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ORIGINAL PAPER

"I'm not Alone; He will be There for Me": A Mixed-Method Approach Exploring the Impact of Spousal Support on Mammogram Utilization and Health Beliefs

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Abstract

Regular mammogram screenings are effective for early breast cancer (BC) detection and decreased mortality rate. However, immigrant Muslim Arab women (IMAW) are less likely to adhere to these screenings although the rate of BC among IMAW is high. Recent studies have explored low mammogram screening rates among immigrant Muslim and/or Arab women from a limited perspective, overlooking the fact that husbands have an influence in IMAW's health behaviors toward cancer screenings. Thus, this mixed-method approaches were employed to (a) explore the association between spousal support and IMAW's health beliefs toward mammograms and their utilization, (b) to understand IMAW's experiences of spousal influence related to their mammogram use and health beliefs. The quantitative portion of the study, recruitment and data collection were conducted via online surveys in Arabic and English. Logistic regressions were used to explore relationships between perceived spousal support and IMAW's mammogram utilization and health beliefs. The qualitative portion of the study was conducted on a purposive sample of IMAW. A semi-structured interview guide in Arabic and English was used during one-on-one interviews. Arabic interviews were translated into English and transcribed by professionals. Interviews were analyzed by thematic analysis according to Braun and Clarke (2008). A total of 184 IMAW completed the survey with mean age of 50.4 ($SD = 5.58$, range = 45–60). Results revealed low mammogram screening rate among IMAW. Only 32.6% adhered to mammograms. Spousal support was positively associated with ever having obtained a mammogram and IMAW's adherence to mammogram. The 20 qualitative interviews, 16 in Arabic and four in English, produced rich description supporting results from the survey which includes, (a) types of spousal support, (b) impact of spousal support on participants' mammogram utilization and experience, and (3) impact of spousal support on participants' health beliefs toward mammograms. Findings from surveys and interviews show that a husband's support is positively associated with IMAW's mammogram utilization and health beliefs. Suggesting a new approach to integrate husbands in culturally appropriate interventions to increase mammogram screening rates among IMAW.

Keywords Health Disparities · Minority Health · Mammogram · Breast cancer

Background

In the United States, about one in eight women is predicted to have invasive breast cancer (BC) with the disease estimated to kill 1 in 39 women [1]. Currently, regular mammogram screening is the most effective approach to counter that threat [2]. However, increasing mammogram adherence rates is a nationwide challenge, especially among immigrant women of ethnic minorities who demonstrate poor mammogram adherence rates [1].

Immigrant Muslim and Arab women (IMAW), an ethnic minority group, have had unsatisfactory mammogram

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adherence rates as reported in a few states, including Illinois, California, New York, and Michigan [3–7]. Studies have shown that attitudes of IMAW toward mammogram screenings is created by a combination of social, religious, and cultural factors. Some of these factors were shaped in their countries of origin, such as BC stigma, fatalism, and health beliefs toward health promotion, whereas other factors are related to immigration, such as acculturation, difficulty navigating the US health care system, discrimination, and language barriers.

However, recent studies have explored low mammogram screening rates among immigrant Muslim and/or Arab women from a limited perspective, overlooking the fact that Arab cultures are family-centric [8, 9]. Few findings from qualitative studies have showed that family-related factors contributed to Arab and/or Muslim women's mammogram utilization. Family responsibilities were reported as a barrier to adhering to mammogram recommendations for some women, whereas family responsibilities motivated others to maintain their health and adhere to screenings to ensure they will be able to fulfill their family duties [10, 11]. Another family-centric factor that may contribute to IMAW's mammogram practice is their husbands. Scattered evidence in the literature has shown that husbands have a role in IMAW's behavior and attitude toward mammograms [9, 11–15].

Husbands' roles contributed to Muslim and/or Arab wives' mammogram utilizations, as reported in the literature, fluctuating from negative, positive, to no significant roles. Findings from qualitative and quantitative studies, which mostly conducted in Arab countries, suggested that a husband's encouragement could positively influence a wife's mammogram practices [12, 14].Women from the United Arab Emirates (n = 329) reported that their husbands could especially encourage hesitant wives to obtain or adhere to mammogram screening schedules [15]. Aligning with findings from a study on Qatari men (n = 50), they emphasized their role of making sure their wives received BC screenings [13]. Additionally, a national survey conducted among Lebanese women (n = 2,400) revealed that spousal encouragement significantly predicted the wife's adherence to mammogram recommendations, yet his study didn't describe whether or how husbands encouraged their wives [15].

Limited findings in the literature also suggested that involving husbands in the mammogram decision-making process has a positive or negative impact on their wives' mammogram practices. A cross-sectional study of Iranian women (n = 1,165) showed that a husband's involvement in his wife's decision to obtain a mammogram increased the woman's likelihood to ever have had a mammogram [16]. The study, however, did not describe how husbands were involved in the decision-making process.

In other studies, husbands involvement in the decision to obtain mammograms was studied as seeking husbands' permission to obtain the screening. A study among immigrant Arab and/or Muslim women (n = 130) in Washington, DC, reported that needing their husbands' permission to obtain a mammogram had a mild negative association with the women's adherence to BC screenings [14]. Similarly, women in qualitative studies conducted in both the Arab world (n = 15) and the United States (n = 107) reported that seeking husbands' permission to have BC screenings may delay their wives' mammogram screenings, especially if there is a lack of female physicians or due to stigma associated with BC [9, 13]. However, studies conducted in Qatar and United Arab Emirates showed different results. A cross-sectional study on Qatari (n = 1,063) women reported that only1.7% and 3.2% respectively had not obtained a mammogram because their husband denied approval [13]. Likewise, Emirati women (n = 41) emphasized that their husbands do not prevent their wives from obtaining a mammogram; the decision is the woman's [15].

Additionally, the socially constructed image about the husband in Arab culture has emphasized the significance of his role for his wife's well-being. This image is based on the Arab husband's role as protector, guider, and maintainer of the family. The image is also founded in Islamic religious beliefs as marital qīwamah, defined as a husband's mandatory responsibility to protect and care for his wife [17]. Fulfilling this religious responsibility includes addressing his wife's health needs by adhering to mammogram recommendations. A male Qatari participant reported, "Our religion, Islam, asks us to look after women and take care of them. Therefore, it is a must that Arab men have to protect her and keep her away from everything that could harm her or impact her life." [13].

Despite the importance of husbands' roles in their wives' well-being, and in addition to other findings from previous studies supporting that husbands influenced Arab and/or Muslim mammogram utilization, their exact roles have not been studied among IMAW. Therefore, to understand the association between spousal support and mammogram utilization among IMAW, a mixed-method approach employing both quantitative and qualitative methods was conducted. The quantitative part of the study aimed to explore the association between spousal support and IMAW's health beliefs toward mammograms and their utilization. With the qualitative part sought to understand IMAW's experiences of spousal influence related to their mammogram use and health beliefs.

To fully understand the association between spousal support and IMAW's mammogram use, we also explored the impact of spousal support on IMAW's health beliefs toward mammograms. Substantial evidence among IMAW

in the United States along with women in the Arab world confirmed that health beliefs toward mammograms have affected mammogram use [5, 7, 18, 19]. IMAW with higher perceived mammogram barriers were less likely to adhere to mammogram screening, whereas those with higher perceived mammogram benefits were more likely to obtain a mammogram [3, 5, 7]. Similarly, higher level of perceived self-confidence predicted having had at least one mammogram in their lifetimes [5].

Mixed-method approaches were employed because of a lack of culturally appropriate tools designed to measure spousal influence or support among IMAW. Additionally, as previously mentioned, a husband's influence on his wife's well-being is molded by religious and cultural contexts and employing just one research method may not explore this phenomenon fully. Thus, a qualitative method was incorporated to better understand the phenomenon, taking into consideration the religious and cultural contexts of the lives of IMAWs.

Methods

Recruitment and Data Collection

Concurrent mixed-method methodology (cross-sectional and thematic analysis) was conducted from January to September 2020. For the quantitative part of the study, a convenient sample was recruited online. Flyers, including Qualtrics-links to Arabic and English surveys, were distributed in private Facebook and WhatsApp groups for immigrant Arab women in Los Angeles and Orange County. Participation in the study was limited to those who met the following eligibility requirements: self-identification as Arab and Muslim, at least 45 years of age, immigrated from an Arab country as defined by the United Nations (2017) [20], no history of BC,residence in California, and married to an Arab husband. Each woman answered screening questions and signed consent electronically before participating in the survey.

For the qualitative portion of the study, women were recruited to participate in the interviews after completing the survey. Women who were interested contacted the primary investigator (PI) were screened and provided with the purpose of the interview. Participants set a date for a one-to-one phone interview in Arabic or English. Verbal consent was obtained from each woman before each interview. This study was reviewed and approved by the institutional review board at University of California Los Angeles.

Theoretical Frameworks

Two theories guided this study. The cross-sectional design of the study was guided by the health belief model, which provides a framework for understanding the impact of heath beliefs and modifying factors (e.g., sociodemographic) on human behaviors and attitudes toward health screenings [21]. In our study, spousal support, as a modifiable factor, could directly impact IMAW's behaviors toward mammogram utilization by motivating the women to obtain or adhere to mammogram recommendations. Also, spousal support could indirectly impact a woman's mammogram utilization by affecting her perception of health beliefs related to mammograms, which includes perceived mammogram benefits/barriers, BC susceptibility, and self-confidence to obtain the screening. Thus, we hypothesized that (1) Receiving high levels of spousal support will increase the likelihood that an IMAW has ever obtained a mammogram and adhered to mammogram screenings, and (2) receiving high levels of spousal support will be associated with high levels of perceived mammogram benefits / BC susceptibility / mammogram self-confidence, and low levels of perceived mammogram barriers.

Symbolic interactionism (SI) was the theoretical underpinning for thematic analysis. According to SI, meanings are driven from human social interaction and how individuals interpret and reinterpret those interactions [22]. Hence, IMAW's interpretation (perception) of their husbands' influence regarding mammograms what makes sense to them within their social, cultural, and religious context. This interpretation (meaning) is what affects these women's health beliefs and attitudes toward mammograms.

Survey Tools

Outcome Variables

History of Mammogram Use. Women were asked to report if they had (a) ever obtained a mammogram, and (b) obtained a mammogram within the past two years (adhered to mammogram according to American cancer society guidelines) [23].

Mammogram and Breast Health Beliefs. We utilized the modified Champion's breast health tool to measure IMAW's health beliefs regarding BC and mammograms [24–26]. The tool consists of five subscales, as follows, (a) perceived mammogram benefits (four items), (b) perceived mammogram barriers (23 items), (c) perceived BC susceptibility (three items), (d) perceived self-confidence to obtain a mammogram (10 items), and (e) fear (3 items). Each subscale employed a 5-point Likert-type scale, ranging from strongly agree to strongly disagree. Hasnain et al. (2014) [5]

adopted, translated, and validated the tool among Muslim women in Illinois (n = 207) of which 50.7% identified themselves as IMAW. Each subscale demonstrated an acceptable level of reliability. In our study sample, internal consistency reliability for each scale was acceptable with Cronbach's α that ranged from 0.85 to 0.901.

Independent Variables

Sociodemographic. Variables including age, education, country of origin, household income, and others, were collected. Sociodemographic information about the participants' husbands, including their education levels and duration of residency in the United States, were self-reported by the participants.

Spousal Support. The perceived spousal support scale was used to measure participants' perceptions about their husbands' support for mammogram screenings. The tool consisted of seven items (multiple choice); each item scores in a range from one to four, with high scores representing a higher level of perceived spousal support. The tool was developed for a Korean American female population with acceptable levels of internal consistency and reliability (Cronbach's alpha = 0.67) [27]. Among the sample in our study, Cronbach's alpha was 0.79. To the best of our knowledge, this tool has yet to be used with Muslim or Arab populations.

Interview Tool

For the qualitative portion of the study, the PI used a semi-structured interview guide in Arabic and English. The PI previously utilized the tool in a pilot study which provided opportunity to modify the questions and enhance the tool's credibility. The tool was designed to guide the PI start the interview with open ended and nondirective questions, suitable for IMAW to impartially share their experiences with mammogram, such as "Tell me about your experience with mammograms." The questions were also developed to guided PI asked focused questions about the women's experience of husbands' support to obtain mammograms, such as "what was it like for your husband to that you were getting a mammogram?". Table 1 presents examples of questions and probes used during the interview.

Table 1 Examples of interview questions and props

• Please share with me about the last time you received a mammogram?
• How did you decide on having your mammogram?
• Who, if anyone, was with you or was involved when you got the mammogram?
If the woman mentioned her husband, the PI followed up with question A; if not, the PI followed up with question B.
A- What was it like for your husband that you were getting a mammogram?
B- Please share with me more about any sort of support you received from you husband when you received your mammogram.

Tool Translation

Perceived spousal support, sociodemographic questioner, interviews guide were translated from English to Arabic by a professional translator. followed by evolution phase in which four bilingual (Arabic-English) Arab nurses with doctoral degrees in nursing appraised the translated tools independently for clarity and cultural appropriateness. The PI then integrated all evaluators' feedback. Finally, the translated survey to Arabic was piloted with 14 Arab women who were 45 years or older. No significant changes were requested.

Data Analysis

We computed descriptive statistics for demographics and for perceived spousal support. Then we conducted multivariate logistic regressions to evaluate the relationship between perceived spousal support and IMAW's mammogram utilization for both outcomes. Also, bivariate logistic regressions were conducted to further assess the association between each item in the spousal support scale, with IMAW's mammogram use for both outcomes. Finally, we performed multivariate linear regressions to assess the association between spousal support and IMAW's health beliefs toward mammograms. We computed confidence intervals at 95%, and $p < .05$ was considered significant. All analyses were conducted using SPSS version 28.0.

Initially, sociodemographic covariates were selected if they were associated with the outcomes at $p \leq .2$. Because of their multilinearity, the two covariates, which are women's age at immigration and the length of residence in the United States for husbands, were not included together in one model.

For the qualitative part of the study, we used inductive thematic analysis (TA) to analyze the interviews according to Braun and Clarke, 2008 [28]. Data analysis went through five phases: (a) data familiarity, (b) coding, (c) searching for themes, (d) reviewing themes, and (e) defining a naming theme. The PI first familiarized herself with the data while conducting interviews and then checked the transcripts for accuracy against the interviews. In the coding phase, initial codes were assigned to the data, line by line. Then the codes were closely examined for similarities and differences among in each interview. In this third phase, the PI grouped codes, phrases, and stories that shared similar meanings into themes. In the fourth phase (reviewing themes), data within each theme were evaluated for cohesiveness and validity.

Finally, after the main aspect of the data within each theme was identified, the PI wrote detailed description of each theme, examining how they fit within the overarching narrative response to the research question.

During data analysis, the PI held regular meetings with research team members to discuss interviews, initial coding, and themes, until a final agreement was reached. Due to the PI's identity as an Arab and Muslim woman, she also practiced self-reflexivity via memos written during data collection and analysis [29]. Methodological notes were written during and after each interview.

Results

Results from the surveys and interviews were presented in three main categories:1) types of spousal support, 2) impact of spousal support on participants' mammogram utilization and experience, and 3) impact of spousal support on participants' health beliefs toward mammograms. Results from the survey are outlined below, followed by results from the interviews.

Sample Characteristics

A total of 184 IMAW participated in the survey with a mean age of 50 years (standard deviation [*SD*] = 5.58, range = 45–60). About 58% reported having a bachelor's degree, and 48.9% were unemployed. The average length residence in the United States was 18.3 years (SD = 9.4; range = 1–45 years; see Table 2. In terms of mammogram utilization, the survey showed that 86% of the women had had at least one mammogram in their lives, and only 32.6% reported adherence to mammogram screenings (i.e., they had obtained a mammogram within the past 2 years).

The primary researcher conducted 20 one-on-one interviews, 16 of them in Arabic and 4 in English. The average duration of these interviews was 52 min. The average age of interview participants was 50 years (*SD* = 3.5, range = 45–58 years). In total, 9 of the participants (45%) reported having a bachelor's degree. The participants' average duration of residency was 20 years (*SD* = 7.9, range = 7–34 years) (see Table 2). All the women who participated in the interviews had had a mammogram at least once in their lifetimes, and 18 (90%) had had a mammogram within the last 2 years.

Types of Spousal Support

The survey showed that the average level of the participants' perceptions about spousal support was high ($\bar{X}$ = 20.2, *SD* = 4.8, range: 7–29). As demonstrated in Table 3, a majority (65%) of the participants reported that their husbands were very supportive if they wanted to get a mammogram, but only 9.8% of the women reported that their husbands had a strong influence on their decision to obtain a mammogram. About 35% of the women reported frequently receiving spousal encouragement to obtain a mammogram, and 28% frequently received advice or information from their husbands about health problems such as BC. In total, 56% of the participants reported that their husbands were willing to listen to their health problems related to BC and mammography. Half of the participants reported that their husbands helped by providing rides or watching their children while they attended mammogram appointments.

During the interview, IMAW expanded on the types of support they experienced from their husbands before, during, and after receiving mammograms. All spousal support was classified into two categories: tangible and emotional. In alignment with results from the survey, tangible spousal support included making mammogram appointments (according to one participant, *"[My husband] managed the appointment for me"*) and accompanying their wives to mammogram appointments (as another participant reported, *"He makes sure to free up his schedule to come with me"*). Tangible spousal support also included taking care of children during mammogram visits. One participant stated, *"When I went to do the mammogram, he took all responsibilities to watch the kids while I was having the mammogram."*

Participants in the interviews also shared forms of tangible spousal support that were not measured by the survey. Most of the participants (n = 17) reported that their husbands were the main translators during appointments or after receiving mammogram results; as one woman said, "*He was the one who translated for me.*" A few participants (n = 3) said that their husbands' tangible support was mainly financial (e.g., *"He will pay for mammograms and any procedure for me to stay healthy*"). An additional form of tangible support was receiving education about mammograms and BC from their husbands. One woman shared a story about the first time she heard about mammograms, saying, *"I wasn't aware, so I asked my husband, and then my husband told me, 'They will check and see if you have breast cancer, because women get it after a certain age.'"*.

Like survey participants, interview participants had also experienced emotional spousal support, such receiving their husbands' encouragement to get a mammogram. One of the participants said, *"He always supports me when I plan to have a mammogram.'"* Other women (n = 6) received reminders to make or maintain mammogram appointments; as one woman said, *"He reminds me to ask the doctor about mammograms."* In alignment with the survey, participants also considered it emotional support when their husbands listened and discussed with them their concerns about breast

Table 2 Demographic characteristics of participants in surveys and interviews

Characteristics	Survey Number (%) *(N = 184)*	Interview Number (%) *(N = 20)*
Age,	**n = 184**	**n = 20**
45–50	112 (60.9)	10 (50)
≥51	72 (39.1)	10 (50)
Mean (range)	50.4 (range 45–70)	50.9 (range 45–58)
Duration in the United States (women)	**n = 184**	**n = 20**
≤ 18 years	141 (76.6)	10 (50)
> 18 years	43 (23.4)	10 (50)
Mean (range)	18.3 (1–45)	19.8 (range 7–34)
Age at the time of immigration	**n = 184**	**n = 20**
≤ 31 years	109 (59.2)	11 (55)
> 31 years	75 (40.8)	9 (45)
Mean (range)	31 (5–45)	30.2 (18–43)
Level of education	**n = 182**	**n = 20**
High school or less	22 (12.0)	2 (10)
Associate degree	53 (29.1)	6 (30)
Bachelor's degree or higher	107 (58.7)	13 (65)
Employment	**n = 182**	**n = 20**
Full-time	30 (16.4)	7 (35)
Part-time	56 (30.7)	5 (25)
Not employed	90 (49.4)	8 (40)
Retired	6 (3.3)	0
Number of children	**n = 181**	**n = 20**
No children	12 (6.6)	1 (5)
One child	30 (16.4)	4 (20)
Two children	26 (14.2)	4 (20)
Three children	43 (23.6)	4 (20)
More than three children	70 (38.4)	7 (35)
Marriage duration	**n = 184**	**n = 20**
≤ 10 years	21 (11.4)	1 (5)
11–20 years	58 (31.5)	6 (30)
21–30 years	74 (40.2)	11(55)
≥ 31 years	31 (16.8)	1 (5)
Mean (range)	23.5 (4–52)	21.3 (range 7–35)
Annual house income	**n = 172**	**n = 20**
<$16,000	28 (16.2)	4 (20)
$16,001–35,000	38 (22.0)	3 (15)
$35,001–55,000	32 (18.6)	4 (20)
>$55,000	74 (43.0)	9 (45)
Having health insurance	**n = 182**	**n = 20**
Yes	176 (95.7)	20 (100)
No	6 (3.3)	0 (0)
Ability to speak English (self-rated)	**n = 182**	**n = 20**
Excellent	65 (35.3)	11 (55)
Good	100 (54.3)	9 (54.3)
Poor	17 (9.2)	1 (5)
Ability to read English (self-rated)	**n = 182**	**n = 20**
Excellent	76 (41.7)	10 (50)
Good	89 (48.9)	9 (45)
Poor	17 (9.3)	1 (5)
Level of Education (husbands)	**n = 182**	**n = 20**
High school or less	18 (9.8)	0
Associates degree	38 (20.7)	5 (25)
Bachelor's degree or higher	126 (68.9)	15 (25)
Employment (husbands)	**n = 180**	**n = 20**
Full-time	110 (61.1)	11 (55)
Part-time	28 (15.5)	7 (35)
Not employed	16 (8.8)	1 (5)
Retired	26 (14.4)	1 (5)

Table 2 (continued)

Characteristics	Survey Number (%) *(N = 184)*	Interview Number (%) *(N = 20)*
Duration in the United States (husbands)	**n = 183**	**n = 20**
≤ 25 years	90 (49.1)	9 (47.4)
> 25 years	93 (50.8)	10 (52.6)
Mean (range)	25 (1–48)	28.6 (range 7–42)
Receiving health care provider recommendation	**n = 184**	**n = 20**
Yes	154 (83.7)	16 (80)
No	30 (16.3)	4 (20)

Table 3 Perceived spousal support scale descriptive analysis (N = 184)

Characteristics	Number (%)
Husband's support for having mammography (n = 183)	
Very unsupportive	3 (1.6)
Somewhat unsupportive	12 (6.5)
Somewhat supportive	49 (26.6)
Very supportive	119 (64.7)
Husband's feeling about receiving mammography (n = 183)	
Strongly disapprove	3 (1.6)
Disapprove	9 (4.9)
Approve	92 (50)
Strongly approve	79 (99.5)
Husband's opinions about the decision to obtain a mammogram (n = 183)	
Not very much influence	60 (32.6)
Not much influence	54 (29.3)
Much influence	51 (27.7)
very much influence	18 (9.8)
Receiving encouragement to have a mammogram (n = 184)	
Never	54 (29.3)
Rarely	28(15.2)
Sometimes	37 (20.1)
Frequently	65 (35.3)
Willingness to listen to health problems such as breast cancer and mammogram (n = 183)	
Never	18 (9.8)
Rarely	16 (8.7)
Sometimes	46 (25)
Frequently	103 (56)
Receiving advice or information about mammography (n = 184)	
Never	41 (22.3)
Rarely	43 (23.4)
Sometimes	47 (25.5)
Frequently	52 (28.3)
Providing rides taking care of family members while having mammogram appointment (n = 184)	
Never	13 (7.1)
Rarely	19 (10.3)
Sometimes	28 (15.2)
Frequently	93 (50.5)

health and cancer screenings. One woman stated, *"We talked about that [BC screenings], and my husband is a great listener."* As mentioned in the interviews only, emotional spousal support also extended to husbands' championing wives' health rights. For example, one of the participants felt uncomfortable about being examined by a male doctor; she stated, *"I closed my eyes, and my husband was like, 'You know, if you want a female physician, it's okay.'"*.

The Impact of Spousal Support on Participants' Mammogram Utilizations and Experience

Spousal support was positively associated with IMAW's mammogram utilization. Multivariate analyses showed that women who reported higher levels of spousal support had 13% higher odds of ever having obtained a mammogram than their counterparts (*OR* = 1.13, *P* < .017, *CI*: 1.02–1.25). Additionally, a perception of high levels of spousal support increased the likelihood of IMAW's mammogram adherence (having obtained a mammogram within the last 2 years; *OR* = 1.08, *CI*: 1.00–1.17, *P* < .04; see Table 4).

When we took into account the impact of each item in the survey on participants' mammogram utilization, only two forms of emotional spousal support were significant. First, receiving husbands' frequent encouragement to obtain mammograms increased participants' likelihood of ever having obtained a mammogram up to three times, and it doubled their chances of adhering to mammogram screening compared to women who reported never having received spousal encouragement (OR = 3.11, P = .033, CI: 1.09–8.87; OR = 2.9, P = .009, CI: 1.31, 6.47, respectively). Second, we also found that participants who reported that their husbands were frequently willing to listen to their breast health concerns were more likely to have ever obtained a mammogram compared to women whose husbands were never willing listen to their concerns (OR = 3.79, P = .023, CI: 1.20–11.97).

Data from the interviews revealed more details that helped clarify how spousal support impacted these wives' attitudes toward mammogram use. For some women (n = 7), receiving advice to undergo screening was what initially

Table 4 Association between spousal support and mammogram utilization (have ever obtained a mammogram and obtained a mammogram within the previous two years),controlling for covariates (multivariate logistic regression, N = 173–172)

Out comes Variables	Variables	B	S.E.	Wald	df	Sig.	OR	95% C.I.	
								Lower	Upper
Ever having had a mammogram	Perceived Spousal Support (Scale)	0.126	0.05	5.66	1	0.017*	1.13	1.02	1.25
	Number of years spent in USA (women)	0.01	0.03	0.22	1	0.63	1.01	0.95	1.07
	Annual income:								
	<$16,000zz	-1.63	0.73	4.94	1	0.02*	0.19	0.04	0.82
	$16,000–$35,000	−0.52	0.69	0.57	1	0.44	0.59	0.15	2.29
	>$35,000–$55,000	-1.11	0.66	2.81	1	0.09	0.32	0.09	1.20
	>$55,000	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Age	0.11	0.06	3.46	1	0.06	1.12	0.99	1.27
Having had a mammogram within the previous two years	Perceived Spousal Support (Scale)	0.08	03	4.22	1	0.04*	1.08	1.00	1.17
	Number of years spent in USA (women)	0.03	0.02	2.36	1	0.12	1.03	0.99	1.07
	Annual income:								
	<$16,000	-1.14	0.55	4.26	1	0.03*	0.31	0.10	0.94
	$16,000–$35,000	−0.50	0.48	1.09	1	0.29	0.60	0.23	1.56
	>$35,000–$55,000	−0.66	0.51	1.69	1	0.19	0.51	0.18	1.40
	>$55,000	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Husbands' level of education								
	High school or less	−0.01	0.62	0.01	1	0.99	0.99	0.29	3.36
	Associate degree	0.62	0.41	2.30	1	0.12	1.87	0.83	4.22
	Bachelor's degree or higher	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref

*P < .05, **P < .01, ***P < .001

prompted them to get their first mammogram. One participant stated, *"Maybe if [my husband] didn't tell me that I should have a mammogram. . I wouldn't have done it."* Spousal support for some women (n = 4) was a facilitator that changed their attitude toward mammograms. One participant shared that, when she was a recent immigrant to the United States, her husband used encourage her to see the physician for annual checkups. *"We're going to see the doctor,"* her husband would tell her. Initially, she replied, *"I am not sick,"* but with her husband's encouragement, her attitude toward mammograms eventually changed, and she began to adhere to the screenings. She said, *"Since then, it's my habit."* Adhering to mammograms and other secondary health screenings were linked to receiving a regular reminder from husbands to book the annual visit with the family doctor. As one woman reported,*"[My husband] would say, you have to do your checkups for this year, and I will call to make an appointment."*

When husbands discussed their wives' concerns about mammograms, they frequently uncovered some of the negative emotions associated with mammogram attainment. One of these negative emotions was fear of being diagnosed with BC. A few participants (n = 4) reported alleviating their fears by sharing their feelings with their husbands before a mammogram appointment. One woman said, *"If I told him that I am afraid or worried, he discussed it with me."* Such discussion enhanced the women's sense of security when going through the screening; another woman shared her feelings by saying, *"Seriously, you can feel secure; you can feel that there's someone near you*." For another participant, this security was a motive to have regular mammograms, a fact she emphasized by saying, *"I'm not alone; he will be there for me."*After obtaining mammograms, spousal support also helped to lower wives' anxiety. One woman stated, *"While I was waiting for the results, he helped me to feel calm."*

Impact of Spousal Support on Participants' Health Beliefs Toward Mammograms

Multiple linear regression analyses were conducted and the results are presented in Table 5. After controlling for selected sociodemographic covariates, we found statistically significant associations between perceived spousal support and IMAW's mammogram health beliefs. Perceived spousal support significantly predicted an increase in IMAW's perceived self-confidence even after controlling for receiving a mammogram recommendation from health care providers and other covariates. The model was significant (F (5,170) = 6.74, $P < .001$), explaining about 14.5% of the variance in IMAW's perceived self-confidence ($R^2 = 0.155$; adjusted R = .141). Perceived spousal support was also positively associated with women's perceived mammogram benefits. The model was significant (F (6,169) = 4.75, $P < .001$) and explained approximately 11% of the variance in IMAW's perceived mammogram benefits

Table 5 Association between spousal support perceived breast cancer and mammogram health beliefs in IMAW, controlling for covariates (multivariate linear regression, N = 181–183)*

Out Come Variable	Predictor Variable	B	SE	t	P	CI	
Perceived Mammogram Barriers	Perceived Spousal Support.	-0.7	0.18	-3.75	0.0001	-1.07	-0.33
	Level of Education (husbands)	-1.37	1.37	-1	0.31	-4.09	-1.33
	Employment (women)	-0.65	0.3	-2.17	0.03	-1.25	-0.05
Perceived Mammogram Benefits	Perceived Spousal Support.	0.14	0.03	3.75	0.0001***	0.06	0.22
	Level of Education (women)	-0.25	0.18	-1.36	0.17	-0.62	0.11
	Level of Education (husbands)	-0.26	0.3	-0.86	0.39	-0.85	0.33
	Employment (husbands)	-0.03	0.05	-0.65	0.51	-0.14	0.07
	Marriage duration	0.01	0.007	1.45	0.14	0.003	0.02
	Number of children	0.28	0.13	2.05	0.04	0.01	0.55
Perceived Self Confidence	Perceived Spousal Support.	0.35	0.08	4.21	.001**	0.18	0.51
	Duration in the United States (women)	0.05	0.06	0.85	0.39	-0.06	0.17
	Duration in the United States (husbands)	0.07	0.04	1.52	0.12	-0.02	0.16
	Employment (women)	-0.84	0.51	-1.65	0.1	-1.85	0.16
	Health care provider recommendation	-0.82	1.11	-0.73	0.46	-3.03	1.38

Note. *P < .05, **P < .01, ***P < .001

($R^2 = 0.14$; adjusted R = .11). Finally, one point of positive difference was that perceived spousal support significantly decreased wives' perceived mammogram barriers by -0.706 unit (F (3,178) = 6.46). The model explained about 8% of the variability in women's perceived mammogram barriers ($R^2 = 0.09$; adjusted R = .08) (see Table 5).

The interviews showed that spousal support enhanced women's self-confidence in regard to taking care of their health; one woman even considered this its main asset, saying, *"It's the most important thing to have that support because then you grow in confidence*." Women described self-confidence as a "*boost"* and a *"spiritual motive"* to have their first mammogram. For some participants (n = 4), spousal support helped grow their self-confidence to deal with potentially abnormal mammogram results. In reference to her experience, one woman said, *"Whatever happens, I have support. It makes you feel okay, more accepting of any situation you deal with."*

Although the interview participants did not share how spousal support influenced their perceived mammogram barriers, they did share how it helped them overcoming several barriers to obtaining the screening. Immigration status often affected participants' need for emotional and tangible spousal support. One woman said, *"Immigrant wives need extra support."* Recently immigrated women (n = 12) especially relied on their husbands' help to meet their health needs, including mammograms; as one participant stated, *"At the beginning when you first come, for sure, you need help."* Spousal support was necessary to counter new immigrant wives' individual barriers, such as difficulties with language. One participant said, *"I didn't speak English at the time. He used to translate to me."* Spousal support also helped with transportation barriers; a woman stated, *"At the beginning. I wasn't driving yet. He used to bring me to the doctor."* During the interviews, participants noted that spousal support helped them to eventually break down barriers associated with mammograms and enhanced their autonomy. One participant said, *"Now, I go by myself to the doctor; I speak for myself. I do everything by myself."*

Discussion

Findings from surveys and interviews are in agreement on the impotence of spousal support for mammogram use. Results from the survey revealed that spousal support not only predicted women's adherence to mammogram screenings, but also had a positive impact on IMAW's health beliefs toward mammograms. Results from the interviews provided further details about the nature of spousal support the participants experienced surrounding mammogram utilization. This experience, interpreted through the women's interactions with the process of obtaining mammograms, started with anxiety thinking about the screening, followed by their ability to access it, ending with their fears about the results.

Overall, most women in the study reported receiving at least one form of spousal support (emotional or tangible) for obtaining a mammogram. Findings from the surveys and interviews allow for some speculation that emotional spousal support had a more significant impact on IMAW's mammogram utilization compared to tangible spousal support. Emotional support in the form of receiving encouragement and husbands' willingness to listen to wives' concerns were associated with higher mammogram utilization. Our speculation is supported by findings from other studies among Lebanese women in which emotional spousal support and receiving encouragement increased the likelihood

of the woman adhering to mammogram recommendations [12]. In addition, in the findings from the interviews, spousal emotional support had an impact not only on IMAW's mammogram utilization but also on the participants' mammogram health beliefs. Spousal emotional support boosted participants' self-confidence to obtain the screenings.

Results from the bivariate analyses showed that none of the spousal tangible support predicted the IMAW's mammogram utilization or adherence. However, the spousal support tool used in the study did not include other forms of spousal support mentioned in the interview, such as translation and financial support. Relying on findings from the interviews, we found that the impact of tangible spousal support was dominant from the moment the participants immigrated to the United State. These findings suggested that the impact and significance of tangible spousal support could be transitional based on the wives' needs or immigration status. However, the scope of this study is limited to exploring the impact of spousal tangible support on the women's mammogram utilizations considering their immigration status. This suggests a knowledge gap for future studies to explore in more detail.

Although spousal support had a positive impact on IMAW's health beliefs toward perceived barriers to mammograms, the process is still unknown. From the interview, however, it could be inferred that spousal support mitigated some of the barriers that IMAW faced in obtaining mammograms, which could have changed each woman's perception of the barriers. As experienced by the participants, their spousal support was tailored toward each barrier they dealt with. Tangible spousal support, such as translation, was personalized based on the wives' needs to overcome barriers to obtaining a mammogram, as was emotional support to overcome fear and anxiety before or after obtaining the screening.

Results from the surveys showed a positive association between spousal support and participants' perceived benefits of the mammogram, yet the interviews did not yield a cohesive theme to further explain this association. Implicitly, results from the survey may suggest an explanation. In total, 54% of participants reported "sometimes" to "frequently" receiving information about mammograms from their husbands, which may have affected their perceptions of mammogram benefits. Also, according to one participant's experience, we can assume that spousal emotional support may have an impact on how the women perceive mammogram benefits, especially related to early BC detection. One participant stated, "He [husband] encourages me and tells me, 'Why not? It is a good thing. It is an important checkup to take care of ourselves early.'" Thus, the association between spousal support and wives' perceived mammogram benefits is an assumption for future studies to explore.

Despite the fact that this study revealed important findings about the impact of spousal support on mammogram utilization and heath beliefs among IMAW, the findings should be interpreted with critical considerations. The spousal support tool used in this study was developed for Korean American immigrant women and has not been validated with Muslim or Arab populations in the United States or in Arab countries [27]. Henceforth, qualitative studies are needed to modify and adapt the tool for Arab and Muslim populations. In addition, quantitative studies are also recommended to psychometrically validate the tool in these populations.

Limitations

Results from this study should be interpreted in light of several limitations. Recruiting samples from social media might limit the generalizability of our results. Findings from our study may not be applicable to immigrant Arab women living in the United States from different religious backgrounds. Also, this study is centered on heteronormative (male and female) family structures, hence results from this study is ungeneralizable to other family structures. Among women who participated in the interviews, 90% have had a mammogram within the last two years. Thus, the results of the qualitative part of the study may only reflect the experience of spousal support of women who adhere to mammogram screening guidelines.

Implications of the Study

Findings from surveys and interviews show that a husband's support is positively associated with IMAW's mammogram utilization and health beliefs. Suggesting a new approach to integrate husbands in culturally appropriate interventions to increase mammogram screening rates among IMAW.

Author Contributions Dr. Sarah Alkhaifi is the primary investigator. Dr. Alkhaifi designed the quantitative and qualitative parts of the study. She also conducted the study and analyzed the data from both surveys and interviews. Additionally, she drafted the article. Dr. Aasim Padela actively participated in study design (in both parts quantitative and qualitative). He also substantially evaluated data analysis (thematic analysis and statistical analysis parts). Dr. Padela also helped with drafting the article.

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Declarations

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