually); but, for the Chinese-Australian women aged 50-69 years, they found a higher mammogram

participation rate (75%) than the general Australian population (55%) within the same age group in 2012-2013 (AIHW, 2015). More recently, Kwok and Lim (2016) reported that 69.4% Chinese-Australian women, living in Sydney, aged 30-78 years had heard of a mammogram before attending a breast and cervical cancer education program.

5.3 Factors Associated with Breast Cancer Screening Practice among Chinese migrant women

5.3.1 Demographic Factors

Demographic factors are commonly measured in the studies on screening behaviours of breast cancer, such as ethnicity, age, educational level, marital status and employment status. Previous international studies have shown that age and level of education are associated with performing a BSE (Noroozi et al., 2011; Petro & Mikhail, 2002) and mammographic screening (Juon et al., 2002; Legg et al., 2003; Tu et al., 2005; Lin, 2008; Chan et al., 2002; Wu et al., 2008) among women. A study by Kim et al. (2014) indicates that level of education, employment status are positively correlated with mammographic screening rates among immigrant women in Korea. However, in Australia, Kwok (2012b) found that level of education and employment status were not significantly related to mammographic screening participation among Chinese-Australian women. For Chinese migrant women living in Australia, their demographic characteristics could be changed by policy and economic factors. For example, current Chinese migrants tend to be well-educated and form the middle class

because of those Australian immigration policies which target and attract professional and skilled personnels (Lu & Racine, 2015); With the rapid economic growth of China, there are increasing numbers of Chinese migrants from mainland China rather than from Hong Kong, Taiwan, and other East Asian countries (Lu & Racine, 2015).

5.3.2 Acculturation Factors

Acculturation refers to the process of cultural and psychological change in which individuals from one cultural background adopt the behaviors, languages, beliefs, values, social institutions and technologies of another cultural group (Sam & Berry, 2010; Kwok et al., 2012a). Previous studies found that more acculturated migrant women are more likely to receive cancer screening (Pourat et al., 2010; Lee et al., 2014). For breast cancer screening, many studies reported that acculturation is one of the key factors that influence breast cancer screening behaviours among migrant women and it is usually measured by language, birthplace and length of residence in host countries (Pourat et al., 2010; Kwok et al., 2012b). However, international studies have revealed inconsistent results with regards to the association between acculturation factors and screening behaviours of breast cancer among Chinese migrant women (Lee et al., 2014; Pourat et al., 2010). For example, several international studies have suggested that acculturation has a positive impact on breast cancer screening participation among Chinese migrant women (Chen, 2009b; Yu, Wu, & Mood, 2005; Ivanov and Leak, 2010; Ahmad and Stewart, 2004). In particular, fluency in spoken English and length of residence are positively related to

participation rates of breast cancer screening among Chinese migrant women (Tu et al., 2005; Todd et al., 2010; Wu et al., 2008). In contrast, studies by Tang et al. (2000) reveal that English fluency is not significant, however the length of residence is positively associated with participating in mammography for Chinese migrant women. In Australia, Kwok et al (2012b) found that English proficiency and length of stay are not of significant regard to having a mammogram for Chinese-Australian women.

5.3.3 Chinese Cultural Beliefs and Attitudes

Culture plays a crucial role in determining preventive health behaviours and in making health-related decisions (Bloomfield & Illinois, 1994; Kwok & Sullivan, 2007; Kwok et al., 2006). For Chinese migrant women, international studies have found that their participation in breast cancer screening may be inhibited by some commonly held Chinese traditional cultural beliefs (Lee-Lin, Menon, Nail, & Lutz, 2012; Liang et al., 2009). For example, the following cultural beliefs and attitudes might hinder their participation in breast cancer screening:

- Discussing breast cancer is considered inappropriate and could bring bad luck (Facione et al., 2000; Straughan & Seow, 2000; Kwok et al., 2006);
- Fatalistic beliefs (for example, little can done to prevent breast cancer) (Wang et al., 2008);
- Self-care beliefs, which refer to health-seeking behaviours, are unnecessary until symptoms are present (for example, participating breast cancer screening is not necessary when there are no symptoms) (Liang et al., 2009; Tang et al., 2000);

- Avoiding cancer-related thoughts is the best way to prevent the onset of breast cancer (Facione et al., 2000);
- Modesty and embarrassment around sexuality and the body (Tang et al., 2000; Sadler et al., 2000);
- Confucianism, Taoism and Buddhism philosophies lack a prevention orientation for health care services (for example, there is no reason to worry about getting sick when individuals are healthy)(Tang et al., 2000);
- Family members may play a significant role in accepting mammographic screening (Seow et al., 1997).

With regard to Chinese-Australian women, studies have shown that cultural beliefs significantly impact on their screening behaviours for breast cancer (Kwok et al., 2012a; Kwok & Sullivan, 2006). For example, a qualitative study conducted by Kwok and Sullivan (2006) stated that fatalism might be a significant barrier to Chinese-Australian women's participation in breast cancer screening. Kwok and Sullivan (2006) also found that some Chinese migrant women believe that breast cancer is inevitable and there is no way to prevent it. Kwok et al. (2012a) pointed out that Chinese-Australian women's attitudes towards health check-ups and perceived barriers to mammography may be associated with their screening behaviours.

5.4 Gap in Current Literature

The overseas-born population has reached its highest point in over a century and the Chinese immigrant group is the largest ethnic minority group in Australia (ABS,

2016); and yet, little attention has been given to this group and the research on their health behaviours and needs are limited. With the rapid growth of Chinese immigrants and their increasing risk of developing breast cancer in Australia, a significant gap exists in the research literature, including the lack of national information and research investigations regarding screening participation rate and participation behaviours of breast cancer among Chinese migrant population. As a result, little is known about the breast cancer screening participation and behaviours of Chinese Australian women.

Although many overseas studies have investigated the breast cancer screening practices of Chinese migrant women, findings from these studies may be not applicable to the Australian context for several reasons. Firstly, Chinese migrant women may have different participation rates, barriers and facilitators regarding breast cancer screening across countries due to differences in health insurance coverage, accessibility of public health services, recommended breast cancer screening guidelines, effort in promoting breast cancer screening, immigrant history and so on. For example, Kwok et al. (2011c) revealed the lack of health insurance and access to usual sources of care could impede Chinese-American women participating in cancer screening in the USA. In contrast, Medicare, which is a universal public health insurance scheme and provides free or subsidised treatment by health professionals in Australia since 1984 (Department of Human Services, 2013), might be a facilitator to Chinese-Australian women participating in breast screening. Secondly, the findings from international studies on the health behaviours and factors

associated with breast cancer screening practice among Chinese migrant women were inconsistent. This suggests that there is a lack of understanding about the experiences and associating factors in breast cancer screening for Chinese Australian women.

8. Conclusion

According to this review of the literature, three keys points have emerged. First, breast cancer is the leading cause of cancer death among women (Kwok et al., 2006). It is well documented that early detection of breast cancer plays a pivotal role in reducing mortality and costs related to breast cancer. Second, although Chinese women have increased incidence of breast cancer and risk of developing breast cancer following immigration, their low participation rates in breast examinations have only been highlighted by a few studies (FECCA, 2010; Kwok and Sullivan, 2007a; Dollis et al., 1993). Third, in Australia, little is known about the participation rates and behaviours of breast cancer screening among Chinese migrant women. Previous international studies also have shown mixed results about the breast cancer screening practice associated with engagement in screening, including factors such as demographics, acculturation, health beliefs and cultural attitudes. Therefore, there is an urgent need to investigate breast cancer screening practices and behaviours among Chinese-Australia women and to utilise those findings to design culturally sensitive screening programs for promoting early detection of breast cancer.

The proposed study aims to investigate the breast cancer screening practices among Chinese migrant women in Australia. As Sydney (39%) is the most populous

city for migrants and has the largest China-born population (147,000 people) across Australia in 2011, this study focuses on the Chinese migrant women living in Sydney and explores how they participate in breast cancer screening. The aims of this study are to:

- 1) Investigate the participation rates of the main breast cancer screening tests/practice (BSE, CBE and mammography) among Chinese-Australian women living in Sydney;
- 2) Identify any factors associated with their breast cancer awareness and their behaviours of breast cancer screening.

References

- Abolfotouh, M. A., BaniMustafa, A. A., Mahfouz, A. A., Al-Assiri, M. H., Al-Juhani, A. F., & Alaskar, A. S. (2015). Using the health belief model to predict breast self examination among Saudi women. *BMC Public Health*, 15(1), 1163.
- Ahern, T., Gardner, A., & Courtney, M. (2015). Geographical comparisons of information and support needs of Australian women following the primary treatment of breast cancer: a 10-year replication study. *Health Expectations*, 18(6), 2678-2692.
- Ahmad, F., & Stewart, D. (2004). Predictors of clinical breast examination among south Asian immigrant women. *Journal of Immigrant Health*, 6 (3), 119-126.
- Andreeva, V. A., Unger, J. B., & Pentz, M. A. (2007). Breast cancer among immigrants: a systematic review and new research directions. *Journal of Immigrant and Minority Health*, 9(4), 307-322.
- Australian Bureau of Statistics. (2016). Migration, Australia 2014-15 (Cat. no. 3412.0) Canberra, Australia: ABS.
- Australian Bureau of Statistics. (2010). *Population-country of birth*. Retrieved from <http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/92C0101965E7DC14CA25773700169C63?opendocument>
- Australian Institute of Health and Welfare & National Breast Cancer Centre. (2006). Breast cancer in Australia: an overview 2006 (cat. no. CAN 29). Canberra, Australia: AIHW.
- Australian Institute of Health and Welfare. (2009). Breast cancer in Australian: an

- overview 2009 (Cat. no. CAN 46). Canberra, Australia: AIHW.
- Australian Institute of Health and Welfare & Cancer Australia. (2012). Breast cancer in Australian: an overview (Cat. no. CAN 67). Canberra, Australia: AIHW.
- Australian Institute of Health and Welfare. (2014). Cancer in Australia: an overview 2014 (Cat. no. CAN 88). Canberra, Australia: AIHW.
- Australian Institute of Health and Welfare. (2015). *BreastScreen Australia monitoring report 2012–2013*(Cat. no. CAN 93). Canberra, Australia: AIHW.
- Australian Institute of Health and Welfare. (2016). Australia's health 2016 (Cat. no. AUS 199). Canberra, Australia: AIHW.
- Becker, M. H. (1974). *The health belief model and personal health behavior*. Thorofare, NJ: Slack.
- Bloomfield, R. D., & Illinois, C. (1994). Cultural sensitivity and health care. *Journal of the National Medical Association*, 86, 819-820.
- Cancer Council Australia. (2016). *Understanding breast cancer*. Sydney, Australia: Cancer Council NSW.
- Cancer Australia. (2015). *Position statement on early detection of breast cancer*. Retrieved from <https://canceraustralia.gov.au/publications-and-resources/position-statements/early-detection-breast-cancer>
- Cancer Australia. (2012a). *Report to the nation - breast cancer 2012*. Surry Hills, NSW: Cancer Australia.
- Cancer Australia. (2012b). *Guide for women with early breast cancer*. Surry Hills,

NSW: Cancer Australia.

Chan, C., Ho, S. C., Chan, S. G., Yip, Y. B., Wong, F. C., & Cheng, F. (2002). Factors affecting uptake of cervical and breast cancer screening among perimenopausal women in Hong Kong. *Hong Kong Medical Journal*, 8(5), 334–341.

Department of Human Services. (2013). Medicare for providers. Canberra, Australia: Department of Human Services.

Dollis, N., Gifford, S., Henenberg, C., & Pirkis, J. (1993). *Removing cultural and language barriers to health*. Melbourne, Australia: National Health Strategy.

Elmore, J. G., Armstrong, K., Lehman, C. D., & Fletcher, S. W. (2005). Screening for breast cancer. *Journal of the American Medical Association*, 293(10), 1245-1256.

Facione, N. C., Giancarlo, C., & Chan, L. (2000). Perceived risk and help-seeking behavior for breast cancer: a Chinese-American perspective. *Cancer Nursing*, 23(4), 258-267.

Federation of Ethnic Councils of Australia (FECCA). (2010). *Cancer and linguistically diverse communities*. Deakin, Australia: FECCA.

Glanz, K., Rimer, B.K. & Lewis, F.M. (2002). *Health Behavior and Health Education: theory, research and practice*. San Francisco: Wiley & Sons.

Grulich, A. E., McCredie, M., & Coates, M. (1995). Cancer incidence in Asian migrants to New South Wales, Australia. *British Journal of Cancer*, 71(2), 400.

Humphrey, L. L., Helfand, M., Chan, B. K., & Woolf, S. H. (2002). Breast cancer screening: a summary of the evidence for the US Preventive Services Task Force. *Annals of Internal Medicine*, 137(5), 347-360.

- Janz, N. K., & Becker, M. H. (1984). The health belief model: A decade later. *Health Education & Behavior*, 11(1), 1-47.
- Jirojwong, S., & MacLennan, R. (2003). Health beliefs, perceived self-efficacy, and breast self-examination among Thai migrants in Brisbane. *Journal of Advanced Nursing*, 41(3), 241-249.
- Johnson, C. E., Mues, K. E., Mayne, S. L., & Kiblawi, A. N. (2008). Cervical cancer screening among immigrants and ethnic minorities: a systematic review using the health belief model. *Journal of Lower Genital Tract Disease*, 12(3), 232-241.
- Juon, H., Seo, Y. J., & Kim, M. T. (2002). Breast and cervical cancer screening among Korean American elderly women. *European Journal of Oncology Nursing*, 6(4), 228-235. doi:10.1054/ejon.2002.0213
- Khan, M., Ives, C., & Green, M. (2013). Breast cancer: diagnosis and overview of treatment. *Innovait*, 6(4), 214-221.
- Khalili, A. F., & Shahnazi, M. (2010). Breast cancer screening (breast self-examination, clinical breast exam, and mammography) in women referred to health centers in Tabriz, Iran. *Indian Journal of Medical Sciences*, 64(4), 149.
- Kim, J., Lee, S. K., Lee, J., Choi, M., Jung, S. P., Kim, M. K., & Kil, W. H. (2014). Breast cancer screening knowledge and perceived health beliefs among immigrant women in Korea. *Journal of Breast Cancer*, 17(3), 279-286.
- Kwok, C., Sullivan, G., & Cant, R. (2006). The role of culture in breast health practices among Chinese–Australian women. *Patient Education and Counseling*, 64(1), 268-276.

- Kwok, C., & Sullivan, G. (2006). Influence of traditional Chinese beliefs on cancer screening behaviour among Chinese-Australian women. *Journal of Advanced Nursing*, 54(6), 691-699.
- Kwok, C., & Sullivan, G. (2007). The concepts of health and preventive health practices of Chinese Australian women in relation to cancer screening. *Journal of Transcultural Nursing*, 18(2), 118-126.
- Kwok, C., Koo, F. K., D'Abrew, N., White, K., & Roydhouse, J. K. (2011a). East meets west: a brief report of a culturally sensitive breast health education program for Chinese-Australian women. *Journal of Cancer Education*, 26(3), 540-546.
- Kwok, C., & White, K. (2011b). Cultural and linguistic isolation: the breast cancer experience of Chinese-Australian women - a qualitative study. *Contemporary Nurse*, 39(1), 85-94.
- Kwok, C., White, K., & Roydhouse, J. K. (2011c). Chinese-Australian women's knowledge, facilitators and barriers related to cervical cancer screening: a qualitative study. *Journal of Immigrant and Minority Health*, 13(6), 1076-1083.
- Kwok, C., Fethney, J., & White, K. (2012a). Breast cancer screening practices among Chinese-Australian women. *European Journal of Oncology Nursing*, 16(3), 247.
- Kwok, C., Fethney, J., & White, K. (2012b). Mammographic screening practices among Chinese-Australian women. *Journal of Nursing Scholarship*, 44(1), 11-18.
- Kwok, C., Tranberg, R., & Lee, F. C. (2015). Breast cancer knowledge, attitudes and

- screening behaviors among Indian-Australian women. *European Journal of Oncology Nursing*, 19(6), 701-706.
- Kwok, C., & Lim, D. (2016). Evaluation of a culturally tailored education to promote breast and cervical cancer screening among Chinese-Australian women. *Journal of Cancer Education*, 31(3), 595-601.
- Legg, J. S., Fauber, T. L., & Ozcan, Y. A. (2003). The influence of previous breast cancer upon mammography utilization. *Women's health issues*, 13(2), 62-67.
- Lee-Lin, F., Menon, U., Nail, L., & Lutz, K. F. (2012). Findings from focus groups indicating what Chinese American immigrant women think about breast cancer and breast cancer screening. *Journal of Obstetric, Gynecologic, & Neonatal Nursing*, 41(5), 627-637.
- Lee, S., Chen, L., Jung, M. Y., Baezconde-Garbanati, L., & Juon, H. (2014). Acculturation and cancer screening among Asian Americans: role of health insurance and having a regular physician. *Journal of Community Health*, 39(2), 201-212.
- Lin, S. (2008). Factors influencing the uptake of screening services for breast and cervical cancer in Taiwan. *Journal of The Royal Society for The Promotion of Health*, 128(6), 327-334.
- Liang, W., Wang, J., Chen, M., Feng, S., Yi, B., & Mandelblatt, J. (2009). Cultural views, language ability, and mammography use in Chinese American women. *Health Education & Behavior*, 36(6), 1012-1025.
- Lu, Y., & Racine, L. (2015). Reviewing Chinese immigrant women's health

- experiences in English-speaking western countries: a postcolonial feminist analysis. *Health Sociology Review*, 24(1), 15-28.
- McCredie, M., Coates, M. S., & Ford, J. M. (1990). Cancer incidence in European migrants to New South Wales. *Annals of Oncology*, 1(3), 219-225.
- National Health and Medical Research Council. (2007). *National statement on ethical conduct in human research 2007 (Updated March 2014)*. Canberra, Australia: NHMRC.
- Nickson, C., Mason, K. E., & Kavanagh, A. M. (2014). Breast cancer screening of women aged 70–74 years: results from a natural experiment across Australia. *Breast Cancer Research and Treatment*, 143(2), 367-372.
- Noroozi, A., Jomand, T., & Tahmasebi, R. (2011). Determinants of breast self-examination performance among Iranian women: an application of the health belief model. *Journal of Cancer Education*, 26(2), 365-374.
- Petro-Nustus, W., & Mikhail, B. I. (2002). Factors associated with breast self-examination among Jordanian women. *Public Health Nursing*, 19(4), 263-271.
- Peters, K., & Cotton, A. (2015). Barriers to breast cancer screening in Australia: experiences of women with physical disabilities. *Journal of Clinical Nursing*, 24(3-4), 563-572.
- Pourat, N., Kagawa-Singer, M., Breen, N., & Sripipatana, A. (2010). Access versus acculturation: identifying modifiable factors to promote cancer screening among Asian American women. *Medical Care*, 48(12), 1088-1096.
- Sam, D. L., & Berry, J. W. (2010). Acculturation: when individuals and groups of

- different cultural backgrounds meet. *Perspectives on Psychological Science*, 5(4), 472-481.
- Sadler, G. R., Wang, K., Wang, M., & Ko, C. M. (2000). Chinese women: behaviors and attitudes toward breast cancer education and screening. *Women's Health Issues*, 10(1), 20-26.
- Seow, A., Straughan, P. T., Ng, E., Emmanuel, S. C., Tan, C., & Lee, H. (1997). Factors determining acceptability of mammography in an Asian population: a study among women in Singapore. *Cancer Causes & Control*, 8(5), 771-779.
- Sharma, G. N., Dave, R., Sanadya, J., Sharma, P., & Sharma, K. K. (2010). Various types and management of breast cancer: an overview. *Journal of Advanced Pharmaceutical Technology and Research*, 1(2), 109-126.
- Straughan, P. T., & Seow, A. (2000). Attitudes as barriers in breast screening: a prospective study among Singapore women. *Social Science & Medicine*, 51(11), 1695-1703.
- Supramaniam, R., N.S.W. Cancer Council, & New South Wales Central Cancer Registry. (2006). *Cancer incidence in New South Wales migrants, 1991 to 2001*. Sydney, Australia: NSW Cancer Council.
- Tang, T. S., Solomon, L. J., & McCracken, L. M. (2000). Cultural barriers to mammography, clinical breast exam, and breast self-exam among Chinese-American women 60 and older. *Preventive medicine*, 31(5), 575-583.
- Tu, S., Jackson, S., Yasui, Y., Deschamps, M., Hislop, T., & Taylor, V. (2005). Cancer preventing screening: A cross-border comparison of United States and Canadian

- Chinese women. *Preventive Medicine*, 41(1), 36–46.
- Todd, L., Harvey, E., & Hoffman-Goetz, L. (2010). Predicting breast and colon cancer screening among English-as-a-second-language older Chinese immigrant women to Canadian. *Journal of Cancer Education*, 26(1), 161–169.
- Van D. T., & Finlayson, M. (2007). Ethical decision making in clinical research: application of CELIBATE. *American Journal of Occupational Therapy*, 61(1), 92-95.
- Warrier, S., Tapia, G., Goltsman, D., & Beith, J. (2016). An update in breast cancer screening and management. *Women's Health*, 12(2), 229-239.
- Weber, M., Chiew, M., Feletto, E., Kahn, C., Sitas, F., & Webster, L. (2014). Cancer screening among immigrants living in urban and regional Australia: results from the 45 and up study. *International Journal of Environmental Research and Public Health*, 11(8), 8251-8266.
- Weber, M. F., Banks, E., Smith, D. P., O'Connell, D., & Sitas, F. (2009). Cancer screening among migrants in an Australian cohort; cross-sectional analyses from the 45 and up study. *BMC Public Health*, 9(1), 144-144.
- Western Australian Clinical Oncology Group. (1998). *Recommendations for screening for specific cancers: Guidelines for general practitioners*. Subiaco, W.A.: The Group.
- World Health Organization. (2016). *Breast cancer: prevention and control*. Retrieved from <http://www.who.int/cancer/detection/breastcancer/en/>
- Wu, T. Y., West, B., Chen, Y. W., & Hergert, C. (2006). Health beliefs and practices

related to breast cancer screening in Filipino, Chinese and Asian-Indian women.

Cancer Detection and Prevention, 30(1), 58-66.

Wu, T., Hsieh, H., & West, B. T. (2008). Demographics and perceptions of barriers toward breast cancer screening among Asian-American women. *Women & Health*, 48(3), 261-281.

SECTION 2: JOURNAL MANUSCRIPT

Breast Cancer Screening Practices and Associated Factors among Chinese-Australian Women Living in Sydney

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**Breast Cancer Screening Practices and Associated Factors among
Chinese-Australian Women Living in Sydney**

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Abstract

In Australia, early detection plays a leading role in reducing mortality from breast cancer. Little is known about how Chinese-Australian women engage in breast cancer screenings. This study aimed to investigate breast cancer screening practices and the associated factors amongst Chinese-Australian women. A cross-sectional quantitative method including convenient and snowball sampling was used to recruit 115 Chinese-Australian women living in Sydney (aged 35 years and older). The data was collected by self-administered questionnaires between July and September 2016. The results showed that the majority of participants performed breast self-examinations (78.1%), clinical breast examinations (69.8%) and mammograms (73.3%). Educational level was positively associated with having a breast self-examination. Age, religion, employment status and length of residence were significantly associated with performing a clinical breast examination. Income was related to having a mammogram. Significant associations between knowledge of breast cancer, cancer-related beliefs, and screening participation were also found. The length of residence was the strongest predictor of having a clinical breast examination and mammogram. The most common barrier to mammography screening was that doctors did not recommend it to participants. These findings can be used to develop tailored programs to promote the early detection of breast cancer among Chinese–Australian women.

Keywords: Chinese women, breast cancer, screening, early detection, prevention, breast self-examination, clinical breast examination, mammogram, barriers

INTRODUCTION

Breast cancer is the most common invasive cancer and the second leading cause of death from cancer among women in Australia (Australian Institute of Health and Welfare [AIHW] 2014). Due to the high incidence and mortality of breast cancer, early detection through breast cancer screening plays a vital role in early diagnosis and survival of breast cancer (Peters and Cotton 2015). The most common screening tests for breast cancer are breast self-examination (BSE), clinical breast examination (CBE) by a health professional and mammography (Khalili and Shahnazi 2010; Noroozi, Jomand, and Tahmasebi 2011).

In Australia, a national breast-screening program has been established to provide free mammographic screening biannually for asymptomatic women aged 40 and over, and the actively targeted age group was extended from women aged 50-69 years to women aged 50-74 years from 2013 (AIHW 2014; Ahern, Gardner, and Courtney 2015). Cancer Australia's (2015) position statement on the early detection of breast cancer in asymptomatic women recommended that: women aged 50-74 years attend the national mammographic screening biennially; women who are not attending routine mammograms may benefit from regular clinical breast examination; women of all ages are encouraged to be aware of the normal look and feel of their breasts and to report any unusual breast changes through a 'breast awareness' approach (there is no evidence to promote the use of BSE). However, the AIHW (2016) reported that women from a culturally or linguistically diverse background, who were between the ages of 50 and 69, had a lower participation rate (49%) in the national screening

program than other Australian women (55%) in 2011-2012. Currently, there is very limited literature exploring the breast cancer screening practices among women from different cultural and linguistic backgrounds in Australia. This study aims to focus on Chinese-Australian women and explore how they participate in breast cancer screening. For this study, the term Chinese-Australian women refers to any Chinese woman who migrated to Australia from Mainland China or Hong Kong.

The Chinese-Australian population is one of the fastest-growing ethnic groups in Australia. The Australian Bureau of Statistics (ABS) (2010) indicated that migrants born in China increased twelvefold from 1981 to 2008, which has made them the third largest group of overseas-born Australians and the largest non-English-speaking ethnic group in Australia (ABS 2016). Although the incidence of breast cancer among China-born women is lower than Australia-born women, breast cancer remains the primary cause of death among Chinese women following migration to Australia (Kwok, Sullivan, and Cant 2006). Additionally, Chinese-Australian women have a higher incidence of breast cancer than Chinese women living in China (Supramaniam et al. 2006). Despite this, very few research studies have explored the breast cancer screening practices of Chinese-Australian women.

Most of the available data about breast cancer screening practices among Chinese migrant women is based on overseas studies. These studies found that Chinese women have an increased risk of developing breast cancer following their resettlement in western countries; however, they were less likely to participate in breast cancer screening in the United States of America, the United Kingdom, Canada

and Singapore (Kwok, Sullivan, and Cant 2006; Sadler et al. 2000; Wu, Hsieh, and West 2008). International studies have also shown that the low uptake of breast cancer screening among Chinese migrant women could be associated with demographic factors (ethnicity, age, educational level, marital status and employment status), acculturation factors (language, birthplace and length of residence) and Chinese cultural beliefs and attitudes. For example, Tu et al. (2005) pointed out that age, employment status and marital status were associated with screening mammography among Chinese women living in Vancouver. Some international studies also have suggested that, for Chinese migrant women, fluency in spoken English and length of residence had positive impact on the breast cancer screening (Tu et al. 2005; Todd, Harvey, and Hoffman-Goetz 2011; Wu, Hsieh, and West 2008). However, studies by Tang, Solomon and McCracken (2000) found that English fluency was not associated with mammographic screening. Moreover, studies by Lee-Lin et al. (2012) and Liang et al. (2009) found that participation in breast cancer screening may be inhibited by Chinese traditional cultural beliefs. Nevertheless, these findings may not be applicable within the Australian context due to the differences in the health care system, efforts in promoting breast cancer screening and the immigration history of Australia. Little is known about the factors associated with breast cancer screening practices among Chinese migrant women in Australia specifically.

In Australia, there is no national data regarding the screening participation rate of breast cancer among Chinese-Australia women. To date, only two quantitative studies both conducted by Kwok and her colleagues have reported participation rates of

breast cancer screening among Chinese-Australia women. Kwok, Fethney and White (2012b) found that, for Chinese-Australia women living in Sydney, 22.1% of them aged 22-78 years performed a BSE (monthly), 35.4% of them aged 40 years and over had a CBE (annually) and 75% of them aged 50-69 years had mammogram (biannually). A similar finding of the mammographic participation rate (74.4%) was reported by Kwok, Fethney and White (2012b). Furthermore, Kwok and her colleagues (2012a; 2012b) suggested English proficiency, length of stay, level of education and employment status were not associated with the screening behaviours of breast cancer among Chinese-Australia women. However, screening participation was related to positive attitudes toward health checkups and the perception of fewer barriers to screening. Given the importance of early detection of breast cancer, there is an urgent need to investigate the breast cancer screening practices of Chinese-Australian women and to fully understand the factors associated with uptake of screening as well as the barriers regarding their screening participation.

Therefore, the purpose of this study is to: 1) investigate the participation rates of Chinese-Australian women living in Sydney in relation to the main breast cancer screening tests (BSE, CBE and mammography); 2) identify any factors associated with their breast cancer screening behaviours. The findings of the study could provide a deeper understanding of the breast cancer screening practices of Chinese-Australian women, and potentially help develop culturally sensitive screening programs for promoting early detection of breast cancer.

METHODS

This cross-sectional quantitative study used self-administered questionnaires for data collection. The study was approved by the University of Sydney Human Research Ethics Committee before the commencement of the study.

Participants

The target population for the study were Chinese-Australian women living in Sydney. Chinese-Australian women were defined as any women of Chinese ancestry who had migrated to Australia from Mainland China or Hong Kong. The eligibility criteria included Chinese-Australian women who were 1) aged 35 years and over; 2) living in Sydney for more than one year following arrival; 3) able to read simplified Chinese; 4) able to communicate either in Mandarin or English; and 5) no history of breast cancer.

Data Collection

Both convenience and snowball sampling were used to recruit eligible participants. Between July and September 2016, 115 Chinese-Australian women were recruited through churches, Buddhist organizations, social and community centres, seniors' clubs and personal networks of the first author in Sydney. The first author is fluent in both Mandarin and English, and invited Chinese-Australian women to participate in the study by attending meetings and events held by the above organizations. The choice of these organizations allowed participant recruitment to involve Chinese women from diverse backgrounds in order to increase study heterogeneity (Tu et al. 2005).

During the initial contact, potential participants were given a Participant

Information Statement (PIS), a consent form and a copy of the study questionnaire. The first author also provided an oral explanation before participants completed the survey. This allowed women interested in participating to understand the aims, methods, risks and benefits of the research, and that participation was voluntary and anonymous. Participants were able to choose the PIS, consent form and questionnaire in English or Simplified Chinese. All eligible women who agreed to participate in the study were asked to review and sign the consent form before filling in the questionnaire. Participants were able to choose to return the signed consent form and the study survey immediately or to send them to the chief investigator's office using stamped addressed envelopes.

Questionnaire

The original questionnaire was first developed in English and used in a previous breast screening study for South East Asian migrant women by Robinson, Hossain and Clarke (2015). Ethics approval of the previous study was obtained from the University of Sydney Human Research Ethics Committee (project No. 2015/295). For the current study, the instrument was modified for Chinese migrant women. For instance, "Taoist" and "no religion" were included in the options of the religion question; and the options of "Mandarin" and "Cantonese" were used for the question of language spoken at home; the question of "Were you born in Australia?" was changed to the question of "Where were you born?" with "Mainland China", "Hong Kong" and "Taiwan" as options. Then, the modified questionnaire was translated into simplified Chinese by a professional translator from the English language into the

Chinese language. The final version was proofread by the first author who is bilingual in Chinese and English.

The questionnaire had a total of 69 questions and mainly involved close-ended questions. Questions covered six sections: socio-demographic background (14 questions), knowledge regarding breast cancer (6 questions), knowledge on and practices of breast self-examination, clinical breast examination and mammography (22 questions), history of breast cancer (7 questions), personal health (10 questions) and concerns about breast cancer (10 questions). The Health Belief Model (HBM) was used to guide the questionnaire design (see Table 1). The self-administered survey took approximately 25 minutes to complete.

Measures

Participants' knowledge of breast cancer was assessed based on three components including symptoms of breast cancer (8 items), treatment options for breast cancer (5 items) and detection of breast cancer (5 items). The response to all of the items was "yes" or "no". Scales were constructed by adding up the responses to items included in the components of breast cancer knowledge. The scale of breast cancer symptom ranged from 0 (indicating no knowledge) to 7 (indicating that they knew all the symptoms of breast cancer). Similarly, the scale of breast cancer treatment/detection ranged from 0 (indicating no knowledge) to 5 (indicating they knew all the treatment/detection options). Reliability statistics were calculated for each scale. The Cronbach's alpha coefficient was 0.78 for the breast cancer symptom scale (Mean=3.66, SD=2.47, N=113), 0.78 for the breast cancer treatment scale

(Mean=2.46, SD=1.65, N=113), and 0.72 for the breast cancer detection scale (Mean=2.90, SD=1.63, N=96).

Some questionnaire variables were recoded for data analysis. For example, the income items were recoded into two groups (“\$20,000 to \$50,000” and “>\$50,000”); educational level items were recoded to “Secondary school or less” and “Tertiary”; length of stay in Australia was re-coded to “<10 years”, “10 to 20 years” and “>20 years”.

Data Analysis

Survey data from completed questionnaires were coded and entered into Statistical Package for Social Sciences (SPSS) version 22.0. Descriptive statistics were used to summarise the demographic characteristics and breast cancer screening practices of the participants. Normality was assessed by visual inspection of histograms. All significance levels were set at $p = 0.05$. Both parametric and non-parametric tests were undertaken to explore the factors related to breast cancer screening practices among the population. Bivariate analysis was conducted to examine the relationship between independent variables (including demographic and acculturation variables, breast cancer knowledge and cancer-related beliefs) and dependent variables (screening practices such as breast self-examination, clinical breast examination and mammogram).

Chi-square tests were conducted to examine the relationship between categorical variables (demographic and acculturation variables) and screening practices. Independent sample t tests also were used to explore the relationship between the

knowledge scales of breast cancer and breast cancer screening practices. The Mann-Whitney U test and independent sample t tests were used to analyse the association between cancer-related beliefs and breast screening participation. Multivariate analysis (the binary logistic regression) was undertaken to predict the dependent variables. Lastly, descriptive statistics were used to summarise the barriers of participating in BSE, CBE and mammograms.

RESULTS

A total of 115 eligible Chinese-Australian women completed and returned a questionnaire.

Socio-demographic characteristics of the participants

The socio-demographic characteristics of the participants are shown in Table 2. The age of the participants ranged from 35 to 85 years (mean=56.5 years, 95% CI: 53.24–59.77), with 62.6% of women aged 50 years and over. The majority of women was married (79.8%), and had children (92%). Most women were born in Mainland China (88.7%) and spoken Mandarin at home (77.2%). More than half the women completed tertiary education (67.0%) and were currently working (53.5%), but 54.8% were not satisfied with their English ability. Most participants (61.2%) had lived in Australian for more than 10 years, with a mean length of residence of 14 years. Nearly half of participants indicated they had no religion.

Breast cancer screening practices

The majority of participants (93.9%) had heard of breast self-examination (BSE) and 78.3% had heard of mammograms (see Table 3). Although 78.1% of women had performed a BSE, less than one-fifth of participants performed BSE monthly (18.8%) and only 11.9% did so 2-4 days post-menstruation. While 42.9% of women reported that they received the explanation of how to perform a BSE from general practitioners (GPs), 35.2% reported that they had never received an explanation from any health professionals. Although 69.8% of participants had had a clinical breast examination (CBE), 58.3% of participants reported that their CBE was done more than one year ago, and 83.1% of participants had their CBE conducted by a GP. In addition, 73.3% of the women had received a mammogram and 64.2% had their mammogram within the last two years. Within the group of participants aged 50 to 69 years, 84.8% had had mammograms as recommended (see Table 4).

Factors associated with breast cancer screening practices

Demographic and acculturation factors

Table 4 shows results from the Chi-square tests that examined the relationship between categorical variables and breast cancer screening practices. The number of children, language spoken at home, suburb lived in, and country of birth were not significantly related to performing a BSE, CBE or mammogram. For the BSE, age, religion, employment status and level of annual income were not significantly associated with performing a BSE; but, participants with a higher educational level were more likely to perform a BSE ($P < 0.05$). Neither educational level nor level of annual income were significantly associated with having a CBE. However, women

were less likely to have a CBE when they were 70 years or older, if they were Buddhist and were retired (see Table 4). Furthermore, age group, religion, educational level and employment status were not significantly related to receiving a mammogram. However, there was a significant association ($p < 0.05$) between the level of annual income and having a mammogram. This suggests that women with a lower income level were more likely to participate in mammographic screening (see Table 4).

In terms of acculturation variables, neither English proficiency nor length of residence was significantly related to performing a BSE and having a mammogram. While English proficiency was not significantly associated with having a CBE, a significant association ($P < 0.05$) was found between length of residence and having a CBE (see Table 4).

Knowledge of breast cancer

Knowledge of breast cancer, including symptoms, treatment options and detection of breast cancer, were examined by descriptive statistics. The most common symptom of breast cancer known by participants was lump (77.0%), followed by nipple discharge (55.8%), swollen underarms (54.0%), changed size or shape of breasts (52.2%), and redness or dimpling of breast (46.0%). For the treatment options of breast cancer, 77.9% of participants identified surgery, and more than half of them identified chemotherapy (53.1%) and radiation therapy (52.2%). Mammography (66.7%) was the first option identified for detecting breast cancer, CBE was identified second and needle biopsy was identified third.

The independent sample t tests were used to assess the relationship between breast cancer knowledge (symptoms, treatment and detection of breast cancer) and breast cancer screening practices (BSE, CBE and mammogram) (see Table 5). There were no significant associations between breast cancer knowledge and having a CBE, knowledge of treatment and knowledge of detection and having a BSE or mammogram (see Table 5). Participants who had more knowledge about symptoms of breast cancer were more likely to perform a BSE and were less likely to have a mammogram (see Table 5).

Cancer-related Beliefs

The descriptive results show that most of the women (94.5%) believed that “cancers are caused by an unhealthy lifestyle”. This belief was examined further by Mann-Whitney U tests (see Table 6). Results indicated that the belief was not significantly associated with performing a BSE ($p=0.393$, $U=244$, $W=265$), CBE ($p=0.264$, $U=223$, $W=244$) or mammogram ($p=0.406$, $U=169$, $W=184$); but the mean rank showed the population who believed “cancers are caused by an unhealthy lifestyle” were more likely to participate in BSE, CBE and mammogram (see Table 6).

More than half of participants (61.8%) indicated that “cancer is hereditary” and 36.2% of participants indicated that “people got breast cancer as they did not breastfeed their babies”. These two beliefs were further analysed by independent sample t tests. The results, shown in Table 6, indicate that the women who perceived “cancer is hereditary” were more likely to have a CBE ($p=0.029$, $X=4.778^a$, $df=1$),

and the women who perceived “people got breast cancer as they did not breastfeed their babies” were less likely to have a mammogram ($p=0.026$, $X= 4.932^a$, $df=1$).

Multivariate analysis of factors associated with breast cancer screening practices

Binary logistic regression was used to assess the impact of the predictors on the likelihood of participating in breast cancer screening tests. Based on the above bivariate analyses, those associated factors (age, years of residence in Australia, religion, employment status, educational level, annual income, symptoms of breast cancer, “Cancer is hereditary” belief and “People got breast cancer as they didn’t breast feed their babies” belief) were entered into a binary logistic regression as independent variables. Results are presented in Table 7. Knowledge of breast cancer symptoms was the only predictor for performing a BSE (Wald=6.70, $p=0.010$, OR=1.76), which indicates that participants with more knowledge about breast cancer symptoms were more likely to perform a BSE. The length of residence was the strongest predictor for having a CBE (Wald=6.14, $p=0.013$, OR=1.47), followed by Christian religion (Wald=4.65, $p=0.031$, OR=16.4). This suggested that participants, who stayed in Australia longer and were Christians, were more likely to have a CBE. For having a mammogram, the length of residence also was the strongest predictor (Wald=5.77, $p=0.016$, OR=1.29), followed by age (Wald=4.28, $p=0.039$, OR=0.84) and annual income (Wald=4.24, $p=0.039$, OR=0.03). This indicated that participants, who stayed in Australia longer, were younger and had lower annual income, were more likely to have a mammogram.

Experiences and perceived barriers of practicing breast cancer screening

Figure 1 summarises the experiences of participants undertaking breast cancer screening. Most participants agreed there were no problems in performing a BSE (78.8%), having a CBE (60.3%) and having a mammogram (69.0%). However, 11.8% of the women indicated that doing a BSE was uncomfortable. About one fifth of participants reported that having a CBE was embarrassing (24.2%) and painful (19.7%). More than half of participants stated that having a mammogram is painful (58.3%) and uncomfortable (56.6%), and they reported experiences of irritation (32.1%) and being embarrassed (29.1%).

Figure 2 outlines the perceived barriers of performing a BSE. The common barriers included that doing a BSE was unnecessary (44.4%), time consuming (26.4%) and painful (11.2%); participants were too old (32.0%) or too young (15.9%) to practice a BSE; and negative things may be discovered by BSE (10.0%).

Figure 3 outlines the perceived barriers of having a mammogram. Barriers identified were that doctors did not suggest mammogram to the participants (44.7%); unnecessary radiation exposure (43.8%), having a mammogram was time consuming (38.5%), painful (23.9%) and expensive (18.0%); and participants were too old (30.2%) or too young (18.0%) to have a mammogram.

DISCUSSION

This study aimed to investigate how Chinese-Australian women practice breast cancer screening in Sydney. Findings provided an insight into their breast cancer

screening practices and behaviours by examining the associated factors and barriers regarding performing a BSE, CBE and mammogram.

Breast cancer screening behaviours and issues

Results indicated that most Chinese-Australian women had engaged in a BSE, CBE and mammogram. Muruges (2013) suggested that BSE is best done at the same time every month and the best time of performing a BSE is after the end of the last period for premenopausal women. In Australia, Guthrie et al. (2005) found that the average age of menopause among women was 52.9 years. However, few participants aged under 50 years did a BSE at the right time after menstruation and had not had BSE explained to them. Even if participants had heard of BSE, few performed a BSE monthly. This is consistent with the findings from a previous study conducted in Sydney by Kwok and her colleagues (2012a). They also identified a gap between the number of Chinese-Australian women who had heard about BSE and the number that actually performed BSE monthly as recommended. Thus, it is possible that these women performed a BSE in an incorrect way and at the wrong time, and did not perform it regularly. This may be because some health professionals did not provide information about how and when to perform a BSE to participants. Although the American Cancer Society (2015) and Cancer Australia (2015) have stated that there is limited evidence to support recommending BSE, performing a BSE regularly can help women to increase their breast awareness by being familiar with the normal look and feel of their breasts, so they may be able to recognize and report any unusual breast changes earlier. Our findings suggested an urgent need to teach Chinese-Australian

women how to perform a BSE both correctly and regularly through conducting breast health education programs or by health practitioners. The practices of performing BSE and other self-examination techniques are worth further exploration among Chinese-Australian women, in particular, the women who are not eligible for mammography screening and have difficulty in accessing health services.

The participation rate of having a CBE was consistent with the study done by Kwok, Fethney, and White (2012a). The current study did not investigate the rate of having a CBE annually compared to Kwok and her colleagues' study, but our study highlighted that a large proportion of participants had a CBE over a year ago. Cancer Australia (2015) suggests that women who are not attending routine mammograms may gain benefits from a regular CBE. Therefore, more efforts need to be made to screen women who are not actively targeted by the national mammographic screening program, and their behaviour of having a CBE should be investigated further in future. Our findings also suggest that GPs play an important role in promoting CBE practice. Therefore, the recommendation of a regular CBE provided by GPs could be beneficial for women aged below 50 years who do not receive an invitation for a biannual mammographic screening.

For women aged between 50 and 69 years, the mammogram screening participation rate of the Chinese-Australian women in our study was higher than the national data of the general Australian women (55%) and women from a culturally or linguistically diverse background (49%) (AIHW 2015). Similar findings were reported by Kwok, Fethney, and White (2012a; 2012b). The favourable rate of having

a mammogram indicated that Chinese-Australian women made good use of mammographic screening within the recommended age group. The national breast-screening program provides free biennial mammographic screening for asymptomatic women aged between 50 and 69 years through mailed invitations, as evidence has shown that mammography screening is most effective for women in that age group (Cancer Australia 2015). It is possible that the relatively high rates of mammography in this study may be due to the method of recruitment that focused on Chinese organizations. For instance, participants recruited through community organizations could be exposed to more resources and information related to mammography screening. Attending seniors clubs could also be a significant facilitator to having a mammogram, as group mammography with an interpreter and transportation provided targets senior clubs (Kwok, Cant, and Sullivan 2005). These reasons highlight the need for future research to further investigate the mammogram screening behaviours among Chinese migrant women who are not connected to such Chinese organizations.

Demographic factors

Consistent with the previous studies (Noroozi, Jomand, and Tahmasebi 2011; Petro and Mikhail 2002), educational level was associated with performing a BSE. As women with a higher level of education were more likely to access to information and to have knowledge about preventive care, it was not surprising that more educated Chinese-Australian women were more likely to practice a BSE. This finding suggests that the women with a lower educational level may need more information and

education about performing a BSE. For having a CBE, religion was a predictor, which suggested that the Christian women were more likely to have a CBE compared to the Buddhist women. This result confirms the findings from a previous study on Chinese-American women (Tu et al. 2003). The result may be explained by the Buddhist concept of karma that encourages people to do morally good things to receive positive consequences and disapproves of people talking about disease or death (Koo et al. 2012). In light of these beliefs, women from the Buddhist religion may prefer doing a good deed rather than having a CBE to prevent breast cancer death. Other factors related to not having a CBE included being aged 70 years and over and being retired, perhaps because older and retired women may believe that their risks of being diagnosed with breast cancer are low.

Educational level and employment status were not correlated with participating in mammography screening. This is consistent with the study by Kwok, Fethney and White (2012b). However, our study reported that annual income was negatively related to having a mammogram. The finding might be the result of national mammographic screening program that provides a free two-yearly mammogram to asymptomatic women aged 40 years and over.

Acculturation

While the current study did not find a significant relationship between acculturation (English proficiency and length of residence) and performing a BSE, length of residence was the most important predictor for both having a CBE and a

mammogram. This is inconsistent with a previous study (Kwok, Fethney, and White 2012a) that reported length of residence was not associated with participating in breast cancer screening (BSE, CBE and mammogram) among Chinese-Australian women who had heard of the screening tests. Similarly, Kwok, Fethney and White (2012b) also indicated that having a mammogram as recommended was not significantly related to length of residence. In contrast, our study suggested that Chinese migrant women who lived in Australia longer, were more likely to get a CBE and mammogram done. It is possible that women who have been in Australia longer may be more familiar with the Australian health service and have more knowledge about breast cancer screening. Thus, more effort on promoting breast cancer screening practices should target women who have recently arrived in Australia. However, a relationship between English proficiency and practicing the three screening tests (BSE, CBE and mammogram) was not found, which is consistent with the two previous studies (Kwok, Fethney, and White 2012a; 2012b).

Knowledge of breast cancer and cancer-related beliefs

Although previous studies indicated that knowledge of breast cancer was not associated with the breast cancer screening behaviours of Chinese migrant women in Australia (Kwok, Fethney, and White 2012a, 2012b) and America (Lee-Lin et al. 2007), the current study found a significant relationship between knowledge of breast cancer symptoms and participating in BSE and mammogram. The inconsistency may be due to different knowledge items of breast cancer that were used in the questionnaire. Our study reported that knowledge of symptoms of breast cancer was

positively related to practicing a BSE, but was negatively related to having a mammogram. This finding is unique for the current study. In terms of cancer-related beliefs, the two beliefs (“cancer is hereditary” and “people got breast cancer as they did not breastfeed their babies”) correlated with having a CBE and mammogram, and involved knowledge about risk factors for breast cancer. However, future research is required to further explore the association between Chinese-Australian women’s screening behaviours and breast cancer knowledge such as risk factors, symptoms, treatment and detection of breast cancer.

Common experiences and barriers

In the current study, most Chinese migrant women reported that there were no problems with undertaking the three breast cancer screening tests. However, several negative experiences involving pain, discomfort, irritation and embarrassment, were reported, in particular for having a mammogram. These negative experiences may contribute to barriers that impede Chinese-Australian to participate in screening tests.

Previous studies stated that perceived barriers were significantly related to performing a BSE (Noroozi, Jomand, and Tahmasebi 2011) and having a mammogram (Kwok, Fethney, and White 2012a; 2012b). The current study highlighted a number of common barriers to BSE and mammogram practices. While most participants had completed tertiary education, they perceived that performing a BSE was unnecessary and being exposed to unnecessary radiation from mammography was a barrier. This may be explained by the belief that breast cancer is

inevitable (Kwok and Sullivan 2006) and Chinese cultural beliefs that it is unnecessary to participate in breast cancer screening when they are feeling well (Tang, Solomon, and McCracken 2000). Secondly, participants in our study aged 50 years and over may rely on the free mammographic screening rather than performing a BSE, and therefore they may perceive performing a BSE is unnecessary. For having a mammogram, our study also found other common barriers that include a lack of recommendation from doctors, time needed, pain and age issues, and a lack of information about how to book a mammographic screening. Thus, it is important to provide more information and resources that help Chinese migrant women know why and how to have a mammogram. Doctors also play a vital role to discuss with each woman to make an appropriate recommendation for her breast cancer screening. Moreover, previous studies emphasised different barriers of having a mammogram in Chinese migrant women, involved language barriers (Todd, Harvey, and Hoffman-Goetz 2011; Kwok, Fethney, and White 2012b), modesty issues, transportation and embarrassment issues (Kwok, Fethney, and White 2012b). Our study suggested that more investigations are needed to further explore the barriers not only for mammographic screening but also other breast cancer screening.

Limitations

There are a number of limitations to the current study. Firstly, this study was limited by a convenience sample and therefore findings may be not be easily generalized. Secondly, the utilization of self-administered questionnaires may lead to some study data (e.g. the screening participation rate, annual income) being

overestimated or underestimated by participants. Social desirability bias may also emerge where participants tend to present a favourable image of themselves when filling out the survey (Van de Mortel 2008). Thirdly, survey fatigue may be caused by the long questionnaire and thus some participants may skip over or miss questions. Despite the limitations, the study used a comprehensive questionnaire and recruited key informants to explore the Chinese-Australian women's breast cancer screening practices.

CONCLUSION

This study provides insight on the practices and associated factors of breast cancer screening among Chinese-Australian women. In general, Chinese-Australian women were willing to have mammogram screening as recommended rather than performing a BSE and having a CBE regularly. The associated factors are important to take into account to develop tailored and culturally sensitive education programs regarding breast cancer screening in order to meet the unique needs of the target population. Improving screening experiences and minimizing the perceived barriers can assist to promote the early detection of breast cancer among Chinese-Australian women.

References

- Ahern, T., A. Gardner, and M. Courtney. 2015. Geographical comparisons of information and support needs of Australian women following the primary treatment of breast cancer: A 10-year replication study. *Health Expectations* 18 (6): 2678-92.
- American Cancer Society. 2015. American Cancer Society recommendations for early breast cancer detection in women without breast symptoms. <http://www.cancer.org/cancer/breastcancer/moreinformation/breastcancerearlydetection/breast-cancer-early-detection-ac-recs> (accessed October 5, 2016)
- Australian Bureau of Statistics. 2010. Population-country of birth. <http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/92C0101965E7DC14CA25773700169C63?opendocument>(accessed October 2, 2016)
- Australian Bureau of Statistics. 2016. *Migration, Australia 2014-15* (Cat. no. 3412.0) Canberra, Australia: ABS.
- Australian Institute of Health and Welfare. 2014. *Cancer in Australia: an overview 2014* (Cat. no. CAN 88). Canberra, Australia: AIHW.
- Australian Institute of Health and Welfare. 2015. *BreastScreen Australia monitoring report 2012–2013*(Cat. no. CAN 93). Canberra, Australia: AIHW.
- Australian Institute of Health and Welfare. 2016. *Australia's health 2016* (Cat. no. AUS 199). Canberra, Australia: AIHW.
- Cancer Australia. 2015. Position statement on early detection of breast cancer. <https://canceraustralia.gov.au/publications-and-resources/position-statements/earl>

y-detection-breast-cancer (accessed October 1, 2016)

Guthrie, Janet R., Lorraine Dennerstein, John R. Taffe, Philippe Lehert, and Henry G.

Burger. 2005. Hot flushes during the menopause transition: A longitudinal study in australian-born women. *Menopause* 12 (4): 460-7.

Khalili, A., and M. Shahnazi. 2010. Breast cancer screening (breast self-examination, clinical breast exam, and mammography) in women referred to health centers in Tabriz, Iran. *Indian Journal of Medical Sciences* 64 (4): 149-62.

Kwok, C., R. Cant, and G. Sullivan. 2005. Factors associated with mammographic decisions of chinese-australian women. *Health Education Research* 20 (6): 739-47.

Kwok, C., G. Sullivan, and R. Cant. 2006. The role of culture in breast health practices among Chinese–Australian women. *Patient Education and Counseling* 64 (1): 268-76.

Kwok, C., and G. Sullivan. 2006. Influence of traditional chinese beliefs on cancer screening behaviour among Chinese–Australian women. *Journal of Advanced Nursing* 54 (6): 691-9.

Kwok, C., J. Fethney, and K. White. 2012a. Breast cancer screening practices among Chinese-Australian women. *European Journal of Oncology Nursing : The Official Journal of European Oncology Nursing Society* 16 (3): 247.

Kwok, C., J. Fethney, and K. White. 2012b. Mammographic screening practices among Chinese-Australian women: Mammographic screening and chinese women. *Journal of Nursing Scholarship* 44 (1): 11-8.

- Lee□Lin, F., U. Menon, L. Nail, and K. F. Lutz. 2012. Findings from focus groups indicating what chinese american immigrant women think about breast cancer and breast cancer screening. *Journal of Obstetric, Gynecologic, & Neonatal Nursing* 41 (5): 627-37.
- Liang, W., J. Wang, M. Chen, S. Feng, B. Yi, and J. S. Mandelblatt. 2009. Cultural views, language ability, and mammography use in chinese american women. *Health Education & Behavior* 36 (6): 1012-25.
- Muruges, R. K. 2013. Breast self examination. *Asian Journal of Nursing Education and Research* 3 (4): 258.
- Noroozi, A., T. Jomand, and R. Tahmasebi. 2011. Determinants of breast self-examination performance among iranian women: An application of the health belief model. *Journal of Cancer Education* 26 (2): 365-74.
- Petro□Nustus, W., and B. I. Mikhail. 2002. Factors associated with breast Self□ Examination among jordanian women. *Public Health Nursing* 19 (4): 263-71.
- Peters, K., and A. Cotton. 2015. Barriers to breast cancer screening in australia: Experiences of women with physical disabilities. *Journal of Clinical Nursing* 24 (3-4): 563-72.
- Sadler, G. R., K. Wang, M. Wang, and C. M. Ko. 2000. Chinese women: Behaviors and attitudes toward breast cancer education and screening. *Women's Health Issues* 10 (1): 20-6.
- Supramaniam, R., N.S.W. Cancer Council, and New South Wales Central Cancer Registry. 2006. *Cancer incidence in new south wales migrants, 1991 to 2001*.

Sydney: Cancer Council NSW.

- Tang, T. S., L. J. Solomon, and L. M. McCracken. 2000. Cultural barriers to mammography, clinical breast exam, and breast self-exam among chinese-american women 60 and older. *Preventive Medicine* 31 (5): 575-83.
- Tu, S., S. L. Jackson, Y. Yasui, M. Deschamps, T. G. Hislop, and V.M. Taylor. 2005. Cancer preventive screening: a cross-border comparison of United States and Canadian Chinese women." *Preventive medicine* 41(1): 36-46.
- Tu, S., Y. Yasui, A. A. Kuniyuki, S. M. Schwartz, J. C. Jackson, T. G. Hislop, and V. Taylor. 2003. Mammography screening among Chinese-American women. *Cancer* 97 (5): 1293-302.
- Todd, L., E. Harvey, and L. Hoffman-Goetz. 2011. Predicting breast and colon cancer screening among english-as-a-second-language older chinese immigrant women to canada. *Journal of Cancer Education* 26 (1): 161-9.
- Van de Mortel, T. F. 2008. Faking it: Social desirability response bias in self-report research. *Australian Journal of Advanced Nursing, the* 25 (4): 40-8.
- Wu, T.Y., B. West, Y. W. Chen, and C. Hergert. 2006. Health beliefs and practices related to breast cancer screening in filipino, chinese and asian-indian women. *Cancer Detection and Prevention* 30 (1): 58-66.
- Wu, T. Y., H. F. Hsieh, and B. T. West. 2008. Demographics and perceptions of barriers toward breast cancer screening among asian-american women. *Women & Health* 48 (3): 261-81.

Tables and figures

Table 1. Summary of the questionnaire content guided by the HBM.

The Content of Questionnaire	The Key Factors of the HBM
<p>1. Socio-demographic background.</p> <p>For example, age, religion, marital status, employment status, the level of education and income, acculturation factors.</p>	<ul style="list-style-type: none"> • Modifying factors - demographic factors.
<p>2. Knowledge regarding breast cancer.</p>	<ul style="list-style-type: none"> • Modifying factors - structural factors.
<p>3. Knowledge on and practices of breast self-examination, clinical breast examination and mammography.</p>	<ul style="list-style-type: none"> • Modifying factors - structural factors; • Perceived barriers.
<p>4. History of breast cancer.</p>	
<p>5. Personal health.</p>	<ul style="list-style-type: none"> • Perceived benefits; • Perceived barriers.
<p>6. Concerns about breast cancer.</p>	<ul style="list-style-type: none"> • Perceived susceptibility; • Perceived severity; • Perceived benefits; • Perceived barriers.

Table 2. Socio-demographic characteristics of participants (N = 115)

Characteristics	n	%
Age (years)		
(Mean: 56.51; 95% CI: 53.24 - 59.77)		
35-39	25	21.7
40-49	18	15.7
50-59	17	14.8
60-69	23	20.0
70+	32	27.8
Religion		
Buddhist	29	25.9
Christian	30	26.8
No religion	53	47.3
Educational level		
Secondary school or less	38	33.0
Tertiary	77	67.0
Employment status		
Unemployed	15	13.2
Working full-time	45	39.5
Working part-time	16	14.0
Retired	38	33.3
Number of years employed		
(Mean: 24.01, 95% CI: 21.69 - 26.33)		
Marital status		
Single	9	7.9
Married	91	79.8
Divorced/ Widowed	14	12.3
Number of children		
None	7	8
1	35	39.8
2	33	37.5
3 +	13	14.7
Annual income		
\$20,000 - \$50,000	37	41.6
>\$50,000	52	58.4
Years of residence in Australia		
(Mean: 13.95; 95% CI: 12.31 - 15.60)		
<10 years	43	38.7
10 to 20 years	43	38.7
>20 years	25	22.5
Country of birth		
Mainland China	102	88.7
Hong Kong	13	11.3
Self-rated English proficiency		

Cannot speak English	24	21.2
Poor	38	33.6
Satisfactory	32	28.3
Fluent	19	16.9
Language spoken at home		
Mandarin	88	77.2
Cantonese	22	19.3
English	4	3.5
Living suburb		
North Sydney	25	22.5
South Sydney	33	29.7
West Sydney	13	11.7
Inner Sydney	40	36.0

Abbreviation: CI = confidence interval.

Table 3. Breast cancer screening practices of participants (N = 115)

Breast cancer screening tests	N	%
Breast self-examination (BSE)		
Ever heard about it	108/115	93.9
Ever performed	82/105	78.1
Performed monthly	16/85	18.8
Performed 2-4 days post-menstruation (below the age of 50 years)	7/32	21.9
Clinical breast examination (CBE)		
Ever performed	74/106	69.8
Performed over a year ago	42/72	58.3
Mammogram		
Ever heard about it	90/115	78.3
Ever performed	66/90	73.3
Performed within the last 2 years	43/67	64.2

Table 4. Association between socio-demographic factors and the breast cancer screening practices among participants who had ever performed breast screening (N=115)

Factors	Breast cancer screening practices ever performed				
	Breast self-examination (BSE)		p	Pearson value	df
	No n (%)	Yes n (%)			
<u>Demographic factors</u>					
Educational level	12(34.3)	23(65.7)	0.030	4.704 ^a	1
Secondary school or less	11(15.7)	59(84.3)			
Tertiary					
<u>Acculturation factors</u>					
English proficiency			0.362	3.200 ^a	3
Cannot speak English	7(31.8)	15(68.2)			
Poor	4(12.1)	29(87.9)			
Satisfactory	7(23.3)	23(76.7)			
Fluent	4(21.1)	15(78.9)			
Years of residence in Australia			0.416	1.753 ^a	2
<10 years	9(23.1)	30(76.9)			
10 to 20 years	6(15.4)	33(84.6)			
>20 years	7(29.2)	17(70.8)			
<u>Clinical breast examination (CBE)</u>					
<u>Demographic factors</u>					
Age			<0.001	22.995 ^a	4
35-39	5 (22.7)	17(77.3)			
40-49	5 (29.4)	12(70.6)			
50-59	0 (0.0)	16(100.0)			
60-69	4 (18.2)	18(81.8)			
70+	18 (62.1)	11(37.9)			
Religion			0.015	8.439 ^a	2
Buddhist	14(53.8)	12(46.2)			
Christian	7(24.1)	22(75.9)			
No religion	11(22.9)	37(77.1)			
Employment status			0.016	8.328 ^a	2
Unemployed	3(23.1)	10(76.9)			
Working	11(20.0)	44(80.0)			
Retired	16(48.5)	17(51.5)			
<u>Acculturation factors</u>					
English proficiency			0.343	3.334 ^a	3
Cannot speak English	10(43.5)	13(56.5)			
Poor	10(29.4)	24(70.6)			
Satisfactory	6(20.7)	23(79.3)			
Fluent	5(26.3)	14(73.7)			

Years of residence in Australia					
<10 years	18(45.0)	22(55.0)	0.030	6.980 ^a	2
10 to 20 years	9(23.7)	29(76.3)			
>20 years	4(16.7)	20(83.3)			

Mammogram

Demographic factors

Age					
35-49	12(41.4)	17(58.6)	0.064	5.487 ^a	2
50-69	5(15.2)	28(84.8)			
70+	7(25.0)	13(75.0)			
Annual income					
\$20,000 - \$50,000	5(17.2)	24(82.8)	0.041	4.179 ^a	1
>\$50,000	15 (40.5)	22(59.5)			

Acculturation factors

English proficiency					
Cannot speak English	5(26.3)	14(73.7)	0.542	2.150 ^a	3
Poor	6(20.0)	24(80.0)			
Satisfactory	6(24.0)	19(76.0)			
Fluent	6(40.0)	9(60.0)			
Years of residence in Australia					
<10 years	10(32.3)	21(67.7)	0.437	1.657 ^a	2
10 to 20 years	10(30.3)	23(69.7)			
>20 years	4(17.4)	19(82.6)			

Abbreviation: df = degrees of freedom.

Table 5. Association between breast cancer knowledge and breast cancer screening practices among participants who had ever performed breast screening (N=115)

Breast cancer screening practices	Breast cancer knowledge								
	Symptoms of breast cancer			Treatment of breast cancer			Detection of breast cancer		
	n	mean	(SD)	n	mean	(SD)	n	mean	(SD)
BSE									
Yes	81	4.23	(2.36)	81	2.68	(1.63)	73	3.03	(1.70)
No	22	2.45	(2.04)	22	2.05	(1.53)	15	2.60	(1.40)
Significance	p=0.002 (t=3.22, df=101)			p=0.105 (t=1.634, df=101)			p=0.365 (t=0.91, df=86)		
CBE									
Yes	73	4.00	(2.36)	73	2.62	(1.64)	63	3.14	(1.69)
No	31	3.55	(2.47)	31	2.39	(1.59)	25	2.56	(1.45)
Significance	p=0.381 (t=0.88, df=102)			p=0.511 (t=0.66, df=102)			p=0.133(t=1.52, df=86)		
Mammogram									
Yes	65	3.54	(2.39)	65	2.20	(1.69)	55	2.67	(1.72)
No	23	4.91	(2.23)	23	3.00	(1.60)	20	3.40	(1.60)
Significance	p=0.018 (t=-2.41, df=86)			p=0.051 (t=-1.98, df=86)			p=0.104 (t=-1.65, df=73)		

Abbreviation: t= computed test statistic, df= degrees of freedom

Table 6. Association between cancer-related beliefs and the breast cancer screening practices among participants who had ever performed breast screening (N=115)

Cancer-related beliefs	Breast cancer screening practices ever performed					
	Breast self-examination (BSE)		Clinical breast examination(CBE)		Mammogram	
	No	Yes	No	Yes	No	Yes
	n (MR)	n (MR)	n (MR)	n (MR)	n (MR)	n (MR)
Cancers are caused by an unhealthy lifestyle.	6(44.17)	95(51.43)	6(40.75)	95(51.65)	5(36.80)	81(43.91)
	p=0.393,U= 244, W=265		p=0.264,U=223,W=244		p=0.406,U=169,W=184	
	No	Yes	No	Yes	No	Yes
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Cancer is hereditary.						
No	7(20.6)	27(79.4)	16 (47.1)	18(52.9)	7(22.6)	24(77.4)
Yes	14(23.3)	46(76.7)	15 (25.0)	45 (75.0)	14(29.2)	34(70.8)
	p=0.759,X= 0.094 ^a , df=1		p=0.029,X=4.778 ^a ,df=1		p=0.518,X=0.419 ^a ,df=1	
People got breast cancer as they didn't breast feed their babies.						
No	15(27.8)	39(72.2)	14(25.9)	40(74.1)	9(20.5)	35(79.5)
Yes	6(18.2)	27(81.8)	15(45.5)	18(54.5)	13(44.8)	16(55.2)
	p=0.310,X= 1.030 ^a , df=1		p=0.061,X=3.515 ^a ,df=1		p=0.026,X=4.932 ^a ,df=1	

Abbreviation: MR=Mean Rank, U=Mann-Whitney U, W=Wilcoxon W, X=Pearson value, df= degrees of freedom.

Table 7. Factors associated with breast cancer screening practices among participants who had ever performed breast screening (N=115)

	Breast cancer screening practices ever performed											
	Breast self-examination (BSE) (n=65)				Clinical breast examination (CBE) (n=65)				Mammogram (n=51)			
	W(df)	P	OR	95% CI	W(df)	P	OR	95% CI	W(df)	P	OR	95% CI
Age (years)	0.00(1)	0.994	1.00	(0.90,1.11)	0.02(1)	0.88	0.99	(0.86,1.14)	4.28(1)	0.039	0.84	(0.72,0.99)
Years of residence in Australia	0.77(1)	0.38	1.05	(0.94,1.18)	6.14(1)	0.013	1.47	(1.08,2.00)	5.77(1)	0.016	1.29	(1.05,1.59)
Religion												
Buddhist (reference)												
Christian	0.25(1)	0.616	1.78	(0.19,16.79)	4.65(1)	0.031	16.41	(1.29,208.65)	0.58(1)	0.446	0.39	(0.03,4.48)
No religion	0.10(1)	0.75	0.72	(0.10,5.47)	3.73(1)	0.053	11.78	(0.96,143.9)	0.02(1)	0.904	0.86	(0.08,9.44)
Employment status												
Unemployed (reference)												
Working	0.02(1)	0.897	1.24	(0.05,33.84)	0.70(1)	0.403	0.22	(0.01,7.86)	3.30(1)	0.069	0.05	(0.00,1.28)
Retired	1.54(1)	0.215	5.68	(0.37,88.51)	2.22(1)	0.136	0.04	(0.00,2.73)	0.02(1)	0.893	0.76	(0.02,38.95)
Educational level												
≤Secondary school (reference)												
Tertiary	0.80(1)	0.373	2.49	(0.34,18.38)	0.10(1)	0.757	0.59	(0.02,17.17)	0.44(1)	0.508	2.18	(0.22,21.93)
Annual income												
\$20,000-\$50,000(reference)												
>\$50,000	0.11(1)	0.737	0.76	(0.16,3.70)	0.07(1)	0.792	0.76	(0.10,5.72)	4.24(1)	0.039	0.03	(0.00,0.84)

Symptoms of breast cancer	6.70(1)	0.010	1.76	(1.15,2.71)	1.15(1)	0.283	1.31	(0.80,2.14)	1.89(1)	0.169	0.65	(0.35,1.20)
Cancer is hereditary	0.061)	0.805	0.80	(0.14,4.72)	0.39(1)	0.531	1.93	(0.25,15.07)	0.00(1)	0.967	0.96	(0.12,7.69)
People got breast cancer as they didn't breast feed their babies.	0.331)	0.568	0.57	(0.08,3.95)	1.28(1)	0.258	0.25	(0.02,2.78)	0.00(1)	0.974	1.04	(0.11,10.12)
	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square		-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square		-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square	
Model summary	52.907 ^a	0.220	0.327		36.387 ^a	0.444	0.640		36.749 ^a	0.410	0.561	

Abbreviation: W=wald, OR=odds ratio, CI= confidence interval

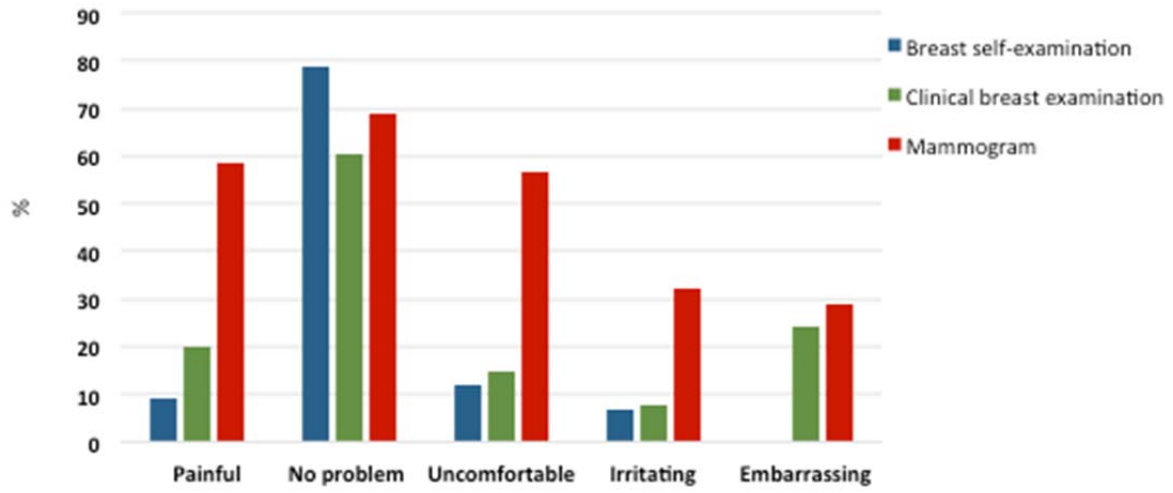


Figure 1. Experiences of practicing breast cancer screening (N=115)

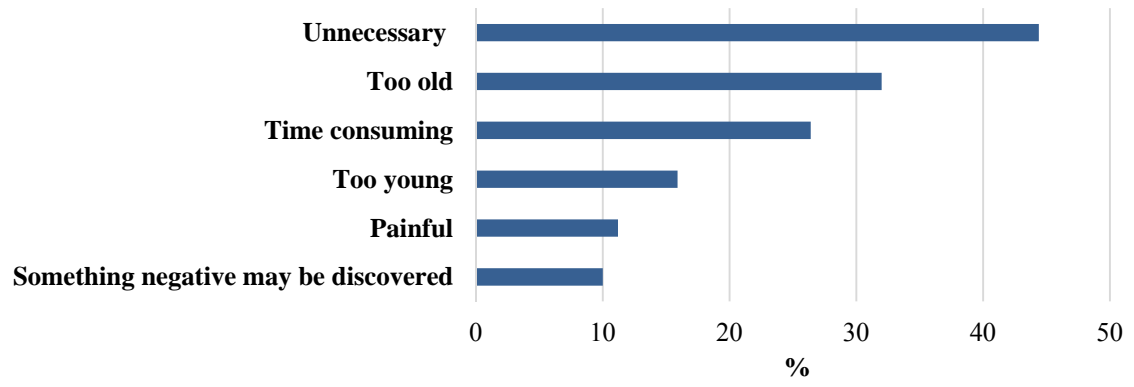


Figure 2. Perceived barriers of performing a breast self-examination (N=115)

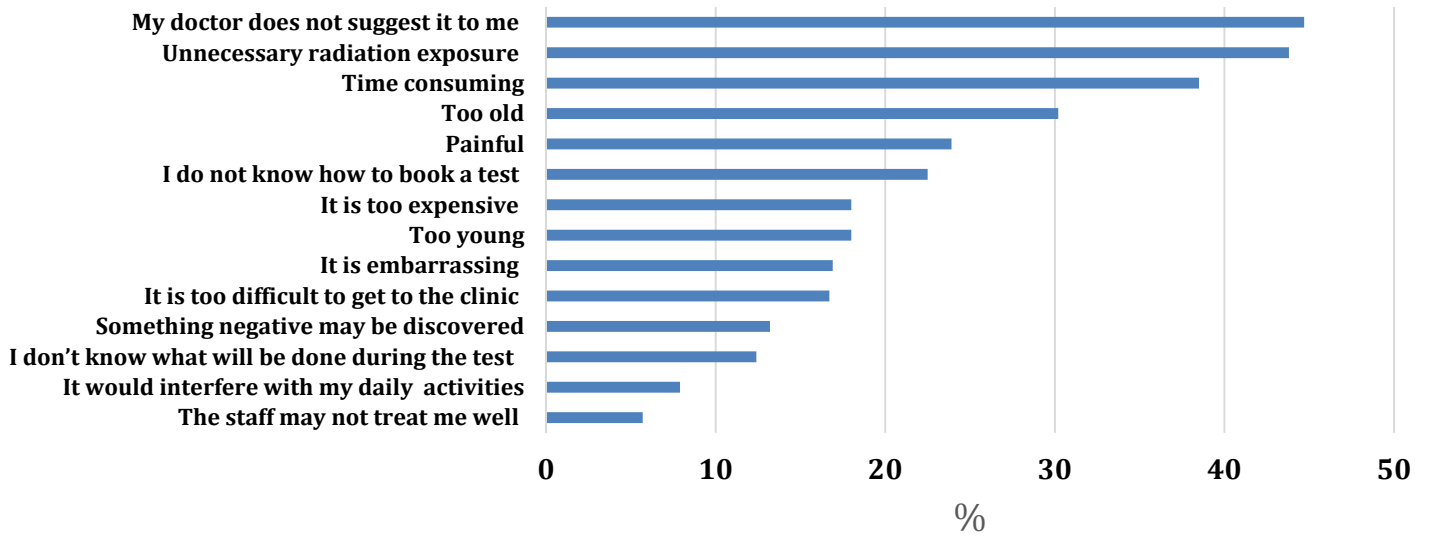


Figure 3. Perceived barriers of having a mammogram (N=115)

Appendices

Appendix A

Ethics approval letter from University of Sydney Human Research Ethics Committee



Research Integrity
Human Research Ethics Committee

Friday, 3 June 2016

Dr Syeda (Zakia) Hossain
Health Systems and Global Populations; Faculty of Health Sciences
Email: zakia.hossain@sydney.edu.au

Dear Syeda (Zakia)

Your request to modify the below project submitted on 09 May 2016 was considered by the Executive of the Human Research Ethics Committee at its meeting on 19 May 2016.

The Committee had no ethical objections to the modification/s and has approved the project to proceed.

Details of the approval are as follows:

Project No.: 2015/295
Project Title: South East Asian Migrant Women's Breast Cancer Screening Project

Approved Documents:

Date Uploaded	Type	Document Name
30/05/2016	Advertisements/Flyer	Advertisement_Clean copy
30/05/2016	Participant Info Statement	PIS clean copy
09/05/2016	Advertisements/Flyer	Advertisement_Chinese version
09/05/2016	Advertisements/Flyer	Advertisement_English version
09/05/2016	Participant Consent Form	Consent form
09/05/2016	Participant Consent Form	Consent Form_English version
09/05/2016	Participant Info Statement	Participant Information Statement_Chinese version
09/05/2016	Participant Info Statement	Participant Information Statement_English
09/05/2016	Questionnaires/Surveys	Questionnaire_Chinese version
09/05/2016	Questionnaires/Surveys	Questionnaire_English

Please do not hesitate to contact Research Integrity (Human Ethics) should you require further information or clarification.

Yours sincerely

Associate Professor Lilon Bandler
Deputy Chair
Human Research Ethics Committee

This HREC is constituted and operates in accordance with the National Health and Medical Research Council's (NHMRC) National Statement on Ethical Conduct in Human Research (2007), NHMRC and Universities Australia Australian Code for the Responsible Conduct of Research (2007) and the CPMP/ICH Note for Guidance on Good Clinical Practice.

Research Integrity
Research Portfolio
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CRICOS 00026A

Appendix B - Participant Information Statement in English



Office
Discipline of Behavioural and
Social Sciences in Health
Faculty of Health Sciences

ABN 15 211 513 464

SYEDA ZAKIA HOSSAIN, DR
SENIOR LECTURER
CHIEF INVESTIGATOR

Room T310
The University of Sydney
NSW 2006 AUSTRALIA
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Email:
zakia.hossain@sydney.edu.au
Web: <http://www.usyd.edu.au/>

South East Asian (Chinese) Migrant Women's Breast Cancer Project

PARTICIPANT INFORMATION STATEMENT

(1) What is the study about?

Breast cancer is the most commonly diagnosed malignant tumour among women in Australia. Studies have shown that early detection of the disease strongly contributes to increased chances of survival. Ethnic differences have been shown to influence the rate of survival, with Chinese women having far having a much higher mortality rate. However, there is limited evidence to support this is the case in Australia, especially in Sydney. The purpose of this study is to record the breast cancer awareness and breast cancer screening practices of a sample of Chinese Migrant women residing in the Sydney Metropolitan area.

(2) Who is carrying out the study?

The study is being conducted by a team of researchers from University of Sydney Dr Syeda Zakia Hossain, Senior Lecturer (Chief Investigator and Primary supervisor), Dr Lynette Mackenzie, Associate Professor (Co-Investigator and Associate Supervisor), and Ms Lei Wang, Master of Occupational Therapy student. The study will form the basis of the Master degree of Ms Lei Wang.

(3) What does the study involve?

The questionnaire will ask questions on your background, such as age, education, employment, marital status, number of children, your health, family history of breast cancer and so on. The questionnaire also includes questions on your knowledge, awareness and concerns of breast cancer; breast screening practices including breast self examination (BSE), clinical breast examination (CBE) and mammography; service utilisation, such as where do you go when sick, what services you use and problems encountered with utilisation of health services.

(4) How much time will the study take?

Approximately 25 minutes.

(5) Can I withdraw from the study?

Being in this study is completely voluntary - you are not under any obligation to

South East Asian (Chinese) Migrant Women's Breast Cancer Project version 1 22nd April 2016 1

consent and - if you do consent - you can withdraw at any time without affecting your relationship with The University of Sydney. You may stop the questionnaire at any time if you do not wish to continue. However, if you submit the survey, data cannot be withdrawn, as it is non-identifiable. Also please note that submission of the survey is indicative of consent.

(6) Will anyone else know the results?

All the information collected from you for the study will be treated confidentially, and only the named researchers on the study will have access to it. The study results may be presented at a conference or in a scientific publication, but individual participants will not be identifiable in such a report.

(7) Will the study benefit me?

The study will benefit you by increasing your knowledge about breast cancer symptoms and where to go when detected any problem with breast health. This will begin to identify barriers and facilitators to breast screening among Chinese migrant women in Australia which could ultimately assist in better cancer detection methods.

(8) Can I tell other people about the study?

Yes, you can tell friends and/or family, in particular women aged 35 and above years old from Mainland China, Hong Kong or Taiwan, living in Sydney Metropolitan area more than one year, about the project and ask them to contact the Chief Investigator of the project Dr. Syeda Zakia Hossain: 02 9351 9340 or zakia.hossain@sydney.edu.au or Ms Lei Wang, student researcher: lwan8677@uni.sydney.edu.au

(9) What if I require further information?

Please contact: Chief Investigator Dr Syeda Zakia Hossain, University of Sydney; Phone: 02 9351 9 340.

(Q10) What if I have a complaint?

Any person with concerns or complaints about the conduct of the research study can contact **the Deputy Manager, Human Ethics Administration, University of Sydney (02) 8627 8176** or ro.humanethics@sydney.edu.au .

This information sheet is for you to keep

Appendix C - Participant Information Statement in Chinese



健康行为与社会科学专业办公室
健康科学学院

ABN 15 211 513 464

希尔达·扎基娅·侯赛因 (Syeda Zakia Hossain) 博士,
高级讲师
首席调研员

澳大利亚新南威尔士州

悉尼大学

T310室

邮编: 2006

电话: +61 2 9351 9340

传真: +61 2 9351 9540

邮件: zakia.hossain@sydney.edu.au

网站: <http://www.usyd.edu.au/>

东南亚——中国移民女性乳腺癌调研项目

参与信息声明

(1) 研究背景和目的

在澳洲女性中, 乳腺癌是最常见的恶性肿瘤。研究表明, 该疾病的早期发现对增加存活率有重大意义。种族的不同对该疾病患者的存活率也有影响, 而中国女性乳腺癌患者的存活率远低于其它种族患者。但是在澳大利亚, 特别是悉尼地区对这一现象的研究依据非常有限。该研究旨在记录移居在悉尼市区的中国妇女对乳腺癌关注和乳腺癌筛查的样本分析。

(2) 研究人员

该研究小组成员包括悉尼大学高级讲师(首席调研员, 主要导师) 希尔达·扎基娅·侯赛因 (Syeda Zakia Hossain) 博士, 副教授(合作调研员, 副导师) 李耐特·麦肯齐 (Lynette Mackenzie) 博士, 以及作业治疗(职业治疗) 专业硕士生王蕾 (Lei Wang)。该项目研究将作为王蕾女士硕士学位的研究课题。

(3) 调查内容

调查问卷涉及您的背景, 例如年龄、教育程度、职业、婚姻状况、子女人数、个人健康状况, 以及您的乳腺癌家族史等等。问卷还包括您对乳腺癌的知识、了解和关注度; 乳腺癌筛查的实施包括乳房自检, 临床乳房检查以及乳房X光检查; 医疗服务的使用包括生病时您的就诊地, 您使用的医疗服务以及使用健康医疗服务中存在的问题。

(4) 问卷调查的用时

大约25分钟。

(5) 我是否可以中途退出研究调查?

该研究调查完全自愿参与——您没有任何义务必须同意, 并且如果您已经同意, 您可以随时退出, 这并不会对您与悉尼大学的关系产生任何影响。若您不愿意继续问卷调查可以在任何时间停止。但是, 一旦您提交了调查问卷表, 由于问卷调

查不包含任何个人识别信息，所以已提交的数据不能撤回。另外，请注意，调查问卷的提交意味着您已同意参与本项研究。

(6) 其他人会知道调查结果吗？

您所提交的一切调查信息将完全保密，只有以上提及的研究人员能够查看。整个项目的研究结果可能会公布于会议或科学出版物中，但参与者的任何个人信息不会被识别。

(7) 该项研究调查与我何益？

该研究调查可以帮助您增进乳腺癌症状的相关知识，以及当您发现任何乳房健康问题时应当去哪里就诊。该研究调查也将开始认识对移居在澳洲的中国女性进行乳腺癌排查的障碍以及解决办法，这可以有效帮助完善乳腺癌探查的方法。

(8) 我是否可以和其他人谈论该项研究？

可以。您可以将此研究项目告诉您的朋友和/或家人，尤其是移居在悉尼市区超过一年，年龄在35岁及以上的中国大陆或香港女性。他们可以联系研究调查的首席调研员希尔达·扎基娅·侯赛因 (Syeda Zakia Hossain) 博士，电话：02 9351 9340，邮箱地址：zakia.hossain@sydney.edu.au；或研究学生王蕾 (Lei Wang) 女士，邮箱地址：lwan8677@uni.sydney.edu.au。

(9) 如何获取更多信息？

请联系：悉尼大学首席调研员希尔达·扎基娅·侯赛因 (Syeda Zakia Hossain) 博士，电话：(02) 9351 9 340。

(10) 如何投诉？

对于整个研究的进行，如果您有任何不满或抱怨需要投诉，请联系悉尼大学人类伦理管理副经理，电话：(02) 8627 8176 或 邮箱地址：ro.humanethics@sydney.edu.au

请您保留这份信息说明书

Appendix D - Consent Form in English



Office
Discipline of Behavioural and
Social Sciences in Health
Faculty of Health Sciences

ABN 15 211 513 464

SYEDA ZAKIA HOSSAIN, DR
SENIOR LECTURER
CHIEF INVESTIGATOR

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Facsimile: +61 2 9351 9540
Email:
zakia.hossain@sydney.edu.au
Web: <http://www.usyd.edu.au/>

PARTICIPANT CONSENT FORM

I,[PRINT NAME], give consent to my participation in the research project

South East Asian (Chinese) Migrant Women's Breast Cancer Project

In giving my consent I acknowledge that:

1. The procedures required for the project and the time involved has been explained to me, and any questions I have about the project have been answered to my satisfaction.
2. The Participant Information Statement was read by the field investigator and I have been given the opportunity to discuss the information and my involvement in the project with the researcher/s.
3. I understand that I can withdraw from the study at any time, without affecting my relationship with the researcher(s) or the University of Sydney now or in the future.
4. I understand that my involvement is strictly confidential and no information about me will be used in any way that reveals my identity.
5. I understand that being in this study is completely voluntary – I am not under any obligation to consent.
6. I understand that I can stop participating/ interview at any time if I do not wish to continue and the data collected through the survey/interview will be erased and the information provided will not be included in the study. Once the questionnaire

Appendix E - Consent Form in Chinese



健康行为与社会学专业办公室

健康科学学院

ABN 15 211 513 464

希尔达·扎基娅·侯赛因 (Syeda Zakia Hossain) 博士,
高级讲师
首席调研员

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传真: +61 2 9351 9540

邮件: zakia.hossain@sydney.edu.au

网站: <http://www.usyd.edu.au/>

参与者同意书

我, _____ [全名规范书写], 自愿同意参加该研究项目。

东南亚——中国移民女性乳腺癌调研项目

在我同意参加该项目之前, 我已知晓以下信息:

1. 我已知晓该项目的流程和时间, 我对该项目的疑虑已获得满意答复和解释。
2. 实地调查工作者已朗读《参与信息声明》, 并已给予我时间对相关信息与本项目的调研员进行讨论。
3. 我已知晓我可以随时退出该项研究调查, 并不会对我与调研员或与悉尼大学将来的关系产生任何影响。
4. 我已知晓我的参与是完全保密的, 我所有的个人信息将不会以任何形式被识别。
5. 我已知晓该研究是完全自愿参与——我没有任何义务必须同意。
6. 我已知晓我若不愿意继续可以随时停止参加调查问卷或访问, 而所提供的调查问卷或访问数据将会被消除且不会包括在此调查研究里。一旦我完成并提交调查问卷, 我的问卷无法被退回, 因为所有问卷都是匿名的, 且不包含任何识别信息。

我同意参加：

i) 调查问卷 是 否

或

ii) 面对面访问 是 否

参与者签名： _____

参与者姓名： _____

日期： _____

Appendix F- Recruitment Advertisement in English



THE UNIVERSITY OF
SYDNEY


Brunei


Cambodia


Indonesia


Myanmar


Malaysia


Laos


Philippines


Singapore


Thailand


Vietnam


China

South East Asian (Chinese) Migrant Women's Breast Cancer Project



Calling Chinese women aged 35 years and above!

Breast cancer is the most commonly diagnosed malignant tumor among women in Australia. However studies show that increased chances of survival stems from the early detection of the disease, by means of breast screening practices. However, little is known regarding the breast screening practices of Chinese women living in Australia. As the Chinese population is increasing rapidly in Australia and little is known regarding their health behaviours, we will be conducting a project based on the breast screening practices of Chinese migrant women living in Sydney.

We are currently recruiting Chinese women living in the Sydney metropolitan area from age 35 years and above. **If you are from Mainland China or Hong Kong, 35 years and above, no history of breast cancer, living in Sydney more than one year**, you are encouraged participate in this study. You will be required to fill out a questionnaire including questions based on knowledge, attitudes, and screening practices of breast cancer. All information gathered will contribute to a further understanding of breast screening practices among this population, in order to raise awareness and education of the disease and its detection, and further promote early detection.

This is an research project being conducted by Master of Occupational Therapy' student at University of Sydney, Ms Lei Wang, and Supervisor, Senior Lecturer Dr Syeda Zakia Hossain and Associate Professor Lynette Mackenzie.

If you are interested in participating please contact via the details as below.

Contact Details

Dr Syeda Zakia Hossain

Dr Lynette Mackenzie

Ms Lei Wang

zakia.hossain@sydney.edu.au
Mobile: 0433 545 532
lynette.mackenzie@sydney.edu.au
Tel: 02 9351 9832

lwan8677@uni.svdnev.edu.au

Appendix G- Recruitment Advertisement in Chinese



THE UNIVERSITY OF
SYDNEY



Brunei



Cambodia



Indonesia



Myanmar



Malaysia



Laos



Philippines



Singapore



Thailand



Vietnam



中国

东南亚——中国移民女性乳腺癌调研项目



招募 35 岁及以上的中国女性！

在澳洲女性中，乳腺癌是最常见的恶性肿瘤。然而，研究表明通过乳腺癌筛查对这一疾病的早期发现增大了存活机率。但是，对于居住在澳洲的中国女性乳腺癌筛查研究甚少。

随着在澳洲的中国人口日益剧增，且对中国人群健康行为知之甚少，我们特此针对居住在悉尼的中国移民女性展开乳腺癌调研项目，调查此人群乳腺癌筛查的实施情况。

目前，我们招募居住在悉尼市区，35岁及以上的中国女性。

如果您来自中国大陆或香港，年龄在35岁及以上，没有乳腺癌病史，并在悉尼居住1年以上，我们呼吁您加入此项调查研究。您需要填写一份调查问卷，问卷内容包括对乳腺癌的知识、态度以及乳腺癌筛查的实施。所有调查信息用于对这一人群乳腺癌筛查的进一步了解，从而提升对这一疾病的关注、教育和发现，并进一步提升早期发现的可能性。

此项目的调研员为悉尼大学作业治疗（职业治疗）专业硕士王蕾（Lei Wang），其导师、高级讲师
希尔达·扎基娅·侯赛因（Syeda Zakia Hossain）博士，和李耐特·麦肯齐（Lynette Mackenzie）副教授。**如果您有兴趣加入此项调查研究，请通过以下联系方式联系我们。**

联系方式

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Appendix H- Study Questionnaire in English

ID No. _____

Confidential

South East Asian (Chinese) Migrant Women's Breast Cancer Project

Breast cancer is the most commonly diagnosed malignant tumour among women in Australia. Studies have shown that early detection of the disease strongly contributes to increased chances of survival, as well as the contribution of ethnic differences in the survival rate of breast cancer. However, there is limited evidence on ethnic differences in the survival rate of breast cancer in Australia, especially in Sydney. Therefore, the purpose of this study is to record the breast cancer screening practices, including breast self examination (BSE), clinical breast examination (CBE) and mammography, of a sample of South East Asian migrant women, in particular Chinese migrant women residing in the Sydney Metropolitan area. This will be achieved by conducting a questionnaire on a sample size of approximately 200 participants.

This questionnaire is divided into six broad sections:

- 1) Socio-demographic background
- 2) Knowledge regarding breast cancer
- 3) Knowledge on and practices of breast self examination, mammography and other clinical practices
- 4) History of Breast Cancer
- 5) Personal health
- 6) Health Belief model for Breast Cancer

This survey plays a crucial role in enabling us to find out the levels of awareness and knowledge of breast cancer and its screening practices among migrant women, in particular Chinese Migrant women in Sydney metropolitan area (SMA).

Your participation in this survey is completely voluntary and you can withdraw from the survey at any time without any penalty. If you decide to participate in this survey please sign the Consent form and complete this questionnaire. Your identity will remain confidential throughout the study.

We appreciate it if you would answer every question in this questionnaire.

Where required, please answer the question by placing a cross (X) the most applicable box ()

Section 1: Socio-demographic Background

1. Age: _____

2. Country of birth _____

3. Religion:

•Buddhist

•Christian

•Muslim

•Taoist

•No religion

•Other (please specify) _____

4. Highest level of education. _____ (years)

5. Highest attained level of education:

•No formal education

•Primary school

•Secondary

•Tertiary

– Diploma

– Undergraduate degree

– Postgraduate degree

•Other (please specify) _____

6. Employment status (main employment):

•Unemployed [go to Question 8]

•Full time

•Part time

•Casual/Contract

•Other (please specify) _____

7. Number of years employed _____ (years)

8. Marital status:

•Married

- Widowed
- De facto
- Divorced/Separated
- Single (Go to question 10)

9. If you have children, how many? _____

10. What is your (if you are single) / your family's (combined you, your partner and/or children's income) **annual income**?

- \$20,000 - \$50,000
- \$50,000 - \$100,000
- \$100,000 - \$150,000
- \$150,000 - \$200,000
- \$200,000 +

11. In what year did you migrate to Australia?

a. _____(year)

b. Where were you born?

- Mainland China
- Hong Kong
- Tai Wan
- Other (please specify) _____

12. How do you rate your English speaking ability?

- Cannot speak English
- Poor
- Satisfactory
- Fluent
- Very fluent

13. What language do you speak at home?

- Mandarin
- Cantonese
- English
- Others (please specify) _____

14. What is the area of the suburb you live currently?
Area _____ (for example: Ashfield)

Section 2: Knowledge regarding Breast Cancer

15. Have you heard of breast cancer?

- Yes
- No

16. What are the symptoms of Breast Cancer? (You can choose more than one from the following.)

- Lump
- Changed size or shape of breasts
- Nipple discharge
- Crusting, ulcer or redness of nipples
- Redness or dimpling of breast
- Swollen underarms
- Breast swelling
- Not sure

17. If you discover any of the above, how soon should you seek help?

- Immediately
- Within 1-3 months
- After 3 months
- Not at all
- Not sure

18. What are the treatment options available for breast cancer? (You can choose more than one from the following.)

- Prescription drugs
- Chemotherapy
- Surgery
- Radiation therapy
- Hormone therapy
- Don't know

19. Do you believe there is anything you can do to prevent getting cancer?

- No
- Yes
- Not sure

20. Why do you think people get **cancer**? (Please answer yes or no for each)

- It is a God's punishment.

No Yes

- It is fate.

No Yes

- It is bad luck.

No Yes

- Cancer is a contagious disease.

No

Yes

- Cancer is hereditary.

No Yes

- They have an unhealthy lifestyle.

No Yes

(Such as no exercise, smoking or eating unhealthy food)

- They do not breast feed their babies.

No Yes

Section 3: Knowledge and practice of Breast Self Examination (BSE), Mammography and other Clinical Practices

21. Have you heard about Breast Self Examination (BSE)?

- Yes
- No (*Go to question 35*)

22. How often should BSE be performed?

- Daily
- Weekly
- Monthly
- Annually

- Not sure

23. BSE is most appropriate when performed:

- 2-4 days pre-menstruation
- 2-4 days post-menstruation
- Not Sure

24. Have you ever performed BSE?

- Yes
- No (*Go to question 29*)

25. How often do you perform BSE?

- Daily
- Weekly
- Monthly
- Annually
- Not sure

26. When do you perform BSE?

- 2-4 days pre-menstruation
- 2-4 days post-menstruation
- Whenever

27. When did you last perform BSE?

- Within the last week
- Within the last month
- Within the last 3 months
- Within the last 6 months
- Within the last year
- Over a year ago

28. How did you find the experience of BSE?

Place a cross (X) in the most applicable box (☐)

SA=Strongly Agree A=Agree N= Neutral D=Disagree SD= Strongly Disagree

•Painful

SA ☐ A ☐ N ☐ D ☐ SD ☐

•No problem

SA ☐ A ☐ N ☐ D ☐ SD ☐

•Uncomfortable

SA ☐ A ☐ N ☐ D ☐ SD ☐

•Irritating

SA ☐ A ☐ N ☐ D ☐ SD ☐

29. Do you ever intend performing BSE?

•Yes ☐

•No ☐

•Maybe ☐

30. Has any health professional explained how to perform BSE to you?

• GP ☐

• Nurse ☐

• Other ☐

• Never ☐

31. Have you ever had a breast examination by a medical professional?

• Yes ☐

• No ☐ (go to question 35)

32. Which health professional performed the clinical breast examination in the last 2 years?

• GP ☐

• Nurse ☐

- Both
- Other (Please specify) _____

33. When was your last clinical breast examination performed?

- Within the last week
- Within the last month
- Within the last 3 months
- Within the last 6 months
- Within the last year
- Over a year ago

34. How did you find the experience of having a clinical breast examination?

Place a cross (X) in the most applicable box ()

SA=Strongly Agree A=Agree N= Neutral D=Disagree SD= Strongly Disagree

•Painful

SA A N D SD

•No problem

SA A N D SD

•Uncomfortable

SA A N D SD

•Irritating

SA A N D SD

•Embarrassing

SA A N D SD

35. Have you heard about mammogram?

- Yes
- No (go to question 42)

36. Where did you find the information about mammograms? (You can choose more than one from the following.)

- GP
- Breast cancer NSW invitation
- Media (TV/radio/Newspapers/magazines)
- Internet
- Community health centres
- Relative/friends
- Others (Please Specify) _____

37. How often should a mammogram be performed?

- Every 2 years
- Every 5 years
- Every 10 years
- Not sure

38. Have you ever had a mammogram?

- Yes
- No (Go to question 41)

39. When was the last time you had a mammogram?

- Within the last 2 years
- Within the last 5 years
- Over 5 years ago

40. How did you find the experience of having a mammogram?

Place a cross (X) in the most applicable box ()

SA=Strongly Agree A=Agree N= Neutral D=Disagree SD= Strongly Disagree

•Painful

SA A N D SD

•No problem

SA A N D SD

•Uncomfortable

SA A N D SD

•Irritating

SA A N D SD

•Embarrassing

SA A N D SD

41. What is/are your reason(s) for not having a mammogram? (You can choose more than one from the following.)

- Unaware of this service
- No knowledge about mammogram?
- Too expensive
- Too far away (distance)
- Religious reason
- Other (please specify) _____

42. How can you detect if you have breast cancer? (You can choose more than one from the following.)

- Breast Self Examination (BSE)
- Clinical breast examination
- Mammography
- Ultrasound
- Magnetic Resonance Imagine (MRI)
- Needle biopsy

Section 4: History of Breast Cancer

43. Have you ever experienced breast cancer?

- Yes
- No (go to question 47)

44. What was/were the symptoms you have experienced (You can choose more than one from the following.)

- Lumps
- Swelling
- Redness/Inflammation
- Itchiness/Rashes
- Pain during breast feeding

- Nipple discharge

45. Which of the following treatment services did you seek? (You can choose more than one answer from the following.)

- General Practitioner
- Paramedic
- Pharmacy
- Hospital
- Naturopath
- Homeopath
- Oncologist
- Radiologist
- Other (*please specify*) _____

46. If you did not seek any treatment, why not?

47. Has anyone in your family ever had breast cancer?

- Yes
- No (*Go to question 50*)

48. If yes, please tick who was in the family affected? (multiple answers)

- Mother
- Sister
- Grandmother
- Aunt
- Others (*Please specify*) _____

49. Has there even been a death in the family due to breast cancer?

- Yes
- No

Section 5: Personal Health

50. How would you describe your health?

- Excellent
- Good
- Satisfactory

- Poor
- Very poor

51. Have you experienced any of the following in the past 12 months?

- Asthma Yes No
 - Diabetes Yes No
 - Cancer Yes No
 - Heart disease Yes No
 - High blood pressure Yes No
 - Female reproductive problems (*please specify*)
-

52. Which of the following health facilities have you used in the past 12 months?

- General Practitioner Yes No
- Paramedic Yes No
- Pharmacy Yes No
- Local hospital Yes No
- Naturopath Yes No
- Physiotherapy Yes No
- Occupational therapy Yes No
- Radiologist Yes No
- Chinese medicine Yes No

53. From the above, which service did you use most?

54. The service you used most, how frequent were your visits?

- Once a month
- Quarterly (every 3 months)
- Every 6 months
- Annually
- More than a year

55. If you haven't used any of the above, what was the reason?

- Unaware of this service

- GP has not recommended
- Unavailable
- Too expensive
- Too far away
- Objection from husband
- No female practitioner available
- No doctor speak Chinese
- No need
- Other (please specify) _____

56. Which of the following apply to you?

- I maintain a healthy well-balanced diet Yes
- I frequently take action to improve my health Yes
- I regularly go for check-ups as required Yes
- I exercise regularly Yes

57. How important are the following factors for you when you consider for a new health practitioner?

Place a cross (X) in the most applicable box ()

SA=Strongly Agree A=Agree N= Neutral D=Disagree SD= Strongly Disagree

•Language

SA A N D SD

•Ethnicity

SA A N D SD

•Gender – female

SA A N D SD

•Cost

SA A N D SD

•Convenience (location)

SA A N D SD

•Religion

SA A N D SD

•Quality of care

SA A N D SD

58. Which of the following would you prefer to have a female practitioner:

*HP = High preference SP= Some preference N= Neutral LP= less preference
NP = No preference*

•Dental exam:

HP SP N LP NP

•Physical exam:

HP SP N LP NP

•Breast exam:

HP SP N LP NP

•Gynecological exam: e.g. pap smear

HP SP N LP NP

59. Are there any medical/health services that you would refuse to get from a male practitioner? Please specify _____

Section 6: Concerns about breast cancer

(Based on barriers, perceived susceptibility, and perceived effectiveness)

60. When I think about breast cancer, I feel:

- Scared
- Anxious
- Nervous
- Nauseous
- Fine
- Nothing

61. I feel breast cancer will threaten my (multiple answers) :

- Marriage (or significant relationship)

- Career
- Relationship with loved ones
- Financial security

62. My chances of getting breast cancer in the future are:

- Very likely
- Likely
- Probable
- Unlikely
- Very unlikely

63. How likely is it that I am at risk for developing breast cancer due to my:
Cross (X) the most applicable box

VL=Very Likely L= Likely M=Maybe U=Unlikely HU=Highly Unlikely

- Age:
 VL L M U HU
- Health:
 VL L M U HU
- Family History:
 VL L M U HU

64. How likely is it that BSE can:
Cross (X) the most applicable box

VL=Very Likely L= Likely M=Maybe U=Unlikely HU=Highly Unlikely

- Be very beneficial for me:
 VL L M U HU
- Help me detect a lump in my breast:
 VL L M U HU
- Help me detect breast cancer before it is too late
 VL L M U HU
- Make me worry less about getting breast cancer:
 VL L M U HU

65. How likely is it that mammogram can:

Cross (X) the most applicable box

VL=Very Likely L=Likely M=Maybe U=Unlikely HU=Highly Unlikely

- Be very beneficial for me:

VL L M U HU

- Help me detect a lump in my breast:

VL L M U HU

- Help me detect breast cancer before it is too late

VL L M U HU

- Make me worry less about getting breast cancer:

VL L M U HU

- Will decrease my chances of dying from breast cancer

VL L M U HU

66. Does the media or any publicity make you further aware of breast cancer?

•Yes

•No

67. How serious do you rate breast cancer as a disease?

•Not too serious

•Serious

•Extremely serious

•Treatable

•Life-threatening

68. How likely is it that the following would prevent you from practicing BSE:

Cross (X) the most applicable box

VL=Very Likely L=Likely M=Maybe U=Unlikely HU=Highly Unlikely

- Unnecessary
VL L M U HU
- Time consuming
VL L M U HU
- Painful
VL L M U HU
- Too old
VL L M U HU
- Too young
VL L M U HU
- Something negative may be discovered
VL L M U HU

69. How likely is it that the following would prevent me from having a mammogram? *Cross (X) the most applicable box*

VL=Very Likely L=Likely M=Maybe U=Unlikely HU=Highly Unlikely

- Unnecessary radiation exposure
VL L M U HU
- Time consuming
VL L M U HU
- Painful
VL L M U HU
- Too old
VL L M U HU
- Too young
VL L M U HU
- Something negative may be discovered
VL L M U HU

- I do not know how to book a test
VL L M U HU
- It is too difficult to get to the clinic
VL L M U HU
- I don't know what will be done during the test
VL L M U HU
- The staff may not treat me well
VL L M U HU
- It is too expensive
VL L M U HU
- My doctor does not suggest it to me
VL L M U HU
- It is embarrassing
VL L M U HU
- It would interfere with my daily activities
VL L M U HU

Thank you very much for completing the questionnaire.

Appendix I- Study Questionnaire in Chinese

序列号: _____

机密

东南亚—中国移民女性乳腺癌调研项目

在澳洲女性中，乳腺癌是最常见的恶性肿瘤。研究表明，该疾病的早期发现对增加存活率有重大意义，种族的不同对乳腺癌患者的存活率也有影响。然而在澳洲，尤其在悉尼，对不同种族乳腺癌患者存活率的研究依据甚少。因此，该项研究旨在记录东南亚移民女性样本中，尤其是移居在悉尼市区的中国女性乳腺癌筛查状况，包括乳房自检（BSE）、临床乳房检查（CBE）以及乳房 X 光检查。该项目的研究方法为约 200 名参与者的样本调查问卷法。

该调查问卷分为六个部分：

- 7) 社会人口背景
- 8) 关于乳腺癌的知识
- 9) 关于乳房自检、乳房 X 光检查和其他临床检查的知识与实践
- 10) 乳腺癌病史
- 11) 个人健康
- 12) 乳腺癌的健康信念模式

该研究对帮助我们了解移民女性，尤其是移居在悉尼市区（SMA）的中国女性对乳腺癌的关注和知识了解状况以及乳腺癌筛查项目的实施具有极其重要的意义。

该调查为自愿参与，您可以随时退出调查，无需承担任何个人后果。如果您愿意参与调查，请在同意书上签字并完成调查问卷。在整个研究过程中我们会保密您的个人信息。

希望您可以完整填写调查问卷中的每一个问题，我们不胜感激。

在需要的地方，请在描述最正确的方框 (□) 内划叉 (X)

第一部分：社会人口背景

6. 年龄： _____ (岁)

7. 出生国家： _____

8. 宗教信仰：

- 佛教徒
- 基督徒
- 穆斯林教徒
- 道教徒
- 没有宗教信仰
- 其他 (请注明) : _____

9. 最高教育年限： _____ (年)

10. 取得的最高教育水平：

- 未受正式教育
- 小学教育
- 中等教育
- 大学教育
 - 专科学位
 - 本科学位
 - 研究生学位
- 其他 (请注明) : _____

70. 工作状况 (主要的工作) :

- 无业 / 待业 [转到问题8]
- 全职工作
- 兼职工作
- 临时工/合同工
- 其他 (请注明) : _____

71. 工作年限： _____ (年)

72. 婚姻状况：

- 已婚
- 丧偶
- 同居
- 离婚/分居
- 单身 (转到问题 10)

73. 如果您有孩子, 请问有几个? _____

74. 您的个人 (如果您单身) /您的家庭 (包括您个人, 您的配偶以及/或者您子女)的年收入?

- \$20,000 - \$50,000
- \$50,000 - \$100,000
- \$100,000 - \$150,000
- \$150,000 - \$200,000
- \$200,000 +

75. 您在哪一年移居到澳大利亚?

a. _____ (年)

b. 出生地?

- 中国大陆
- 香港
- 台湾
- 其他 (请注明): _____

76. 您如何评价自己的英文水平?

- 不能说英语
- 很差
- 满意
- 流利
- 非常流利

77. 您在家使用哪一种语言?

- 普通话
- 粤语
- 英语

- 其他 (请注明): _____

78. 您现居住在哪一城区?

_____ 城区 (例如: Ashfield/艾士菲)

第二部分: 关于乳腺癌的知识

79. 您听说过乳腺癌吗?

- 听说过
- 没有

80. 以下那些是乳腺癌的症状? (多项选择)

- 乳房肿块
- 乳房外形和大小改变
- 乳头溢液
- 乳头结痂、溃疡或发红
- 乳房发红或有凹陷
- 腋下淋巴肿大
- 乳房肿胀
- 不确定

81. 如果发现以上任何症状, 何时需要寻求帮助?

- 立即
- 1-3 个月内
- 3 个月以后
- 不需要
- 不确定

82. 乳腺癌的治疗选择有哪些? (多项选择)

- 处方药物治疗
- 化学疗法
- 手术治疗
- 放射治疗

- 荷尔蒙 / 激素治疗
- 不知道

83. 您相信有方法可以预防癌症发生吗?

- 不相信
- 相信
- 不确定

84. 您认为，为什么人类会患上癌症（请用是或不是回答下列每一项）

- 这是上帝的惩罚。 不
是 是
- 这是命运的安排。 不
是 是
- 因为运气不好。
不是 是
- 因为癌症是传染病。 不是
 是
- 癌症会遗传。
不是 是
- 人的不健康的生活方式。 不是
是
(例如：缺乏运动、抽烟或者吃不健康的食物)
- 没有母乳喂养孩子。 不是
是

第三部分：关于乳房自检（BSE）、乳房 X 光检查（Mammography）和其他临床检查的知识与实施

85. 您听说过乳房自我检查吗?

- 听说过
- 没有 (转到问题 35)

86. 您觉得多久应该做一次乳房自我检查?

- 每天
- 每周
- 每个月
- 每年
- 不确定

87. 你觉得乳房自我检查的最恰当时期是:

- 月经前的 2-4 天
- 月经后的 2-4 天
- 不确定

88. 您是否进行过乳房自我检查?

- 是的 / 有
- 不是 / 没有 (转到问题 29)

89. 您多久进行一次乳房自我检查?

- 每天
- 每周
- 每月
- 每年
- 不确定

90. 您一般何时进行乳房自我检查?

- 月经前的 2-4 天
- 月经后的 2-4 天
- 不定时

91. 您最后一次进行乳房自我检查是什么时候?

- 过去一周内
- 过去一个月内
- 过去三个月内
- 过去六个月内
- 过去一年内

- 超过一年

92. 您对乳腺自我检查的感受如何?

请在描述最正确符合的方块 () 内划叉 (X)

5=非常同意 4=同意 3=既不同意也不反对 2=不同意 1=非常不同意

- 疼痛
5 4 3 2 1
- 没有问题
5 4 3 2 1
- 不舒服
5 4 3 2 1
- 有刺激感
5 4 3 2 1

93. 您是否考虑过要进行乳房自我检查?

- 有
- 没有
- 也许会

94. 是否曾有健康专业人员为您讲解过应当如何进行乳房自我检查?

- 全科医生(GP)
- 护士
- 其他
- 没有

95. 医学专业人员曾经是否帮您做过乳房检查?

- 是的 / 有
- 不是 / 没有 (转到问题35)

96. 在过去 2 年内哪位健康专业人员为您进行过临床乳房检查?

- 全科医生(GP)
- 护士
- 以上两者

- 其他 (请注明) _____

97. 您最后一次接受临床乳房检查过是什么时候?

- 过去一周内
- 过去一个月内
- 过去三个月内
- 过去六个月内
- 过去一年内
- 超过一年

98. 您对进行临床乳腺检查的感受如何?

请在描述最正确符合的方块 (□) 内划叉 (X)

5=非常同意 4=同意 3=既不同意也不反对 2=不同意 1=非常不同意

- 疼痛
5 4 3 2 1
- 没有问题
5 4 3 2 1
- 不舒服
5 4 3 2 1
- 有刺激感
5 4 3 2 1
- 尴尬
5 4 3 2 1

99. 您是否听说过乳房 X 光片 (mammogram) ?

- 是的 / 有
- 不是 / 没有 (转到问题 42)

100. 您从哪里得知关于乳房 X 光片的信息? (您可以在以下选项中选择多项。)

- 全科医生
- 新南威尔士州乳腺癌的邀请
- 媒体 (电视/广播/报纸/杂志)

- 互联网
- 社区健康中心
- 亲戚/朋友
- 其他（请注明） _____

101. 您觉得多久应当进行一次乳房 X 光检查？

- 每两年
- 每五年
- 每十年
- 不确定

102. 您是否进行过乳房 X 光检查？

- 是 / 有
- 不是 / 没有 (转到问题 41)

103. 您最后一次接受乳房 X 光检查是什么时候？

- 过去 2 年内
- 过去 5 年内
- 超过 5 年

104. 您对进行乳房 X 光检查的感受如何？

请在描述最正确符合的方块 (□) 内划叉 (X)

5=非常同意 4=同意 3=既不同意也不反对 2=不同意 1=非常不同意

- 疼痛
5 4 3 2 1
- 没有问题
5 4 3 2 1
- 不舒服
5 4 3 2 1
- 有刺激感
5 4 3 2 1
- 尴尬

5 4 3 2 1

105. 以下选项哪个 / 哪些是您不接受乳房 X 光检查的原因? (您可以选择多个选项)

- 没有意识到 / 察觉到这项服务
- 没有关于乳房 X 光检查的知识
- 价格过高
- 太远 (距离)
- 宗教原因
- 其他 (请注明): _____

106. 如果您患有乳腺癌, 您如何检查? (您可以选择多个选项)

- 乳房自检 (BSE)
- 临床乳房检查
- 乳房 X 光检查
- 超声检查
- 磁共振成像(MRI)
- 穿刺活检

第四部分: 乳腺癌病史

107. 您是否曾经患过乳腺癌?

- 是 / 有
- 不是 / 没有 (转到问题 47)

108. 您有过以下哪些症状? (您可以选择多个选项)

- 肿块
- 肿胀
- 发红/发炎
- 发痒/皮疹
- 哺乳时疼痛
- 乳头溢液

109. 您曾咨询过以下哪项治疗服务? (以下选项您可以选择多个选项)

- 全科医生
- 护理人员
- 药房
- 医院
- 自然疗法(Naturopath)
- 顺势疗法(Homeopath)
- 肿瘤科医师
- 放射科医师
- 其他 (请注明) _____

110. 如果您没有寻求任何治疗,原因为何?

111. 您家中的任何成员是否患有过乳腺癌?

- 是 / 有
- 不是 / 没有 (转到问题 50)

112. 如果是,请选择是哪一位 / 哪些家庭成员患有过乳腺癌? (多项选择)

- 妈妈
- 姐姐
- (外)祖母
- 姨妈或姑婶
- 其他 (请注明) _____

113. 您的家庭成员中是否有因乳腺癌过世的?

- 是 / 有
- 不是 / 没有

第五部分: 个人健康

114. 您如何形容自己的健康状况?

- 非常好
- 好

- 满意
- 不好
- 非常不好

115. 在过去的 12 个月内您是否患过以下疾病?

- 哮喘 是 否
 - 糖尿病 是 否
 - 癌症 是 否
 - 心脏病 是 否
 - 高血压 是 否
 - 女性生殖系统的疾病 (请注明)
-

116. 在过去的 12 个月内您是否使用过以下医疗服务或设施?

- 全科医生 是 否
- 护理人员 是 否
- 药房 是 否
- 当地医院 是 否
- 自然疗法(Naturopath) 是 否
- 物理治疗 (Physiotherapy) 是 否
- 职业/作业治疗(Occupational therapy) 是 否
- 放射科医师 是 否
- 中药 是 否

117. 以上服务或设施您使用最多的是哪一个?

118. 您使用最多的服务或设施, 使用频率为多少?

- 每月一次
- 每季度一次 (每 3 个月)
- 每 6 个月一次
- 每年一次
- 每年不到一次

119. 如果您没有使用过以上任何服务或设施, 原因是?

- 没有意识到这一服务或设施
- 全科医生没有推荐
- 不可用
- 价格太贵
- 距离太远
- 丈夫反对
- 没有女性医护人员
- 没有会说中文的医护人员
- 没有需求
- 其他 (请注明) _____

120. 以下哪个描述符合你的情况?

- 我的饮食一向健康且营养均衡 是
- 我经常采取行动改善我的健康状况 是
- 当需要时, 我定期做体检 是
- 我经常锻炼 是

121. 当您考虑接受一个新的健康从业者时, 你觉得以下各项因素是否重要?
请在描述最正确符合的方块 () 内划叉 (X)

5=非常同意 4=同意 3=既不同意也不反对 2=不同意 1=非常不同意

- 语言
5 4 3 2 1
- 种族差异
5 4 3 2 1
- 性别 – 女性
5 4 3 2 1
- 花费
5 4 3 2 1
- 便利 (位置)
5 4 3 2 1
- 宗教

5 4 3 2 1

- 医护质量

5 4 3 2 1

122. 以下检查，您偏爱或希望是女性从业者的是：

5 = 强烈要求 4 = 要求 3 = 中立 2 = 不强求 1 = 没有要求

- 牙科检查:

5 4 3 2 1

- 身体检查:

5 4 3 2 1

- 乳房检查:

5 4 3 2 1

- 妇科检查: 如宫颈抹片检查

5 4 3 2 1

123. 如果没有女性从业者，您会拒绝接受哪项医疗/健康服务？请注明：

第 6 部分：对乳腺癌的健康顾虑(基于障碍、敏感度和有效度)

124. 当想到乳腺癌时，我感觉：

- 害怕
- 焦虑
- 紧张
- 恶心
- 感觉良好
- 没有感觉

125. 我认为乳腺癌会危及我的 (多项选择)：

- 婚姻 (或密切关系)

- 事业
- 与爱人的关系
- 资金保证

126. 我未来患乳腺癌的可能性是:

- 极有可能
- 很有可能
- 有可能
- 可能性不大
- 几乎没有可能

127. 以下原因可能导致我患乳腺癌风险的是:

请在描述最正确符合的方块 (□) 内划叉 (X)

5=极有可能 4=很可能 3=可能 2=没有可能 1=非常没可能

- 年龄:
5 4 3 2 1
- 健康:
5 4 3 2 1
- 家族史:
5 4 3 2 1

128. 乳房自检 (BSE) 可能会:

请在描述最正确符合的方块 (□) 内划叉 (X)

5=极有可能 4=很可能 3=可能 2=没有可能 1=非常没可能

- 对我非常有好处:
5 4 3 2 1
- 帮助我发现乳房肿块:
5 4 3 2 1
- 帮助我不会太晚发现乳腺癌:
5 4 3 2 1
- 帮助我减轻患上乳腺癌的担忧:
5 4 3 2 1

129. 乳房 X 光检查 (mammography) 可能会:

请在描述最正确符合的方块 (□) 内划叉 (X)

5=极有可能 4=很可能 3=可能 2=没有可能 1=非常没可能

- 对我非常有好处:
5 4 3 2 1
- 帮助我发现乳房肿块:
5 4 3 2 1
- 帮助我不会太晚发现乳腺癌
5 4 3 2 1
- 帮助我减轻患上乳腺癌的担忧:
5 4 3 2 1
- 会减少我死于乳腺癌的风险
5 4 3 2 1

130. 是否有任何媒体或公众信息使您对乳腺癌有进一步的了解?

- 是 / 有
- 不是 / 没有

131. 您认为乳腺癌作为一种疾病的严重性是怎样的?

- 不是特别严重
- 严重
- 非常严重
- 可治愈的
- 会危及生命

132. 以下哪一个可能是您没有进行乳房自检的原因:

请在描述最正确符合的方块 (□) 内划叉 (X)

5=极有可能 4=很可能 3=可能 2=没有可能 1=非常没可能

● 觉得没有必要

5 4 3 2 1

● 耗费时间

5 4 3 2 1

● 疼痛

5 4 3 2 1

- 年纪过长
5 4 3 2 1
- 年纪过轻
5 4 3 2 1
- 可能会检查出不好的结果
5 4 3 2 1

133. 以下哪一个可能是您没有进行乳腺 X 光检查的原因
请在描述最正确符合的方块 (□) 内划叉 (X)

5=极有可能 4=很可能 3=可能 2=没有可能 1=非常没可能

- 没有必要的辐射照射
5 4 3 2 1
- 耗费时间
5 4 3 2 1
- 疼痛
5 4 3 2 1
- 年纪过长
5 4 3 2 1
- 年纪过轻
5 4 3 2 1
- 可能会查出不好的结果
5 4 3 2 1
- 我不知道如何预约检查
5 4 3 2 1
- 不方便到诊所
5 4 3 2 1

- 我不知道在检查过程中会发生什么
5 4 3 2 1
- 从业者可能对我不好
5 4 3 2 1
- 价格昂贵
5 4 3 2 1
- 我的医生并没有建议我进行乳腺 X 光检查
5 4 3 2 1
- 尴尬
5 4 3 2 1
- 会干扰我的日常活动
5 4 3 2 1

我们非常感谢您对此份调查问卷的完整填写。

Appendix J

Author Guidelines - Women & Health

Instructions for authors

Thank you for choosing to submit your paper to us. These instructions will ensure we have everything required so your paper can move through peer review, production and publication smoothly. Please take the time to read and follow them as closely as possible, as doing so will ensure your paper matches the journal's requirements. For general guidance on the publication process at Taylor & Francis please visit our Author Services website.

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Widely accepted as the standard reference source for specialists in the field, *Women & Health* contains information that is eminently useful to researchers, policy planners, and all providers of health care for women. The journal covers findings from studies concerning health and illness and physical and psychological well-being of women, as well as the environmental, lifestyle and sociocultural factors that are associated with health and disease, which have implications for prevention, early detection and treatment, limitation of disability and rehabilitation.

Features include:

- Original research articles
- Contributed critical, systematic research reviews
- Women's health policy research
- Critical, systematic historical research on women's health
- Book reviews

Contributors provide the technical and scientific backdrop that women's health issues require. From time to time, special symposium issues on a single theme are published.

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References

References, citations, and general style of manuscripts should be prepared in accordance with the Chicago Manual of Style, 16th Edition. Cite in the text by author and date (Pacini 1997) and include an alphabetical list at the end of the article.

Examples:

- Journal: Taylor, J., and B. C. Ogilvie. 1994. A conceptual model of adaptation to retirement among athletes. *Journal of Applied Sport Psychology* 6 (1):1–20. Book: Bowlby, J. 1982. *Loss: Sadness and depression*. Vol. 3 of *Attachment and loss*. 3rd ed. New York, NY: Basic Books.
- Chapter in a book: Remael, A. 2012. Audiovisual translation. In *Handbook of translation studies*, ed. by Y. Gambier and L. van Dooslaer, vol. 1, 2nd ed., 12–17. Amsterdam, the Netherlands: John Benjamins.
- Website: United States Census Bureau. 2014. American housing survey: 2013 detailed tables. <http://www.census.gov/newsroom/press-releases/2014/cb14-tps78.html> (accessed October 21, 2014).
- Dissertation: Allison, N. 1981. Bacterial degradation of halogenated aliphatic acids. PhD. diss., Trent Polytechnic.
- Conference presentation: Alfermann, D., and A. Gross. 1997. Coping with career termination: It all depends on freedom of choice. Paper presented at the 9th annual World Congress on Sport Psychology, Netanya, Israel, January 23.
- Paper/report: Grigg, W., R. Moran, and M. Kuang. 2010. National Indian education study. NCEES 2010-462, National Center for Education Statistics, Washington, DC.

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