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Evidence regarding interventions to support informed decision on attendance to breast cancer screening among immigrant women.

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Abstract

Background:

Breast cancer screening (BCS) is a prevention strategy of breast cancer (BC) facilitating early detection and treatment. BCS has been shown to be effective in reducing BC mortality and minimizing the need for more extensive invasive treatments. Immigrant women's participation rate to BSC is lower than that of native women. Interventions to support their informed decision making could make a difference to this.

Purpose

To investigate the current evidence of interventions for supporting informed decision making on attendance to BCS by immigrant women.

Materials and Methods

An integrative review was conducted by searching online databases (Medline, PubMed, PsycInfo, CINAHL, Scopus). A quality appraisal of the articles was performed by using Joanna Briggs Institute quality appraisal checklists and mixed method appraisal tool. Data was extracted and synthesized using narrative analysis.

Result

In total 25 articles were included in the study. Interventional strategies for supporting informed decision making on attendance to BCS by immigrants were home visits, personal navigation service support, education sessions, and media-led information.

Conclusion

In summary, to ensure the effective adoption of interventions for immigrants, it is imperative to consider cultural and linguistic tailored interventions, involve family members, especially husbands, offer free BCS and navigation services to those with limited financial resources, and, most importantly, uphold women's autonomy in deciding their participation in BCS.

Keywords

Cancer, immigrants, interventions, screening, mammography

Introduction

The worldwide incidence rate of breast cancer (BC) is the second highest across all types of cancers and ranks as the fifth cause of cancer deaths overall (1). World Health Organization (WHO) reports a BC incidence rate of 12 % and a BC mortality rate of 7 % among women worldwide (2).

According to the WHO, early detection is a key for improving breast cancer outcomes and survival (2). Breast cancer screening (BCS) is a means of detecting BC at its early stage (3). BCS has been shown to be effective in reducing BC mortality and minimizing the need for more extensive invasive treatments (3,4). However, the attendance rate of immigrant women for BCS, that is, the percentage of immigrant women present compared to the total expected, has been lower than that of native-born women (5). This could potentially put them at an increased risk for more advanced BC (5). On other hand, the benefit of BCS needs to be weighed against the harms of BCS (6). To overcome the concerns about harms of BCS the importance of providing information on the benefits and harms of BCS have been emphasized, so that women can actively participate in decision-making and make an informed choice based on their values and preferences (7, 8). A study showed that

knowledge and a proportion of women being able to make informed choice increased markedly when women (intervention group) received a decision aid containing explanatory and quantitative information on benefits and harms of BCS, compared to a leaflet (control group) that recommended BCS attendance, which did not contain quantitative information on BCS benefits and did not mention potential BCS harms. In the intervention group, 23.2% of 203 women made an informed choice compared to only 0.5% of 197 women in the control group (9).

The global estimate for 2020 indicates that approximately 281 million international migrants exist worldwide, comprising 3.6% of the global population (12). This figure reflects a continuous rise in the number of international migrants over the last five decades (10). Ensuring fair and unbiased access to high-quality healthcare services for all citizens, particularly in the context of a growing immigrant population deeply concerns both researchers and policymakers (10).

A variety of intervention strategies designed to enhance the uptake of BCS among immigrants, that is, attendance in BCS have been researched and studied. Combining strategies to address language barriers, provide culturally sensitive

education, build trust through community partnerships, offer accessible services, and reduce financial and logistical obstacles, alongside the assistance of outreach workers skilled in addressing language and cultural barriers, is likely to enhance the uptake of BCS (13). However, this review only included experimental and randomized controlled trials. A meta-analysis study of interventions found that access-enhancing strategies (reduce cost or free screening, mobile vans) play a vital role as intervention components, especially for immigrants who may face challenges in BCS due to limited resources (14).

There seems to be a lack of evidence from an integrative review [which allows for the inclusion of diverse methodologies that is experimental and non-experimental research and contribute to theory summarization for interventions (16)] of interventions aiming at supporting informed decision making on attendance to BCS by immigrants. Therefore, the study aims to investigate the current evidence of interventions for informed decision making on attendance to BCS by immigrant women.

Research question:

What kinds of interventions have been used aimed at supporting informed decision making on attendance to BCS by immigrant women?

Methods

Search strategy

This integrative review was conducted in accordance with the PRISMA guidelines for integrative review (17). A literature search of Medline, PubMed, PsycInfo, CINAHL, Scopus databases was conducted on October, 2023 and updated on March, 2025. Publication year limitation was not set. The search was done using the search string: ("Breast"[Mesh] OR breast*) AND ("Neoplasms"[Mesh] OR cancer* OR tumor* OR tumour* OR neoplasm* OR carcinoma*) AND (screening* OR mammogram*) AND ("Emigrants and Immigrants"[Mesh] OR immigrant* OR asylum* OR refugee*). Searches were limited to the English language.

The study selection was based on predetermined inclusion and exclusion criteria. The inclusion criteria were: 1) studies aimed at supporting informed decision making on attendance to BCS, 2) studies written in English, 3) immigrant women as participants. Studies were excluded if they 1) included the native population (national citizens) only or health care

professional as participants, 2) protocols and studies regarding intervention development.

Study selection and critical appraisal

Including the update search on March, 2025, 1041 studies were identified (Figure 1) from the databases. Following the elimination of duplicates, 740 distinct studies remained. The first author conducted an initial screening based on titles and removal of duplicates, resulting in 78 studies that were then downloaded into the Rayyan software (18), which is a tool for systematic review management and collaboration. Subsequently, all authors blindly assessed these studies based on their abstracts. Studies with abstracts that clearly aligned with the aim of our study were selected for full-text review (13). Additionally, studies with ambiguous abstracts were also reviewed in full to clarify their relevance. Studies with abstracts that did not relate to our study's aim were excluded, leaving a total of 56 studies for full-text review (13). Finally, all authors reviewed the full texts based on predetermined inclusion and exclusion criteria except for the four articles which were reviewed by only two authors because of lack of time of the third author. The authors held contrasting views regarding two studies where the immigrant status of participants lacked clarity, leading to uncertainty about their

actual immigration status. To resolve the disagreement, both studies were reexamined to determine the participants' status, and upon obtaining this clarification, they were included in the review.

The methodological quality of the included studies was assessed using Joanna Briggs Institute (JBI) critical appraisal tools. Depending on the study designs a respective critical appraisal tool was selected. For randomized controlled trials the JBI Randomized Controlled Trials critical appraisal tool (13 items) was used (20). This tool evaluates the internal, external or statistical conclusion validity. The non-randomized experimental studies were evaluated using the 9-item checklist for quasi-experimental studies (21). The checklist assesses the methodological quality of a study in design, conduct and analysis. JBI for a qualitative study typically consists of 10 items, which assess various aspects such as research design, data collection, analysis, and ethical considerations (22). Mixed method appraisal tool (MMAT) checklist for mixed method study was used. This tool consists of 5 items which permit appraise the methodological quality of mixed methods studies (23). These tools utilize multiple choice responses (yes, no, unclear or not applicable). The studies were first evaluated independently by the researchers

and then discussed within a team to achieve the final consensus. Finally, 25 studies were included for the review.

Data extraction and synthesis

Narrative analysis was utilized to extract and synthesize data about the interventions used in the selected articles (11). This analysis was done as there was heterogeneity in the studies. In the data extraction the following were tabulated: authors, year of publication, place of study conducted, study design, sample size, targeted population, description of intervention. (Table 5). A preliminary synthesis of findings was developed by searching for common and differing components, and then by grouping the related components together into sub-categories. Summarizing and categorizing continued until the main categories were formed (Table 6). This allowed us to summarize the heterogeneity of the interventions.

Results

Characteristics of the studies

In total, 25 studies published from 1996 to January 2025 were included. Of the studies that were included, the majority (n=22) were conducted in the United State of America (USA), two in Canada, and one in Jordan (Table 5). The autonomy of immigrant women in choosing to attend BCS was consistently respected in every intervention and those

who lacked interest in attending BCS were not compelled to participate.

Among the 25 studies, six were randomized controlled trials, six were quasi experimental studies, eight were pre-post interventional studies, two were qualitative, two were mixed method studies and one was retrospective ones. The number of participants in the interventions varied from 44 to 933.

Quality Appraisal of the studies

The assessment criteria were applied separately to randomized controlled trials (Table 1), quasi-experimental studies (Table 2), qualitative studies (Table 3), mixed method studies (Table 4). Each table summarizes the critical appraisal of the included studies in the respective category. The studies exhibited robust designs, with clear objectives, appropriate sample sizes, and rigorous data collection methods. However, limitations were identified in certain studies, such as potential bias in participant selection or challenges in ensuring data reliability. Despite these variations, all studies met acceptable standards and were included in this review.

Interventions to support informed decision on attendance to breast cancer screening

Various interventions aimed at supporting informed decision making on attendance to BCS by immigrant women were found. These interventions were categorized into two main categories: individually-based and group-based interventions. Individually-based interventions were sub-categorized into home visits and personal navigation services support whereas group-based interventions were subcategorized into educational sessions, and media led information (Table 6).

Individually-based interventions: These comprise tailoring activities or services on a one-on-one basis to address the unique needs and characteristics of individual recipients (19,24,35,49). They include home visits and personal navigation services support.

Home visit:

Home visits focusing on breast health awareness were conducted by visiting the immigrant's home individually (24). This intervention featured two key elements: a culturally sensitive breast health educational session delivered by local community outreach workers and referring women aged 40 and above to a nearby mammography unit for free screening. Moreover, a comprehensive intervention kit was developed, comprising flip cards, visual aids, pre- and post-tests, referral vouchers for complimentary

mammography, and a breast model for demonstrating proper breast self-examination techniques.

Personal navigation service support:

Personal navigation service support was given to help immigrants to reduce barriers towards participation in BCS (19,35,49). This was done through direct contact, phone calls or through mailing/emails (19,35,49). This was done to help the women to schedule appointments, make reminder calls, arrange transportation, and to resolve insurance issues (19,35,49). The lay health workers (LHW) even accompanied women to their appointments if they were afraid or felt they were unable to complete the mammogram appointment on their own (19).

Group-based interventions:

A group-based intervention refers to a therapeutic or educational approach that involves working with individuals as part of a collective or group setting (15,25,26,27,28, 29,30,31,32,33,34,36,37,38,39,40,41,42). It included media-led information and education session.

Media-led information:

This intervention used brochures (32), phone calls (32,33), text messages (34,39), automated voice messages (34) and

mails (34) to inform about BCS to immigrants. The messages were also personalized, that is, they addressed women by their first name (34).

Educational session:

Educational sessions about BCS awareness were conducted among the immigrants using different strategies. The sessions lasted from 30 min to 180 minutes. Culturally appropriate videos about BCS with discussion among the immigrants was done to increase their attendance in BCS (15). In one of the studies, the project directors and/or health educators with expertise in community-based programs led these educational sessions (27) while in other they were given by lay health workers (25,26,31,37,38,40,44,45). A cancer survivor was chosen to express her experience and to talk about the advantage of early detection in the session (27). To overcome language barriers, the presentations were conducted in multiple languages with the assistance of interpreters, ensuring that women had unrestricted access to the information (28,36). Interactive breast models were also incorporated, allowing to women to discern the distinctions between a healthy breast and one with benign and malignant tumors (27).

Husbands were involved along with their wives to reduce the cultural barriers of the immigrant women (28,46). Free mammography services were also made available after the session (28). Educational materials were culturally and linguistically tailored (15,25,26,27,28,29,30,31,32,33,34, 36,37,38,39,40,41,42,44,45,46). Additionally, the sessions were facilitated by a gender-match to the women, for their comfort (30).

Delivery Methods of the interventions:

Information regarding BC and BCS was delivered through voice messages (34), text messages (32,33,34,39), and phone calls (19,25,27,32,33,34,35,36,49). Furthermore, information was presented through power point presentations, flip cards/charts (24,25,26,31,36,40,44,45,46), brochure/pamphlets (26,41) and videos (15,24,27,30,31,36). Kits to raise women's awareness about breast cancerous lump (26) and the difference between a healthy and unhealthy breast (26) were also used to deliver the information. A face-to-face interaction delivery method was also used in many studies (19,24,25,29,35,38,40,41,42,44,45,46,59). (Table 7).

Discussion:

This review, encompassing 22 studies, presents a comprehensive overview of interventions aimed at supporting

informed decision making on attendance to BCS by immigrant women.

In this review, the interventions were categorized as individually-based and group-based ones. Interventions in the reviewed studies for supporting informed decision making on attendance to BCS by immigrant women in BCS were home visits (24), personal navigation service support (19,35,49), media-led information (32,33,34,39) and educational session (15,25,26,27,28,29,30,31,36,37,38,40,41,42,44,45,46).

Similar classification was also done in a study by Agide et al. (43) The interventions were classified as ‘individual-based’, ‘community-based’, ‘group-based teachings and training’ and ‘behavioral model based’.

For immigrant women with no basic primary education and a low financial income, navigation services were provided by lay health workers with financial help, appointments dates, and transportation facility, to support informed decision making on attendance to BCS (24,25). Navigation services during BCS help immigrant women overcome barriers such as language, cultural differences, and healthcare system complexity, leading to improved attendance and informed decision-making (19). Free screening for immigrants attracted them to attend BCS (29). These results are

consistent with the broader perspective presented in the literature review by Han et al. (14), emphasizing the importance of access-enhancing strategies such as reducing costs or providing free screening services and utilizing mobile vans. This is particularly relevant for immigrant populations who may encounter challenges in BCS due to limited resources (14).

Culturally and linguistically tailored interventions were organized for the immigrants to increasing their attendance in BCS (15,19,24,25,26,28,31,44,45). Culturally tailored interventions for BCS in immigrant women can enhance informed consent by addressing language barriers, health literacy, and cultural beliefs, thereby fostering better understanding and decision-making (50). The literature review by Han et al. also explained the necessity of culturally tailored interventions to increase the attendance of the immigrants in BCS (14). Moreover, bilingual health navigators were also offered to the immigrants (26,27). Han et al also explained the importance of communicating in their own native language with immigrant women to increase their BCS attendance (14). Moreover, involvement of couples in the BC promoting educational sessions was organized to increase the attendance of the immigrants in BCS (28,46). In

cultures characterized by collectivism, prevalent in many Asian countries, there is a high regard for the family unit, and decisions related to health and well-being are typically made collectively. The support of spouses and family plays a crucial role in influencing screening behaviors in these regions. Cross-sectional studies conducted in Malaysia and Saudi Arabia revealed that the knowledge and support of husbands or other family members regarding BCS were strong predictors of individuals undergoing clinical and breast self-examinations (47,48). The involvement of spouses in BCS) interventions for immigrants can significantly impact informed consent by influencing decision-making dynamics, addressing cultural norms, and enhancing support for BCS participation (51).

In comparison to interventions designed for the general population, interventions targeting specific ethnic groups exhibit greater heterogeneity (24,25,26,27,28). Interventional strategies in the reviewed studies were more often carried out by combining two or more strategies than by using single strategy to support informed decision making on attendance to BCS by immigrants. Similar results have been demonstrated by Lu et al. (13).

Interventions and Their Impact on Autonomy:

Interventions aimed at increasing BCS participation must be evaluated not only for their effectiveness but also for their impact on personal autonomy. While educational interventions that enhance understanding of risks and benefits support informed decision-making, those that use behavioural nudges, social influence, or fear appeals may inadvertently compromise autonomous choice (52). For instance, reminder letters, public awareness campaigns, and incentives may encourage participation but could also introduce coercive elements if individuals feel undue pressure to comply (52).

Furthermore, the ethical responsibility of healthcare systems to uphold autonomy extends beyond merely providing information. True informed choice requires that individuals have the capacity, opportunity, and freedom to make a decision that aligns with their values and preferences (53). This means ensuring that interventions facilitate understanding, allow for deliberation, and respect decisions to decline screening without negative consequences.

Population-based screening vs. opportunistic screening and Its Impact on Informed Choice:

Population-based and opportunistic BCS strategies differ significantly in their approach to patient autonomy.

Population-based screening programs are a part of society's preventive health care programs that aim to maximize participation and often provide information related to BC to all eligible individuals (54). While these programs seek to promote informed decision-making, the uniformity of information may not fully address individual preferences or circumstances, potentially limiting personal autonomy in decision-making (54).

In contrast, opportunistic screening occurs during routine healthcare visits, allowing for personalized discussions between patients and providers. This setting enables healthcare professionals to tailor information based on individual risk factors and preferences, potentially enhancing patient autonomy (55). Therefore, balancing the benefits of information of BC and BCS in population-based programs with the personalized approach of opportunistic screening is crucial to fully support patient autonomy in breast cancer screening decisions.

Involving immigrants in BCS is challenging and important. Identifying immigrants' barriers of BCS uptake and analyzing the ways to reducing those barriers, should be the target of the interventions. However, intervention should provide all the information about BCS including harms it can

cause enabling women to make an informed choice on whether to participate in the program.

In conclusion, the successful adoption of interventions for immigrants should prioritize full understanding about the benefits and disadvantages of BSC with understanding of cultural and linguistic factors. Involving family members, particularly husbands, can enhance women's engagement in these interventions. Additionally, providing free BCS and navigation services is crucial for facilitating participation among individuals with limited financial resources. Above all, it is essential to respect the autonomy of women to decide for themselves whether to participate in BCS.

Limitations:

The reliance on bibliographic databases for searches may have excluded pertinent unpublished studies and gray literature, introducing a potential publication bias. The absence of a meta-analysis due to the inability to statistically assess intervention effectiveness limits the study's quantitative synthesis. Including only opportunistic BCS in this review restricts the generalizability to population-based screenings. Moreover, the predominantly U.S.-centric nature of the reviewed studies raises questions about the global

applicability of findings to immigrant populations worldwide. The inclusion of only one qualitative study, coupled with the choice of the JBI quality appraisal tool, may not adequately capture the subjectivity inherent in the research, challenging the comprehensive interpretation of the study's outcomes.

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Figure Legends

Figure 1: Prisma flow diagram of breast cancer screening studies

Table: 1 JBI Critical Appraisal Checklist for Random controlled trial studies.

Criteria \ Studies	Lee et. al 2014	Leelin et al. 2015	Lee et. al 2017	De Jesus et. al 2021	Salinas et al. 2018	Tan et al. 2024
1. Was true randomization used for assignment of participants to treatment groups?	Yes	Yes	Yes	Yes	Yes	Yes
2. Was allocation to treatment groups concealed?	Yes	Yes	Yes	No	No	Yes
3. Were treatment groups similar at the baseline?	Yes	Yes	Yes	Yes	Yes	Yes
4. Were participants blind to treatment assignment?	Yes	Yes	No	Unclear	No	Yes
5. Were those delivering treatment blind to treatment assignment?	Yes	No	No	Yes	Unclear	Unclear
6. Were outcomes assessors blind to treatment assignment?	Yes	No	No	Yes	Unclear	Unclear
7. Were treatment groups treated identically other than the intervention of interest?	Yes	Yes	Yes	Yes	Yes	Yes

8. Was follow up complete and if not, were differences between groups in terms of their follow up adequately described and analyzed?	Yes	Yes	Yes	Yes	Yes	Yes
9. Were participants analyzed in the groups to which they were randomized?	Yes	Yes	Yes	Yes	Yes	Yes
10. Were outcomes measured in the same way for treatment groups?	Yes	Yes	Yes	Yes	Yes	Yes
11. Were outcomes measured in a reliable way?	Yes	Yes	Yes	Yes	Yes	Yes
12. Was appropriate statistical analysis used?	Yes	Yes	Yes	Yes	Yes	Yes
13. Was the trial design appropriate, and any deviations from the standard RCT design (individual randomization, parallel groups) accounted for in the conduct and analysis of the trial?	Yes	No	Yes	No	Yes	Yes

Table 2. JBI Critical Appraisal Checklist for Quasi-Experimental Studies (non-randomized experimental studies)

Table 3. JBI tool for qualitative study

<p style="text-align: center;">Studies</p> <p style="text-align: center;">Criteria</p>	Lee Hy et. al 2018	William et. al 2025
<p>1. Is there congruity between the stated philosophical perspective and the research methodology?</p>	Unclear	Unclear
<p>2. Is there congruity between the research methodology and the research question or objectives?</p>	Yes	Yes
<p>3. Is there congruity between the research methodology and the methods used to collect data?</p>	Yes	Yes
<p>4. Is there congruity between the research methodology and the representation and analysis of data?</p>	Yes	Unclear
<p>5. Is there congruity between the research methodology and the interpretation of results?</p>	Yes	Unclear

6. Is there a statement locating the researcher culturally or theoretically?	No	Yes
7. Is the influence of the researcher on the research, and vice-versa, addressed?	No	Yes
8. Are participants, and their voices, adequately represented?	Yes	No
9. Is the research ethical according to current criteria or, for recent studies, and is there evidence of ethical approval by an appropriate body?	No	No
10. Do the conclusions drawn in the research report flow from the analysis, or interpretation, of the data?	Yes	Yes

Table 4. MMAT for mixed method study

Criteria	Studies	
	Alkhaifi et al, 2024	Kwon et.al 2025
Is there an adequate rationale for using a mixed methods design to address the research question?	Yes	Unclear
Are the different components of the study effectively integrated to answer the research question?	Yes	Yes
Are the outputs of the integration of qualitative and quantitative	Yes	Yes

components adequately interpreted?		
Are divergences and inconsistencies between quantitative and qualitative results adequately addressed?	Yes	Yes
Do the different components of the study adhere to the quality criteria of each tradition of the methods involved?	Yes	Unclear

Table 5. Descriptions of Breast Cancer Screening Intervention studies (N=22) on immigrants and their outcomes.

Intervention	Home Visit	Navigation service	Description of intervention	Duration of intervention carried out
Taha et al.(2014), Jordan	- Home visit and individual talk -referral vouchers for complimentary mammography, and a breast model for demonstrating proper BSE techniques.	Percac-Lima et al.(2012), USA	-Culturally tailored patient navigation service	Each home visit lasted 70-90 minutes; 25-30 minutes for the interview and 45-60 minutes for the educational session
Percac-Lima et al. (2013), USA	-Culturally tailored patient navigation - at local churches and mosques			NR
Rodriguez-Torres et al.(2019), USA	Culturally tailored patient navigation program.			1-8 hours
				- 1hr of educational program and 1-90 min of personal contact

	<p>Kwon et al. (2025), USA</p> <ul style="list-style-type: none"> - Culturally tailored educational campaign - Patient navigation media 	<p>Williams et al. (2025), Canada</p> <ul style="list-style-type: none"> - Culturally tailored educational events - Free mammogram 	<p>Alkhaifi et al. (2024), USA</p> <ul style="list-style-type: none"> - Involvement of spouse in the intervention 	<p>Tan et al. (2024), USA</p> <ul style="list-style-type: none"> - Culturally sensitive video discussion 	<p>Nnorom et al. (2021), Canada</p> <ul style="list-style-type: none"> - Culturally sensitive educational session - free mammogram
	<ul style="list-style-type: none"> - -1hr educational session 			<ul style="list-style-type: none"> - 18 min of video and 14-66 min of discussion 	<p>NR</p>

Where, N is the total number of studies included.

Table 6. Research question, sub-categories and main categories of intervention

Research questions	Sub-categories	Main categories
What kinds of interventions have been used aimed at increasing the attendance rate of immigrant women in BCS, while also upholding their autonomous decision-making in the process?	Home visit Navigation services	Individually-based intervention
	Media-led information Education session	Group-based intervention

Table 7. Delivery methods of intervention

Authors, publication year and place	Delivery methods	Videos	Pamphlets/ Brochure
Taha et al.(2014), Jordan		x	
Percac-Lima et al.(2012), USA			
Percac-Lima et al. (2013), USA			
Rodriguez-Torres et al.(2019), USA			
Jenkins et al.(1999), USA			
Lee et al.(2017), USA			
Lee Hy et. al (2018), USA			
De Jesus et. al (2021), USA			
Han et al. (2009), USA			
Calderón et.al (2010), USA		x	
Aitaoto et al.(2012), USA			x
Lee-Lin et al.(2013), USA		x	
Lee et al.(2014), USA		x	
Gondek et al.(2015), USA			
Leelin et al. (2015), USA		x	
Nguyen-Trung et. al (2017), USA			
Silko et. al (2017), USA			
White et. al (2017), USA			
Salina et. al (2018), USA			
Kamaraju et al.(2018), USA			
Nnorom et. al (2021), Canada			
Tan et.al (2024), USA		x	
Alkhaifi et. al (2024), USA			x
Williams et al. (2025), Canda			
Kwon et al. (2025), USA			x

