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## RESEARCH ARTICLE

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# Arab Women's Breast Cancer Screening Practices: A Literature Review

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### Abstract

Breast cancer incidence and mortality rates are increasing in the Arab world and the involved women are often diagnosed at advanced stages of breast cancer. This literature review explores factors influencing Arab women's breast cancer screening behavior. Searched databases were: Medline, PubMed, Cochrane Database of Systematic Reviews, CINAHL Plus, Google Scholar, Index Medicus for WHO Eastern Mediterranean, and Asian Pacific Journal of Cancer Prevention. Breast cancer screening participation rates are low. Screening programs are opportunistic and relatively new to the region. Knowledge amongst women and health care providers, professional recommendation, socio-demographic factors, cultural traditions, beliefs, religious, social support, accessibility and perceived effectiveness of screening influence screening behavior.

**Keywords:** Arab women's breast cancer - Arab women's breast cancer screening - breast cancer in the Middle East region

*Asian Pac J Cancer Prev*, 14 (8), 4519-4528

### Introduction

Breast cancer is the most common cancer among Arab women. Breast cancer incidence rates in Arab women have increased during the last 24 years, and women are now being diagnosed with breast cancer at more advanced stages of the disease (Azaiza and Cohen, 2006; Tarabeia et al., 2007; Al-Saad et al., 2009; Miller, 2010). Morbidity and mortality have been shown to be effectively reduced by early detection of breast cancer through screening activities (Baron-Epel, 2009c; Bener et al., 2009; Cohen and Azaiza, 2010). Despite this finding, low participation rates in breast cancer screening activities have been reported among Arab women (Petro-Nustas and Mikhail, 2002; Bener et al., 2009; Najib Kwar, 2009; Azaiza et al., 2010). Barriers and facilitators that influence women's breast cancer screening practices need to be examined in order to plan for effective promotion of breast cancer screening for Arab women.

Literature on breast cancer screening in the Arab world is scarce (Alkhasawneh, 2007). Therefore, an integrative literature review was undertaken in order to: *i*) Gain an overview of breast cancer screening practices in the Arab world and; *ii*) Gain an overview of barriers and facilitators that may influence Arab women's breast cancer screening activities.

### Materials and Methods

Electronic databases were queried for full text, English language, peer reviewed literature published between 2000 and 2011. These were: Medline (OVID), PubMed, Cochrane Database of Systematic Reviews, CINAHL Plus, Google Scholar, and Index Medicus for WHO Eastern Mediterranean. The *Asian Pac J Cancer Prev* was searched separately. Keywords that were used singularly and in combination were: Arab, Middle East, Gulf, women, breast cancer, screening, culture, mammography, beliefs, knowledge, attitude, barriers, facilitators. CINAHL Plus, Medline OVID, and PubMed were searched for breast cancer screening and each Arab country separately. Reference lists from relevant articles were studied to identify additional articles to include in the review. A total of 444 articles were found.

An article was included in the literature review if: *i*) A relevant feature of breast cancer in the Arab world was described; *ii*) A particular aspect of breast cancer screening in the Arab world was described; *iii*) the breast cancer screening described was specific to Arab women; *iv*) the article was published in English between 2000 and 2011, and; *v*) a full text of the article was available. Relevant studies conducted in Iran and Turkey (non-Arab countries in the Middle East region) were included under criterion

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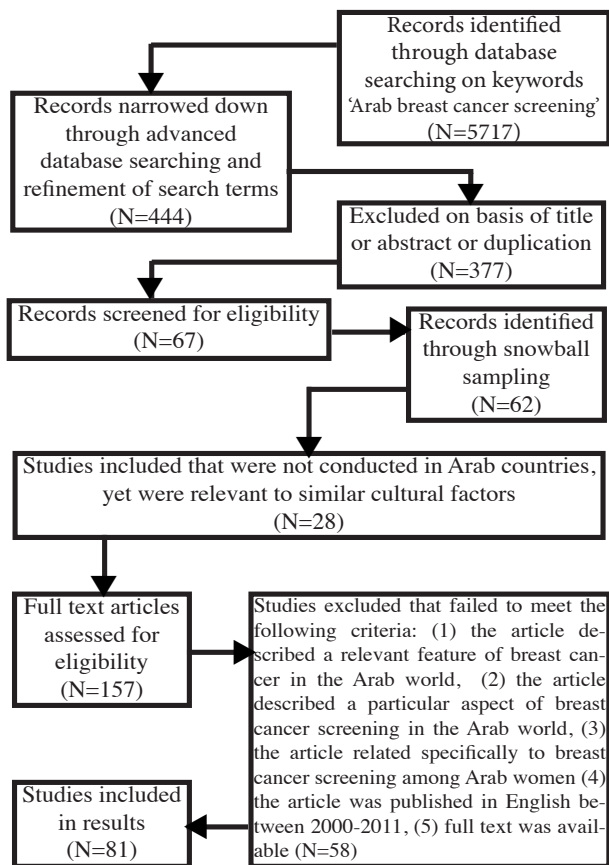


Figure 1. Flow Diagram of Literature Search

2. Iran and Turkey possess cultural aspects, traditional and religious values, similar to Arab countries and encounter similar issues regarding breast cancer screening. Eighty one (81) articles were included in the literature review (Figure 1).

Results

Breast cancer in the Arab world

The Arab world includes the Maghreb countries in North Africa (Libya, Tunisia, Algeria, Morocco, and Mauritania) and the countries in West Asia (Lebanon, Egypt, Sudan, Jordan, Palestine, the West Bank, Gaza, Israel, Somalia, Oman, Yemen, Djibouti, Oman, United Arab Emirates (UAE), Kuwait, Saudi Arabia, Bahrain, Qatar, Jordan, Iraq and Syria). The Arab world is home to more than 300 million individuals (Salim et al., 2009).

Breast cancer is a major public health threat among women in Arab countries (Bener et al., 2007; El Saghir et al., 2007; Salim et al., 2009). Figure 2 shows age-standardized incidence and mortality rates per 100,000 women for 19 Arab countries. Although breast cancer incidence rates are relatively low in Arab countries compared to Western countries, they are increasing rapidly (Bener et al., 2007; El Saghir et al., 2007; Azaiza and Cohen, 2008; WHO, 2011), illustrated by Kuwait with an age standardized incidence rate of 7.6/100,000 in 1982 and 47.7/100,000 in 2008, Lebanon with 20/100,000 in 1966 and 55.4/100,000 in 2008 (El Saghir et al., 2007). Furthermore, mortality rates are proportionally high in Arab countries (El Saghir et al., 2007; Azaiza and Cohen, 2008; IACR WHO, 2008b).

Early detection of breast cancer through regular screening activities such as breast self-examination (BSE), clinical breast examination (CBE), and mammography; improvement of the quality of screening activities; and enhanced treatment have been found to decrease mortality rates by 25-30% (Azaiza and Cohen, 2006; Mai et al., 2009; Ravert and Huffaker, 2010).

Breast cancer detected at an early stage has a high chance of responding successfully to treatment (Tarabeia et al., 2007; Bener et al. 2009; Petro-Nustas, 2001b). However, Arab women are often diagnosed at advanced stages of breast cancer (Petro-Nustas, 2001b; Harirchi et al., 2004; WHO EMRO, 2006; Bener et al., 2007; El Saghir, 2008; Baron-Epel et al., 2009c; Salim et al., 2009; Harirchi et al., 2011). In addition, Arab women develop breast cancer at younger ages than women in Western countries (Harirchi et al., 2004; Bener et al., 2007; El Saghir et al., 2007; Mousavi et al., 2007; Al Saad et al., 2009; Mousavi, 2009; Salim et al., 2009; Lakkis et al., 2010; Najjar and Easson, 2010); the median age for Arab women is 49-52 years compared to 63 years in women in more developed countries (El Saghir et al., 2007). The WHO regional office for the Eastern Mediterranean region (EMRO) reported in 2006 that breast cancer is more commonly diagnosed in Arab women under the age of 50 whereas in more developed countries the incidence rate is higher among women over the age of 50 (WHO EMRO, 2006).

The need for national breast cancer screening programs

In most Arab countries, breast cancer screening is opportunistic, meaning that women who participate in screening activities are either self-motivated or referred by a physician; there is no centrally organized invitation or follow-up system (El Saghir et al., 2007). In developed

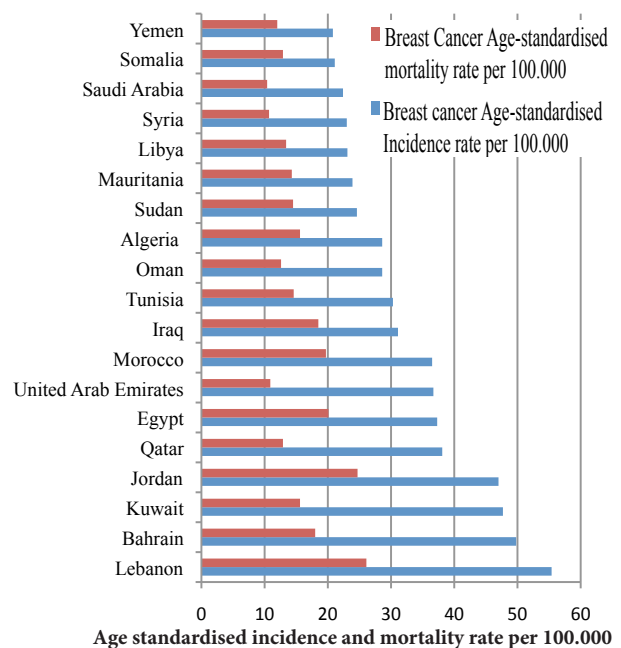


Figure 2. Age-Standardized Incidence and Mortality Rates Per 100,000 of Breast Cancer Victims in Selected Countries in the Arab World in 2008 Based on WHO Data (Globocan 2008, IARC)

countries, national or subnational breast cancer screening programs, many of which were implemented in the 1980s and 1990s, regularly invite women of defined ages to undergo mammography (Autier et al., 2011).

Breast screening programs in the Arab world began in the 1990s with the Shiraz Breast Cancer study (1996-1997) in which 10,000 Iranian women participated in a population based screening program for CBE and BSE (Hadi et al., 2002) and continued with the 2007-2008 Al Qassim Screening mammography, piloted in Saudi Arabia (Akhtar et al., 2010), the Cairo Breast Screening Trial (CBST) conducted in Egypt in 2005 (Boulos et al., 2005) based on BSE and CBE, and similar projects to the CBST based on CBE and BSE conducted in Yemen, Sudan, Iran, and Iraq in 2006 and 2007 (Miller, 2008). The Women's Health Outreach Program (WHOP) offered free mammography screening to all Egyptian women above age 45; 20,098 women were screened between October 2007 and February 2009 (Salem et al., 2008). Bahrain was the pioneer in The Middle East setting up a National

Breast Cancer Screening program in 2005 (Abulkhair et al., 2010); Jordan developed a National Breast Cancer Screening program in 2008/2009 (WHO EMRO, 2009).

In Israel, biannual mammograms for women aged 50-74 and annual mammograms are offered for women at risk. The Maccabi Healthcare Services (MHS) is one of the largest of four health care services, serving about 25% of the Israeli population (Baron-Epel et al., 2009c). Since 1998 the MHS has sent mammography invitations to eligible women, resulting in participation rates higher than any of the other countries in the region (Baron-Epel et al., 2009c; Wilf-Miron et al., 2010).

#### Participation rates

Because national screening programs are new to the Arab region and opportunistic in nature, the few studies that documented breast cancer screening participation rates (CBE, mammography, and BSE) found them to be alarmingly low for women throughout the region (Table 1).

**Table 1. Arab World Participation Rates in Breast Self-Examination (BSE), Clinical Examination (CBE) and Mammography**

Country	Study outcome	Author
Palestine	397 Palestinian women aged 50, more than 60% had never attended mammography, 18% had ever attended mammography, 28% had ever undergone CBE.	Azaiza et al., 2010
Egypt	10.4% of 565 women practiced BSE, 2.7% reported monthly BSE.	Abdel-Fattah, 2000
Sudan	7.2% of 200 medical students practiced BSE, 66.5% had heard of BSE. In addition, of a 300 asymptomatic female sample, 6.4% practiced BSE, 12% had heard of BSE.	Abdelrahman and Yousif, 2006
UAE	12.7% of 1367 women practiced BSE, 13.8% had undergone CBE, 10.3% had undergone mammography.	Bener et al., 2001
Qatar	24.9% of 1200 Qatari women aged 30-55 practiced BSE, 23.3% underwent CBE, 22.5% underwent mammography.	Bener et al., 2009
Jordan	7% of 519 Jordanian women practiced BSE regularly.	Petro-Nustas and Mikhail, 2002
Lebanon	18% of 1200 women had mammogram	Adib et al., 2009
Saudi Arabia	23.1% of 719 women practiced BSE, 14.2 had undergone CBE, 8.1%, had mammogram.	Rachivandran et al., 2011
Saudi Arabia	5.7% of 1315 women age 40-50 and 21.1% of women aged >50 adhering to screening of CBE and mammography according to age specified guidelines.	Amin et al., 2009
Yemen	17.4% of __No university students practiced BSE.	Ahmed, 2010
Israel	20% of 510 Muslim Arab women aged 50-69 had mammography screening according to age specified guidelines.	Soskolne et al., 2007
Israel	Telephone survey of 1550 women, 66.8% of Arab women and 74.2% of Jewish women had undergone mammography during the past 2 years.	Baron-Epel, 2009c
Israel	CBE participation rates were 69.5% for 305 Arab Muslim women, 88.7% for 159 Christian women, 65.4% for 104 Druze women. Mammography rates were 39.7% for Muslims, 58% for Christians, and 36.6% for Druze.	Azaiza and Cohen, 2006
Turkey	23.5% of 503 women, had mammogram at some stage, 33% had undergone CBE.	Avci and Kurt, 2008
Turkey	4.3% of 103 Muslim women performed BSE monthly, 21% performed BSE infrequently.	Avci, 2008
Turkey	27.7% of 224 female academicians performed BSE regularly, 23.2% performed BSE irregularly.	Ceber et al., 2009
Turkey	10.2% of 244 women in rural Turkey performed BSE monthly, 25% ever underwent CBE, 10.6% ever underwent mammography.	Dündar et al., 2006
Iran	28% of 320 Muslim women aged ≥ 35 had experienced mammography.	Hatefnia et al., 2010
Iran	4.5% of 384 married women, performed monthly BSE, 4.1% had experienced CBE, 1.3% had experienced mammography.	Heidari et al., 2008
Iran	6% of 410 Muslim women performed monthly BSE.	Montazeri et al., 2003
Iran	17% of 1402 women performed regular BSE, 20% performed irregular BSE, 63% had never performed BSE.	Montazeri et al., 2008

*Barriers to and facilitators of breast cancer screening*

Attention has been paid to barriers and facilitators related to breast cancer screening. It is recognized that personal, psychological, religious, environmental, social, and economic factors (Theisen, 2004; Soskolne et al., 2007) influence participation in screening programs and other screening activities. Cultural factors have been shown to play a vital role in women's attitudes to breast cancer screening (Bener et al., 2002; Azaiza and Cohen, 2006; Soskolne et al., 2007; Pasick and Burke, 2008; Bener et al., 2009; Akhtar et al., 2010; Azaiza et al., 2010; Baron-Epel, 2010).

Knowledge of the benefits of breast cancer screening is an important determinant of breast cancer screening behavior (Bener et al., 2002; Soskolne et al., 2007), and this knowledge is reportedly low in many Arab countries (Milaat, 2000; Rashidi and Rajaram, 2000; Seif and Aziz, 2000; Abdelraham and Yousif, 2006; Alam, 2006; Dandash and Al Mohaimeed, 2007; Soskolne et al., 2007; Heidari et al., 2008; Montazeri et al., 2008; Amin et al., 2009; Ahmed, 2010; Azaiza and Cohen, 2010; Aghamolaei et al., 2011). Some studies found that even among Arab women with sufficient knowledge, participation in breast cancer screening activities remained low (Dundar et al., 2006; Montazeri et al., 2008; Alkhasawneh et al., 2009; Bener et al., 2009; Taha et al., 2010).

Mass media, health care providers, and friends were found to be important sources of knowledge of breast cancer screening for Arab women (Dandash and Mohaimeed, 2007; Al Qattan et al., 2008; Montazeri et al., 2008; Ahmed, 2010). Lack of knowledge among nurses was found to limit encouragement of patients to engage in screening activities (Madanat and Merrill, 2002). Several studies in Jordan and Iran found that nurses and health care workers did not have sufficient knowledge of breast cancer risk factors and screening methods (Haji-Mahmoodi et al., 2002; Madanat and Merrill, 2002; Alkhasawneh, 2007; Jaradeen, 2010). In other studies, knowledgeable health care providers (Sreedharan, 2010) failed to perform CBE (19.5%) on the majority of their patients and only 5.1% recommended BSE to their patients (Harirchi, 2009).

Continuing education for health care providers is urgently needed, as midwives and nurses make frequent contacts with women and can play a crucial role in increasing breast cancer screening participation rates (Alkhasawneh, 2007; Avci and Kurt, 2008). Arab women have been found to be more likely to take part in screening activities when they have been recommended to do so by a health care provider (Lamyian et al., 2007; Soskolne et al., 2007).

Bener et al. (2001) reported that even though 80% of women in the UAE were willing to have CBE, only 33% of women had been offered CBE by a health care provider. The authors cited lack of proactive health care provider involvement in providing education or offering screening as a major barrier to breast screening activities. A study in Yemen (Al-Naggar et al., 2009) found that among 105 female physicians, 36.6% did not refer asymptomatic women to mammographic screening, 26.9% referred patients with a family history of breast cancer to mammography, and 24.7% referred patients

to mammography screening regardless of symptoms or history. Seventy-four percent (74%) of the participating physicians indicated that they would refer women for mammography only if it were requested by the women themselves (Al-Naggar et al., 2009).

Research shows that physicians are less likely to share information or recommend mammography to women different from themselves in terms of ethnicity, age, gender, or social class (Azaiza and Cohen, 2006; Keinan-Boker, 2006; Shirazi et al., 2006). However, male physicians who belong to the same culture as their female patients are also cautious in offering CBE because they are aware that the women would be uncomfortable having their breasts examined (Donnelly, 2008).

Additional barriers and facilitators to breast cancer screening activities have been found in sociodemographic factors such as age, education level, income, residence in urban or rural areas, employment, and marital status (Al-Qattan et al., 2008). Cost and availability of health insurance have been found to act as barriers to breast cancer screening in the U.S. and other parts of the world, but not in Saudi Arabia and Qatar where mammography is usually either free or covered by insurance (Amin et al., 2009; Bener et al., 2009). In Turkey, Jordan, Israel, and Iran, cost and lack of health insurance were found to be barriers to participation in breast cancer screening (Petro-Nustas, 2001a; Alkhasawneh, 2007; Lamyian et al., 2007; Cam and Gvmvs, 2009; Azaiza et al., 2010).

In Arab countries the role of women is often defined by marriage and children. Participating in screening activities could lead to a diagnosis of cancer, which would interfere with a woman's traditional duties (Baron-Epel, 2004; Remmenick, 2006). However, in one study women reported this factor to be a worry but no longer a barrier (Azaiza and Cohen, 2008). Iranian women cited the traditional role as a motivation to engage in breast screening activities because their children depended on their continued health (Lamyian et al., 2007). Only 8.9% of the subjects in Qatar and 2.7% in the UAE expressed that objections by male family members were a barrier to breast cancer screening (Bener et al., 2001; 2009).

Embarrassment and shyness are barriers to CBE, mammography, and BSE (Seif and Aziz, 2000; Bener et al., 2001; 2009; Petro-Nustas, 2001a). Arab women in Israel described breast cancer as something shameful that should remain a secret (Cohen et al., 2005). Fear of gossip and the belief that a woman's potential for a good marriage could be negatively affected have been described as a barrier to breast cancer screening (Azaiza and Cohen, 2008).

The lack of female physicians was found to be an important barrier to breast cancer screening for Saudi Arabian women (Amin et al., 2009; Akhtar et al., 2010). In a UAE study, 97% of the women participants reported preference for a female physician (Bener et al., 2001). Bener et al. (2001) reported that this factor was not a barrier in the UAE as sufficient female physicians were available in the health clinics. Israeli Arab women were less comfortable with a male examiner than with a female examiner, but the issue was not serious enough to act as a barrier to breast cancer screening. Although deeply

**Table 2. Barriers and Facilitators towards Breast Cancer Screening in the Arab World**

Barrier or facilitator	Country	Author
Inadequate knowledge of breast cancer and screening activities	Saudi Arabia, Egypt, Jordan, Israel, Yemen, Sudan, Iran, Palestine, UAE	Abdelrahman & Yousif, 2006; Alam, 2006; Amin et al., 2009; Ahmed, 2010; Aghamolaei et al., 2011; Azaiza & Cohen, 2010; Bener et al., 2001; Dandash & Al Mohaimeed, 2007; Heidari et al., 2008; Milaat, 2000; Montazeri et al., 2008; Seif & Aziz, 2000; Rashidi & Rajaram, 2000; Soskolne et al., 2007
Adequate knowledge yet still low participation rates	Kuwait, Qatar, Turkey, Jordan, Iran	Alkhasawneh et al., 2009; Al-Qattan et al., 2008; Bener et al., 2009; Alkhasawneh et al., 2009; Al-Qattan et al., 2008; Bener et al., 2009;
Sources of knowledge of breast cancer and screening activities: media, friends and health care providers	Saudi Arabia, Yemen, Iran, Kuwait	Ahmed, 2010; Al Qattan et al., 2008; Dandash & Mohaimeed, 2007; Montazeri et al., 2008
Health care providers were found to have inadequate knowledge of breast cancer screening	Jordan, Iran	Alkhasawneh, 2007; Jaradeen, 2010; Haji-Mahmoodi et al., 2002; Madanat & Merrill, 2002
Adequate knowledge yet only 65% were regularly performing BSE	UAE	Sreedharan et al., 2010
Professional recommendation was found to be an important facilitator however low percentages of health care providers were found to provide recommendation for breast cancer screening	Iran, Israel, Yemen	Al-Naggar et al., 2009; Harirchi et al., 2009; Soskolne et al., 2007
Socio-demographic factors such as age, education, income, marital status, employment, living in urban vs. semi-urban areas as predictors of breast cancer screening	Saudi Arabia, Iran, Egypt, Qatar, Lebanon, UAE, Jordan	Abdel-Fattah, et al., 2000; Adib et al., 2009; Alam, 2006; Amin et al., 2009; Bener et al., 2001 & 2009; Dandash & Mohaimeed, 2007; Petro-Nustas & Mikhail, 2002; Montazeri et al., 2008
Socio-demographic such as age, education, marital status were not predictors	Turkey, UAE	Avci & Kurt, 2009; Bener et al., 2001
Informal social support-objection of spouse to breast cancer screening only mentioned by small minority of 2.7% and 8.9% respectively	UAE, Qatar	Bener et al., 2001 & 2009
Fear of losing traditional role as woman as a result of cancer diagnosis as barrier	Israel	Baron-Epel, 2004; Remmenick, 2006
Fear of losing traditional role as woman not a barrier	Israel	Soskolne et al., 2007
Fear of losing traditional role as woman was concern but not strong enough to act as barrier	Israel	Azaiza & Cohen, 2008
Fear of losing traditional role as woman as a facilitator	Iran	Lamyian et al., 2007
Embarrassment regarding breast cancer screening activities	Saudi Arabia, Qatar, UAE, Jordan, Egypt, Israel, Iran	Akhtar et al., 2010; Amin et al., 2009; Bener et al., 2009; Bener et al., 2001; Cohen & Azaiza, 2005; Petro-Nustas, 2001b; Seif & Aziz, 2000
Embarrassment only mentioned by 4%	Turkey	Cam & Gvmvs, 2009
Although embarrassed women expressed this was not enough to act as a barrier	Israel, Iran	Azaiza & Cohen, 2008; Montazeri, 2003
Fear of gossip regarding breast screening practices	Israel	Azaiza & Cohen, 2008
Recommendation of breast screening from friend or family	Iran, Jordan, Israel	Lamyian et al., 2007; Petro-Nustas, 2001b; Soskolne et al., 2007
Religious influences regarding breast cancer screening as a facilitator	Israel, Iran	Azaiza & Cohen, 2008; Hatefnia et al., 2010
Women expressed religion not to be a barrier for BSE	Iran	Montazeri et al., 2003
Religious influences regarding breast cancer screening as a barrier	Israel	Baron-Epel (2010)
Accessibility to breast cancer screening facilities	Qatar, UAE, Iran, Egypt, Iran	Bener et al., 2001; Bener et al., 2009; Hatefnia et al., 2010; Lamyian et al., 2007; Seif & Aziz, 2000
Cost and lack of health insurance to cover breast cancer screening as barrier	Turkey, Jordan, Iran, Israel	Alkhasawneh, 2007; Azaiza et al., 2010; Cam & Gvmvs, 2009; Lamyian et al., 2007; Petro-Nustas, 2001b
Cost were not a barrier	Saudi Arabia, Qatar	Amin et al., 2009; Bener et al., 2009
Positive attitude toward learning about breast screening	Yemen, Kuwait, Saudi Arabia, Jordan	Ahmed, 2010; Al Qattan et al., 2008; Milaat, 2000; Petro-Nustas, 2001b
Self-confidence in ability to perform BSE	Iran, Yemen, Jordan, Turkey	Ahmed, 2010; Cam & Gvmvs, 2009; Lamyian et al., 2007; Montazeri et al., 2008; Petro-Nustas, 2001a; Petro-Nustas, 2001b; Petro-Nustas & Mikhail, 2002
Self-confidence in BSE only mentioned by 7%	UAE	Bener et al., 2001

**Table 2 (Continue). Barriers and Facilitators towards Breast Cancer Screening in the Arab World**

Barrier or facilitator	Country	Author
Self-care as a low priority	Egypt, Kuwait, Turkey, Iran, Qatar, UAE	Ahmed, 2010; Bener et al., 2001; Bener et al., 2009; Al-Qattan, 2008; Çam & Gümüş, 2009; Hatefnia et al., 2007; Lamyian et al., 2007; Seif & Aziz, 2000
Fear of breast cancer diagnosis as a barrier	Qatar, UAE, Yemen, Kuwait, Egypt, Turkey	Ahmed, 2010; Al Qattan et al., 2008; Bener et al., 2009; Cam & Gvmvs, 2009; Petro-Nustas, 2001a; Petro-Nustas and Mikhail, 2002; Seif & Aziz, 2000
Fear of breast cancer diagnosis as a barrier or a facilitator	Israel	Azaiza & Cohen, 2008; Baron-Epel, 2010; Cohen et al., 2005
Fear of pain from mammogram or CBE	Israel, UAE, Qatar,	Azaiza et al., 2010; Bener et al., 2001; Bener et al., 2009; Soskolne et al., 2007
Fear of pain only mentioned by minority	Jordan	Petro-Nustas, 2001a
Perception of low susceptibility to breast cancer as barrier	Israel, Turkey, Iran, Jordan	Abbaszadeh et al., 2007; Avci, 2009; Avci & Kurt, 2008; Dundar et al., 2007; Petro-Nustas, 2001a; Petro-Nustas, 2001b; Soskolne et al., 2007
Perception of low susceptibility to breast cancer not found as barrier	Iran	Hatefnia et al., 2010; Tavafian et al., 2009
Perceived effectiveness of breast cancer screening	Israel, Iran, Kuwait, Turkey	Abbaszadeh et al., 2007; Avci & Kurt, 2008; Baron-Epel, 2010; Hatefnia et al., 2010; Soskolne et al., 2007; Tavafian et al., 2009

embarrassed and uncomfortable, women believed that Islam would support medical examinations by a male if a female was not available (Montazeri, 2003; Azaiza and Cohen, 2008).

As Arab women depend on male family members for transportation and escorting, accessibility to a screening centre has been identified as a barrier (Bener et al., 2001; Azaiza and Cohen, 2008; Azaiza et al., 2010). In Egypt and Iran lack of or inadequate distribution of screening centers was identified as a barrier (Seif and Aziz, 2000; Lamyian, 2007). Women reported that housekeeping or work outside the home left them insufficient time to attend screening centers (Lamyian et al., 2007). Lack of time, forgetfulness, and neglect—was also found to be a significant barrier to attendance at screening centers (Seif and Aziz, 2000; Lamyian et al., 2007; Al-Qattan et al., 2008; Cam and Gvmvs, 2009).

Arab countries are collectivist societies. Subjective norms, social support, and role modeling are ways in which health behavior can be influenced by significant others, positively or negatively and directly or indirectly (Pasick and Burke, 2008). Therefore, a recommendation from a friend or family member to practice breast cancer screening activities is a major enabler (Petro-Nustas, 2001b; Lamyian et al., 2007; Soskolne et al., 2007). Having a relative with breast cancer has been found to be a predictor of participation in screening activities (Abbaszadeh et al., 2007; Lamyian et al., 2007; Amin et al., 2009; Bener et al., 2009).

Fear of breast cancer being detected has been found to be a significant barrier for Arab women (Seif and Aziz, 2000; Al Qattan et al. 2008; Bener et al., 2009; Cam and Gvmvs, 2009; Ahmed, 2010). In contrast, fear of cancer motivated Israeli Arab women to perform BSE, occasionally excessively (Cohen and Azaiza., 2005; Azaiza and Cohen, 2008). Baron-Epel (2010) found that low levels of fear of breast cancer related to low levels of mammography use in Arab women. Women who do not want to know if they have cancer or feel neutral about this knowledge, have been found to be less motivated to

participate in screening activities (Al-Qattan et al., 2008). Some women fear that talking about breast cancer can cause its onset (Petro-Nustas, 2001a; Petro-Nustas and Mikhail, 2002). Fear of pain from mammography or CBE has been found to act as a barrier to breast screening (Bener et al., 2001; 2009; Soskolne et al., 2007).

Lack of self-confidence in performing BSE can discourage women from self-screening (Petro-Nustas, 2001a; 2001b; Petro-Nustas and Mikhail, 2002; Al-Omran, 2005; Lamyian et al., 2007; Avci, 2008; Montazeri et al., 2008; Cam and Gvmvs, 2009; Tavafian et al., 2009; Ahmed, 2010), and perceived ineffectiveness of breast cancer screening can lower women’s participation (Abbaszadeh et al., 2007; Soskolne et al., 2007; Tavafian et al., 2009; Baron-Epel, 2010; Hatefnia et al., 2010).

*Religious influences breast cancer screening*

Islam plays a large role in many Arab women’s lives, however its impact on health seeking behaviors remains unclear (Hatefnia et al., 2010). Lower religiosity has been said to relate to higher BSE performance and lower personal barriers to breast cancer screening (Azaiza et al., 2010). However, the belief that one should take responsibility for one’s health is rooted in Islam and enables some women to participate in screening (Azaiza and Cohen, 2008; Hatefnia et al., 2010). Islamic religion and culture promote physical health by encouraging a healthy diet, careful hygiene, and regular exercise (Yosef, 2008), thus facilitate individuals to take care of their health.

Islam holds that individuals are responsible for their own health and that failing to care for one’s health is a sin (Hatefnia et al., 2010). According to Azaiza and Cohen (2008), “ignorance about Islam” allows some Muslim women to defer responsibility for their own bodies and health care to God, or fate, leading to passivity regarding self-care. This passive behavior can arise from a belief that external forces are in control (Straughan and Seow as quoted by Baron-Epel et al., 2009b). Some women may believe that death is inevitable when cancer is present

(Baron-Epel et al., 2009b). This view is common among some women (Remmenick, 2006) and can act as a barrier to screening activities (Mayo et al., 2001; Petro-Nustas and Mikhail, 2002; Lamyian et al., 2007; Baron-Epel et al., 2009b; Azaiza et al., 2010). Fatalism has mostly been found in women of low socioeconomic status and educational levels, but has also been noted in affluent populations (Baron-Epel and Klin, 2009a; Baron-Epel et al., 2009b; 2010).

Among Arab women who believe that cancer is a fate determined by God, the interpretation of this fate differs (Azaiza and Cohen, 2008). In a qualitative study among 51 Israeli Arab women, most of the women believed cancer to be a test of patience from God, whereas some women believed cancer to be a punishment from God for improper behavior. Still others concluded that contracting cancer was a punishment in life rather than a punishment deferred to Judgment Day (Azaiza and Cohen, 2008). Furthermore, the belief that one is vulnerable to breast cancer, has been related to higher participation in mammography (Petro-Nustas, 2001a; Abbaszadeh et al., 2007; Dundar et al., 2007). Table 2 describes barriers and facilitators toward breast cancer screening that are noted in the Arab world.

## Discussion

Incidence rates of breast cancer are rising and mortality rates are proportionally high in Arab countries compared to rates in developed countries. The common late diagnosis among Arab women has been related to the low participation rates of Arab women in breast cancer screening activities.

Several barriers to the engagement of women in breast cancer screening have been discovered. Although Arab countries share a great deal of culture, circumstances and economic factors vary enormously between countries. More studies are needed in each country to determine barriers specific to each population. Sociocultural, religious, demographic, environmental, and psychological factors have all been shown to influence participation in breast cancer screening by Arab women. As each population or cultural group has specific factors, it is important to investigate the barriers and facilitators affecting breast cancer screening participation in different segments of the Arab population (Azaiza and Cohen, 2008; Akhtar et al., 2010; Baron-Epel, 2010). It is necessary to understand these barriers and facilitators to develop culturally appropriate and effective interventions (Donnelly et al., 2011).

Lack of knowledge and confidence in the BSE technique was found to be a major barrier for many women. Thus providing more education about breast cancer and the benefits of screening for this disease is an essential first step (Montazeri et al., 2008). Educational programs that aim to change behavior by meeting women's existing beliefs rather than changing these beliefs might be an effective approach to increase screening practices (Petro-Nustas, 2001b). Breast cancer awareness campaigns are effective educational tools; they have been shown to increase motivation in individual women and to improve the attitudes and awareness of physicians (El

Saghir et al., 2007). Education of health care providers would help them to be more sensitive to the beliefs and customs of the Muslim community (Matin and LeBaron, 2004; Yosef, 2008; Banning and Hafeez, 2010).

Much of the literature reviewed found that professional recommendation motivated women to practice breast screening. This is a key finding in terms of improving interventions. Sending reminders in the form of a letter or SMS message was also found to be effective in increasing attendance at breast clinics (Soskolne et al., 2007; Baron-Epel, 2009c). Health care providers need to be encouraged to take a proactive role in offering screenings (Bener et al., 2001; Montazeri et al., 2008) and to play a major part in promoting breast cancer screening. In a Qatar study, 78% of the pharmacists queried revealed that they never distributed breast cancer educational materials. Despite their current low involvement, more than 60% of the pharmacists expressed a high interest in becoming involved in breast cancer health promotion activities (El Hajj and Hamid, 2010).

Social support and the realization that other Arab women are participating in breast screening activities are important enablers in collectivist societies. Recommendation by a friend or family member is an effective facilitator. Soskolne et al. (2007) suggests that women who are already engaged in breast cancer screening activities could act as advocates in creating health behavior changes in their communities.

Using breast cancer survivors to educate women could promote breast cancer screening (Remmenick, 2006) and inspire the view of cancer as a chronic disease rather than as a fatal disease. Hope of survival from a possible cancer diagnosis would encourage women to participate in breast screening activities (Baron-Epel and Klin, 2009a). As men play an important role in Arab women's lives, their interest and participation in breast cancer screening could be an effective enabler (Remmenick, 2006).

It has been shown that religion can play a positive or negative role in screening activities. Thus, collaboration is needed among medical professionals, policy makers, and religious leaders to persuade women that their religion can complement their (breast) health behavior (Mitchell et al., 2002; Hatefnia et al., 2010). Educating and getting support from religious leaders about the importance of breast cancer screening should be an essential part of an effective intervention strategy (Remmenick, 2006; Hatefnia et al., 2010). The media is recognized as an important enabler in breast cancer screening, thus, programs that address culturally specific barriers through media channels should be encouraged and media should play a major role in intervention strategies (Petro-Nustas, 2001b).

This literature review highlights the need for promotion of breast cancer screening and more research about the topic in the Arab world. Although recent years show a slight increase in research in this area, research is still very scarce and much work remains to be done if breast cancer screening is to achieve earlier detection and the consequent decreased mortality. Considerably more research is needed to identify and mitigate the barriers associated with different populations in Arab countries before culturally appropriate, socially acceptable, effective

intervention strategies can be developed.

## Acknowledgements

This publication was made possible by a grant from Qatar National Research Fund under its National Priority Research Program (NPRP 09-261-3-059). Its contents are solely the responsibility of the authors and do not necessarily represent the official views of Qatar National Research Fund.

## References

- Abbaszadeh A, Haghdoost A, Taebi M, Kohan S (2007). The relationship between women's health beliefs and their participation in screening mammography. *Asian Pac J Cancer Prev*, **8**, 471-5.
- Abdel-fattah M, Zaki A, Bassili A, El-Shazly M, Tognoni G (2000). Breast self-examination practice and its impact on breast cancer diagnosis in Alexandria, Egypt. *East Mediterr Health J*, **6**, 34-40.
- Abdelrahman S, Yousif M (2006). Self examination of the breast for early detection of breast cancer: the role of medical students in the faculty of medicine-University of Gezira-Sudan. *Sudan J Public Health*, **1**, 36-42.
- Abulkhair O, Saghir N, Sedky L, et al (2010b). Modification and implementation of NCCN guidelines on breast cancer in the Middle East and North Africa region. *J National Cancer Screening Network*, **8**, 8-15.
- Adib S, Sabbah M, Hlais S, Hanna P (2009). Research in action: Mammography utilization following breast cancer awareness campaigns in Lebanon 2002-05. *East Mediterr Health J*, **15**, 6-18.
- Aghamolaei T, Hasani L, Tavafian S, Zare S (2011). Improving breast self-examination: An educational intervention based on health belief model. *Iran J Cancer Prev*, **2**, 82-7.
- Ahmed B (2010). Awareness and practice of breast cancer and breast self examination among university students in Yemen. *Asian Pac J Cancer Prev*, **11**, 101-6.
- Akhtar S, Nadrah H, Gabbani S, et al (2010). First organized screening mammography programme in Saudi Arabia: Preliminary analysis of pilot round. *East Mediterr Health J*, **16**, 1025-31.
- Alam A (2006). Knowledge of breast cancer and its risk and protective factors among women in Riyadh. *Ann Saudi Med*, **26**, 272-7.
- Alkhasawneh IM (2007). Knowledge and practice of breast cancer screening among Jordanian nurses. *Oncol Nurs Forum*, **34**, 1211-7.
- Alkhasawneh IM, Akhu-Zaheya L, Suleiman S (2009). Jordanian nurses' knowledge and practice of breast self-examination. *J Adv Nurs*, **65**, 412-6.
- Al-Naggar R, Isa Z, Shah S, Chen R, Kadir S (2009). Mammography screening: Female doctors' attitude and practice in Sanaa, Yemen. *Asian Pac J Cancer Prev*, **10**, 743-6.
- Al-Omran H (2005). Measurement of the knowledge, attitudes, and beliefs of Arab-American adults toward cancer screening and early detection: development of a survey instrument. *Ethn Dis*, **15**, 15-6.
- Al-Qattan M, Al Saleh K, Al-Musallam S, Masoud G (2008). Knowledge and factors affecting breast self examination. *Kuwait Medical Journal*, **40**, 103-9
- Al-Saad S, Al-Shinnawi H, Mahmood Shamsi N (2009). Risk factors of breast cancer in Bahrain. *Bahrain Medical Bulletin*, **31**, 1-11.
- Amin T, Al Mulhim A, Al Meqihwi A (2009). Breast cancer knowledge, risk factors and screening among adult Saudi women in a primary health care setting. *Asian Pac J Cancer Prev*, **10**, 133-8.
- Autier P, Boniol M, Gavin A, Vatten L (2011) Breast cancer mortality in neighbouring European countries with different levels of screening but similar access to treatment: trend analysis of WHO mortality database. *BMJ*, **343**, 4411.
- Avci I (2008). Factors associated with breast self-examination practices and beliefs in female workers at a Muslim community. *Eur J Oncol Nur*, **12**, 127-33.
- Avci I, Kurt H (2008). Health beliefs and mammography rates of Turkish women living in rural areas. *J Nurs Scholarship*, **40**, 170-5.
- Azaiza F, Cohen M (2006). Health beliefs and rates of breast cancer screening among Arab women. *J Womens Health (Larchmt)*, **15**, 520-30.
- Azaiza, F, Cohen M (2008). Between traditional and modern perceptions of breast and cervical cancer screenings: a qualitative study of Arab women in Israel. *Psycho-Oncology*, **17**, 34-41.
- Azaiza F, Cohen M, Awad M, Daoud F (2010). Factors associated with low screening for breast cancer in the Palestinian authority: Relations of availability, environmental barriers, and cancer-related fatalism. *Cancer*, **116**, 4646-55.
- Aziz H, Akl O, Ibrahim H (2009). Impact of a health education intervention program about breast cancer among women in a semi-urban area in Alexandria, Egypt. *J Egypt Public Health Assoc*, **84**, 219-43.
- Banning M, Hafeez H (2010). A two-center study of Muslim women's views of breast cancer and breast health practices in Pakistan and the UK. *J Cancer Educ*, **25**, 349-53.
- Baron-Epel O, Granot M, Badarna S, Aurani S (2004). Perceptions of breast cancer among Arab Israeli women. *Women Health*, **40**, 101-16
- Baron-Epel O, Klin A (2009a). Cancer as perceived by a middle-aged Jewish urban population in Israel. *Oncol Nurs Forum*, **36**, 326-34.
- Baron-Epel O, Friedman N, Lernau O (2009b). Fatalism and mammography in a multicultural population. *Oncol Nurs Forum*, **36**, 353-61.
- Baron-Epel O, Friedman N, Lernau O (2009c). Reducing disparities in mammography-use in a multicultural population in Israel. *Int J Equity Health*, **8**, 19-30.
- Baron-Epel O (2010). Attitudes and beliefs associated with mammography in a multiethnic population in Israel. *Health Educ Behav*, **37**, 227-42.
- Bener A, Alwash R, Miller C, Denic S, Dunn E (2001). Knowledge, attitudes, and practices related to breast cancer screening: a survey of Arab women. *J Cancer Educ*, **16**, 215-20
- Bener A, Ayub H, Kakil R, Ibrahim W (2007). Patterns of cancer incidence among the population of Qatar: A worldwide comparative study. *Asian Pac J Cancer Prev*, **8**, 19-24.
- Bener A, El Ayoubi H, Moore M, et al (2009). Do we need to maximize the breast cancer screening awareness? Experience with an endogamous society with high fertility. *Asian Pac J Cancer Prev*, **10**, 1-6.
- Bener A, Honein G, Carter A, et al (2002). The determinants of breast cancer screening behavior: a focus group study of women in the United Arab Emirates. *Oncol Nurs Forum*, **29**, 91-8.
- Boulos S, Gadallah M, Neguib S, et al (2005). Breast screening in the emerging world: high prevalence of breast cancer in Cairo. *Breast*, **14**, 340-6.
- Cam, O, Gvmvs A (2009). Breast cancer screening behavior in Turkish women: relationships with health beliefs and



- self-esteem, body, perception and hopelessness. *Asian Pac J Cancer Prev*, **10**, 49-54.
- Ceber E, Yucel U, Mermer G, Ozenturk G (2009). Health beliefs and breast self-examination in a sample of Turkish women academicians in a university. *Asian Pac J Cancer Prev*, **10**, 213-8.
- Cohen M, Azaiza F (2005). Early breast cancer detection practices, health beliefs, and cancer worries in Jewish and Arab women. *Prev Med*, **41**, 852-8.
- Cohen M, Azaiza F (2008). Developing and testing an instrument for identifying culture specific barriers to breast cancer screening in Israeli Arab women. *Acta Oncol*, **47**, 1570-7.
- Cohen M, Azaiza F (2010). Increasing breast examinations among Arab women using a tailored culture based intervention. *Behav Med*, **36**, 92-9.
- Dandash K, Al-Mohaimeed A (2007). Knowledge, attitudes and practice surrounding breast cancer and screening in female teachers of Buraidha, Saudi Arabia. *Int J Health Sci (Qassim)*, **1**, 61-71.
- Donnelly, T. (2008). Challenges in providing breast and cervical cancer screening services to Vietnamese Canadian women: The healthcare providers' perspective. *Nursing Inquiry*, **15**, 158-68.
- Donnelly T, Al-Khater A, Al-Kuwari M, et al (2011). Study exploring breast cancer screening practices amongst Arab women living in the state of Qatar. *Avicenna*, **2011**, 1-9.
- Dundar PE, Ozmen D, Ozturk B, et al (2006). The knowledge and attitudes of breast self-examination and mammography in a group of women in a rural area in western Turkey. *BMC Cancer*, **6**, 1-9.
- El Hajj M, Hamid Y (2010). Breast cancer health promotion in Qatar: A survey of community pharmacists' interests and needs. *Int J Clin Pharm*, **33**, 70-9
- El Saghir N, Khalil M, Eid T, et al (2007). Trends in epidemiology and management of breast cancer in developing Arab countries: a literature and registry analysis. *Int J Surg*, **5**, 225-33.
- El Saghir N (2008). Responding to the challenges of breast cancer in Egypt and other Arab countries. *J Egypt Natl Canc Inst*, **20**, 309-12.
- Gursoy A, Hindistan S, Nurall N, et al (2009). A comparison of three educational interventions on breast self examination knowledge and health belief. *Asian Pac J Cancer Prev*, **10**, 765-72.
- Hadi N, Sadeghi-Hassanabadi A, Talei A, Arasteh M, Kazerooni T (2002). Assessment of a breast cancer-screening programme in Shiraz, Islamic republic of Iran. *East Mediterr Health J*, **8**, 386-92.
- Haji-Mahmoodi M, Montazeri A, Jarvandi S, et al (2002). Breast self-examination: knowledge, attitudes, and practices among female health care workers in Tehran, Iran. *The Breast*, **8**, 222-5.
- Harirchi I, Karbakhsh M, Kashefi A, Momtahan A (2004). Breast cancer in Iran: results of a multi-center study. *Asian Pac J Cancer Prev*, **5**, 24-7.
- Harirchi I, Mousavi S, Mohagheghi M, et al (2009). Do knowledge, attitudes and practice of Iranian health care providers meet WHO recommendations on early detection for breast cancer? *Asian Pac J Cancer Prev*, **10**, 849-52.
- Harirchi I, Kolahdoozan S, Karbakhsh M, et al (2011). Twenty years of breast cancer in Iran: Down staging without a formal screening program. *Ann Oncol*, **22**, 93-7.
- Hatefania E, Niknami S, Bazargan M, et al (2010). Correlates of mammography utilization among working Muslim Iranian women. *Health Care Women Int*, **31**, 499-514.
- Heidari Z, Mahmoudzadeh-Sagheb H, Sakhavar N (2008). Breast cancer screening knowledge and practice among women in southeast of Iran. *Acta Medica Iranica*, **46**, 321-8.
- IARC International Agency for Research Cancer, WHO. (2008b). Global cancer statistics. <http://www.iarc.fr/en/publications/pdfs-online/wcr/2008/index.php>
- Jaradeen N (2010). Breast cancer risk-factors and breast self examination practice among Jordanian women. *Bahrain Med Bull*, **32**, 1-7
- Keinan-Boker L (2006). Performance of breast cancer early detection in Arab women in Israel-room for improvement. *J Womens Health (Larchmt)*, **15**, 542-5.
- Lakkis N, Adib S, Osman M, Musharafieh U, Hamadeh G (2010). Breast cancer in Lebanon: Incidence and comparison to regional and western countries. *Cancer Epidemiol*, **34**, 221-5.
- Lamyian M, Hydarnia A, Ahmadi F, Faghihzadeh S, Aguilar-Vafaie M (2007). Barriers to and factors facilitating breast cancer screening among Iranian women: a qualitative study. *East Mediterr Health J*, **13**, 1160-9.
- Madanat H, Merrill R (2002). Breast cancer risk-factor and screening awareness among women nurses and teachers in Amman, Jordan. *Cancer Nurs*, **25**, 276-82.
- Mai V, Sullivan T, Chiarelli A (2009). Breast cancer screening program in Canada, successes and challenges. *Salud Publica De Mexico*, **51**, 228-35.
- Matin M, LeBaron S (2004). Attitudes toward cervical cancer screening among Muslim women: a pilot study. *Women and Health*, **39**, 63-77.
- Mayo R, Ureda J, Parker V (2001). Importance of fatalism in understanding mammography screening in rural elderly women. *J Women Aging*, **13**, 57-72.
- Milaat W (2000). Knowledge of secondary-school female students on breast cancer and breast self-examination in Jeddah, Saudi Arabia. *East Mediterr Health J*, **6**, 338-43.
- Miller A (2008). Practical applications for clinical breast examination (CBE) and breast self-examination in screening and early detection of breast cancer. *Breast Care*, **3**, 17-20.
- Miller A (2010). Screening for breast cancer in the eastern Mediterranean region. *East Mediterr Health J*, **16**, 1022-4.
- Mitchell J, Lannin D, Mathews H, Swanson M (2002). Religious beliefs and breast cancer screening. *J Womens Health (Larchmt)*, **11**, 907-15.
- Montazeri A, Haji-Mahmoodi M, Jarvandi S (2003). Breast self-examination: do religious beliefs matter? A descriptive study. *J Public Health*, **25**, 154-5.
- Montazeri A, Vahdaninia M, Harirchi I, et al (2008). Breast cancer in Iran: need for greater women awareness of warning signs and effective screening methods. *Asia Pac Fam Med*, **7**, 1-7
- Mousavi S, Montazeri A, Mohagheghi M, et al (2007). Breast cancer in iran: an epidemiological review. *The Breast*, **13**, 383-91.
- Mousavi S (2009). Age distribution of breast cancer in the Middle East, implications for screening. *The Breast*, **15**, 677-9.
- Najib Kawar L (2009). Jordanian and Palestinian immigrant women's knowledge, affect, cultural attitudes, health habits, participation in breast cancer screening. *Health Care Women Int*, **30**, 768-82.
- Najjar H, Easson A (2010). Age at diagnosis of breast cancer in Arab nations. *Int J Surg*, **8**, 448-52.
- Pasick R, Burke N (2008). A critical review of theory in breast cancer screening promotion across cultures. *Annu Rev Publ Health*, **29**, 351-68.
- Petro-Nustas W (2001a). Young Jordanian women's health beliefs about mammography. *J Community Health Nurs*, **18**, 177-94.
- Petro-Nustas W (2001b). Factors associated with mammography utilization among Jordanian women. *J Transcult Nurs*, **12**,

- Petro-Nustas W, Mikhail B (2002). Factors associated with breast self-examination among Jordanian women. *Public Health Nurs*, **19**, 263-71.
- Rachivandran K, Al Hamdan N, Mohamed G (2011). Knowledge, attitude, and behavior among Saudis toward cancer preventive practice. *J Family Community Med*, **18**, 135-42.
- Rashidi A, Rajaram S (2000). Middle eastern Asian Islamic women and breast self examination: needs assessment. *Cancer Nur*, **23**, 64-70.
- Ravert P, Huffaker C (2010). Breast cancer screening in women: an integrative literature review. *J Am Acad Nurse Pract*, **22**, 668-73.
- Remennick L (2006). The challenge of early breast cancer detection among immigrant women and minority women in multicultural societies. *The Breast*, **12**, 103-10.
- Salem D, Kamal R, Helal M, et al (2008). Women health outreach program; a new experience for all Egyptian women. *J Egypt Natl Canc Inst*, **20**, 313-22.
- Salim E, Moore M, Al-Lawati J, et al (2009). Cancer epidemiology and control in the Arab world-past, present and future. *Asian Pac J Cancer Prev*, **10**, 3-16.
- Seif N, Aziz M (2000). Effect of breast self-examination training program on knowledge, attitude and practice of a group of working women. *J Egypt Natl Canc Inst*, **12**, 105-15.
- Shirazi M, Champeau D, Talebi A (2006). Predictors of breast cancer screening among immigrant Iranian women in California. *J Womens Health (Larchmt)*, **15**, 485-506.
- Soskolne V, Marie S, Manor O (2007). Beliefs, recommendations and intentions are important explanatory factors of mammography screening behavior among muslim Arab women in Israel. *Health Educ Res*, **22**, 665-76.
- Sreedharan J, Muttappallymyalil J, Venkatramana M, Thomas M (2010). Breast self-examination and practice among nurses in United Arab Emirates. *Asian Pac J Cancer Prev*, **11**, 651-4.
- Taha H, Halabi Y, Berggren V, et al (2010). Educational intervention to improve breast health knowledge among women in Jordan. *Asian Pac J Cancer Prev*, **11**, 1167-73.
- Tarabeia J, Baron-Epel O, Barchana M, et al (2007). A comparison of trends in incidence and mortality rates of breast cancer, incidence to mortality ration and stage at diagnosis between Arab and Jewish women in Israel, 1979-2002. *Eur J Cancer Prev*, **16**, 36-42.
- Tavafian S, Hasani L, Aghamolaei T, Zare S, Gregory D (2009). Prediction of breast self-examination in a sample of Iranian women: an application of the health belief model. *BMC Women's Health*, **9**, 37-43.
- Theisen C (2004). In different cultures, cancer screening presents challenges. *J Natl Cancer I*, **96**, 10-2.
- WHO EMRO (2006). Guidelines for the early detection and screening of breast cancer. Available from: <http://applications.emro.who.int/dsaf/dsa696.pdf>
- WHO EMRO (2009). Towards a strategy for cancer control in the Eastern Mediterranean Region. Available from: <http://applications.emro.who.int/dsaf/dsa1002.pdf>
- WHO (2011) Breast Cancer: Prevention and control Available from: <http://www.who.int/cancer/detection/breastcancer/en/>
- Wilf-Miron R, Galai N, Gabali A, et al (2010). Organisational efforts to improve quality while reducing healthcare disparities: the case of breast cancer screening among Arab women in Israel. *Qual Saf Health Care*, **19**, 1-6.
- Yosef A (2008). Health beliefs, practice and priorities for health care of Arab Muslims in the United States: Implications for nursing care. *J Transcult Nurs*, **19**, 284-91.