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A Meta-Analysis of Interventions to Promote Mammography Among Ethnic Minority Women

Hae-Ra Han, PhD, RN,
Associate Professor, School of Nursing, The Johns Hopkins University, Baltimore, Maryland

Jong-Eun Lee, PhD, RN,
Postdoctoral Fellow, School of Nursing, The Johns Hopkins University, Baltimore, Maryland

Jiyun Kim, PhD, RN,
Postdoctoral Fellow, School of Nursing, The Johns Hopkins University, Baltimore, Maryland

Haley K. Hedlin, BA,
Doctoral Student, Bloomberg School of Public Health, The Johns Hopkins University, Baltimore, Maryland

Heejung Song, PhD, and
Research Associate, Bloomberg School of Public Health, The Johns Hopkins University, Baltimore, Maryland

Miyong T. Kim, PhD, RN, FAAN
Professor, School of Nursing, Bloomberg School of Public Health, and School of Medicine, The Johns Hopkins University, Baltimore, Maryland

Abstract

Background—Although many studies have been focused on interventions designed to promote mammography screening among ethnic minority women, few summaries of the effectiveness of the interventions are available.

Objective—The aim of this study was to determine the effectiveness of the interventions for improving mammography screening among asymptomatic ethnic minority women.

Methods—A meta-analysis was performed on intervention studies designed to promote mammography use in samples of ethnic minority women. Random-effects estimates were calculated for interventions by measuring differences in intervention and control group screening rates postintervention.

Results—The overall mean weighted effect size for the 23 studies was 0.078 ($Z = 4.414$, $p < .001$), indicating that the interventions were effective in improving mammography use among ethnic minority women. For mammography intervention types, access-enhancing strategies had the biggest mean weighted effect size of 0.155 ($Z = 4.488$, $p < .001$), followed by 0.099 ($Z = 6.552$, $p < .001$) for individually directed approaches such as individual counseling or education. Tailored, theory-based interventions resulted in a bigger effect size compared with nontailored interventions (effect sizes = 0.101 vs. 0.076, respectively; $p < .05$ for all models). Of cultural strategies, ethnically matched

Corresponding author: Hae-Ra Han, PhD, RN, School of Nursing, The Johns Hopkins University, 525 North Wolfe Street, Room 448, Baltimore, MD 21205-2110 (hhan@son.jhmi.edu).

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intervention deliveries and offering culturally matched intervention materials had effect sizes of 0.067 (Z = 2.516, p = .012) and 0.051 (Z = 2.365, p = .018), respectively.

Discussion—Uniform improvement in mammography screening is a goal to address breast cancer disparities in ethnic minority communities in this country. The results of this meta-analysis suggest a need for increased use of a theory-based, tailored approach with enhancement of access.

Keywords

ethnic minority women; mammography; meta-analysis

Despite considerable progress in breast cancer control in the United States over the past 20 years, ethnic minority women continue to face an unequal burden of cancer (Chu, Miller, & Springfield, 2007; Lantz et al., 2006). For example, African American and Hispanic women are more likely to be diagnosed at an advanced stage of breast cancer (American Cancer Society, 2008; Lantz et al., 2006) and have worse stage-for-stage survival than do White women (Carey et al., 2006; Shavers, Harlan, & Stevens, 2003). Traditionally, Asian American women have had lower breast cancer incidence rates than White women had (American Cancer Society, 2008). Over the past decade, however, the incidence of breast cancer in Asian women has been increasing at a much higher rate than that of White women (annual increase of 6.3% vs. <1.5%; Deapen, Liu, Perkins, Bernstein, & Ross, 2002). In addition, similar to Black and Hispanic women, Asian American women are significantly more likely than White women to discover breast cancer at a later stage (Miller, Hankey, & Thomas, 2002).

Researchers have ascribed a large portion of this disparity in the late-stage diagnosis and poor survival of breast cancer to racial and ethnic differences in the utilization of mammography screening, which is a critical strategy in early detection and timely treatment of breast cancer (Smith-Bindman et al., 2006). The U.S. Preventive Services Task Force (2002) recommends that women have a mammogram every 1–2 years beginning at age 40 years. Although differences in mammography rates between White and African American women have narrowed during the past decade (Smigal et al., 2006), ethnic differences in screening do persist in some groups. The American Cancer Society's most recent annual report of cancer statistics revealed that regular use of mammography was especially low among Hispanic and Asian women relative to the national level (Cokkinides, Bandi, Siegel, Ward, & Thun, 2007). According to a recent report on national surveys (Town, Wholey, Feldman, & Burns, 2007), ethnic minority women are less likely than their White counterparts to have health insurance (69.7% vs. 87%). Minority women who lack health insurance or have lived in the United States for less than 10 years have been found particularly vulnerable to insufficient mammography screening (Cokkinides et al., 2007; Purc-Stephenson & Gorey, 2008; Rakowski et al., 2006).

Many studies have been focused on promoting mammography screening among ethnic minority women using a variety of intervention strategies. For example, *promotora* (lay health advisor) interventions have been generally well received by ethnic minority women, positively affecting their use of preventive health services, including mammography (Erwin et al., 2003; Mock et al., 2007; Navarro et al., 1998; Taylor et al., 2002). Without a sufficient amount of monitoring, support, and opportunities for advancement, however, the utility of the *promotora* approach is uncertain because the content and frequency of interactions between the *promotora* and the study participant may change by the discretion of the *promotora* (Suarez et al., 1997; Wasserman, Bender, & Lee, 2007). Well-validated theories can be used to guide an intervention effectively by specifying the ingredients and correct implementation of the intervention, making replication of the intervention easier (Sidani & Braden, 1998). Theory-guided tailored interventions (i.e., providing intervention materials adjusted to the characteristics of an individual) have been effective in promoting various forms of health behavior such as healthy diet (Park et al., 2008; Resnicow et al., 2008) and smoking cessation

(Schumann et al., 2008). Likewise, recent strategies to promote breast cancer screening include theory-based tailored interventions (Allen & Bazargan-Hejazi, 2005; Champion et al., 2006, 2007; Jibaja-Weiss, Volk, Kingery, Smith, & Holcomb, 2003), although no systematic evaluation of this intervention approach across studies has been done.

The purpose of this meta-analysis was to determine the effects of intervention programs on mammography screening among ethnic minority women. Identification of the determinants of mammography use can facilitate more effective strategies to reduce barriers to breast cancer screening. Meta-analyses of mammography interventions (Denhaerynck et al., 2003; Edwards et al., 2006; Legler et al., 2002; Sohl & Moyer, 2007; Yabroff & Mandelblatt, 1999) found that combined approaches enhancing access—in addition to individual strategies such as reminder letters, telephone calls, or personal contact—can increase mammography use. Specifically, in the Legler et al. (2002) meta-analysis, access-enhancing strategies were the strongest intervention approach, resulting in an increase in mammography use by 18.9% (95% confidence interval [CI] = 10.4–27.4), followed by individually directed interventions in a healthcare setting (17.6%; 95% CI = 11.6–24.0). Yabroff and Mandelblatt (1999) included two studies that used access-enhancing strategies (financial incentives) in their meta-analysis but did not perform meta-analysis with two interventions. They found that patient-targeted behavioral interventions improved mammography utilization by 13.2% (95% CI = 4.7–21.2). Effect sizes of interventions using social networks were revealed to be in the range of 5.8% (Legler et al., 2002) to 12.6% (Yabroff & Mandelblatt, 1999).

However, most previous meta-analyses have not been focused specifically on ethnic minority women, nor have culturally tailored or recent intervention approaches most effective for these groups of women with traditionally lower use of mammography been discussed. The goal of this study was to fill this gap by conducting analyses on more recent studies (published since September 2000, where the review by Legler et al., 2002, left off) that were targeted specifically to ethnic minority women. Specifically, the objective of the meta-analysis was to describe mammography intervention approaches used for ethnic minority (Asian American, African American, and Hispanic) women in the United States.

Methods

Study Selection

Literature for this review was identified using electronic searches of databases and hand searches from reference collections. The literature search was limited to articles published in the English language from 2000 onwards. Two authors independently searched Medline, CINAHL, PsycINFO, and Web of Science using combinations of the key word phrases *Asian, African American, Hispanic or Latino, breast cancer screening, mammography, experimental studies, interventions, and intervention studies*.

The electronic and hand searches generated a combined total of 749 titles and abstracts for assessment. Screening of relevant studies for inclusion was conducted using titles and abstracts based on the following criteria: (a) the study aimed to increase use of mammography screening among asymptomatic women, either exclusively or in addition to other health behaviors; (b) the study included more than 40% of women with ethnic minority background (i.e., Asian American, Black, or Hispanic) in the sample; (c) outcomes were based on a woman's adherence to mammography screening, documented either by self-report or in a clinical database or medical record; (d) an experimental or quasi-experimental design was used in the study; and (e) the study was reported between September 2000 and August 2008. Not included were international studies because the focus was on intervention strategies to improve breast cancer screening among ethnic minority women in the United States.

The titles and abstracts of all identified studies were reviewed by two study team members. Of these 749 studies, 607 were excluded. A total of 142 full-text articles were reviewed systematically to confirm eligibility for this study. Of the 142 articles examined, 43 did not include more than 40% of ethnic minority women, or ethnicity was unclear; 23 did not have a control group; 2 were only system directed; and 6 did not specify an intervention component clearly. In addition, 13 did not include enough information to calculate an effect size; 18 did not include a woman's adherence to mammography screening as an outcome; and 14 had an international study setting or reported on the same sample as another that was already included. As a result, a total of 23 studies were included in the meta-analysis (Figure 1).

Study Coding

The specific outcome of interest in this analysis was the difference in the proportion of mammography screening in the intervention group versus the control group. A number of variables were selected for inclusion in the database of articles. The following were coded: first author, year, study design, setting, sample (percentage of ethnic minority women), unit of assignment, type of intervention, intervention period, time to outcome measure (months), method of outcome ascertainment, number of participants in the study groups, mean age of the study sample, proportion of mammography screening for the treatment and control groups, theory, control group (no intervention, minimal intervention or usual care, or other non-breast-cancer intervention), any cultural strategies used, and study quality. Following the typology used in previous reviews (Legler et al., 2002; Rimer, 1994), interventions were categorized as follows: (a) individual directed (e.g., one-on-one counseling, tailored and nontailored letters and reminders, and telephone counseling), (b) system directed (e.g., provider prompts), (c) access enhancing (e.g., mobile vans and reduced-cost mammograms), (d) social network (e.g., peer educators and lay health advisors), (e) community education, (f) mass media, and (g) multiple strategies (combinations of the intervention approaches listed above). As in a prior review (Legler et al., 2002), in five studies comparing two or more intervention groups to one control group, the intervention with the most components (i.e., highest dose group) was considered. To rate study quality, four items were used from relevant literature (Jadad et al., 1996; Soeken, Lee, Bausell, Agelli, & Berman, 2002). The range of total quality scores was 0 to 4 (Table 1). For the purpose of this analysis, studies with scores of 1–2 were considered to be *low quality* and those with scores of 3–4 were considered to be *high quality*. Using Microsoft Excel, two raters independently coded the variables. Every discrepancy was identified and resolved by discussion among team members. The average κ for coding agreement was sufficient, 0.86.

Analysis

Stata (StataCorp LP, College Station, TX) was used to conduct the data analysis. An effect size (d) was calculated for each study using the difference in the postintervention adherence rates between the intervention and control groups (p_i and p_c, respectively). An overall mean weighted effect size (MWES) for the 23 studies was computed using the *meta* command in Stata, which weights d by the inverse of the estimated study variance in fixed-effects models. For the effect size of $d = p_i - p_c$, the study variance was defined to be $p_i (1 - p_i) / n_i + p_c (1 - p_c) / n_c$, where n_i and n_c are the number of participants in the intervention and control groups, respectively (DerSimonian & Laird, 1986). A test for heterogeneity of the intervention effects was performed using the DerSimonian and Laird (1986) Q statistic. When significant, a random-effects model was used to accommodate this heterogeneity (DerSimonian & Laird, 1986). This process was repeated to calculate MWES for various subgroups of the 23 studies. In addition, 95% CIs were estimated for each MWES.

The sensitivity analyses consisted of refitting the meta-analysis for the overall MWES to determine whether the results varied by potentially influential studies (i.e., extreme effect size, large sample size) or study quality. A leave-one-out approach was taken and the overall MWES was reestimated by removing the influential studies one at a time. Also conducted were meta-analyses restricted to high- and low-quality studies to compare to the overall MWES. Finally, additional analyses using funnel plot and fail-safe *N* were performed to examine publication bias. In the absence of publication bias, the plot should be symmetric, resembling an inverted funnel (Light & Pillemer, 1984). Because visual inspection of the funnel plot involves subjective interpretation, Rosenthal's (1984) fail-safe *N* was calculated also. This calculation is an estimate of the number of studies having no effect (i.e., zero effect size) that is needed to reduce the overall effect size in the meta-analysis from significant to nonsignificant. If the estimated fail-safe *N* is greater than a cutoff value (formula = $5k + 10$, where k is the number of studies in the meta-analysis; Rosenthal, 1984), it is suggested that there is no evidence of publication bias.

Results

Study Characteristics

Of the 23 studies, 6 studies included predominantly African Americans; 2 studies, Hispanics; 5 studies, Asians; and 10 studies, combined ethnic samples. Randomized experimental study design (61%), group-level assignment (57%), and community setting (83%) were common features of the studies. Sample sizes varied; smaller studies included <100 participants in the sample, whereas the biggest study was done on >5,000 women, totaling 22,849 women. (See Table, Supplemental Digital Content 1, which summarizes the characteristics of studies included in this meta-analysis, http://links.lww.com/A1244) This table is also included on the Editor's Web site at http://www.nursing-research-editor.com.

The studies used single or multiple intervention strategies, with individually directed print materials being the most frequently used approach, followed by peer or lay health worker education or support and telephone counseling. Access-enhancing strategies such as low- or no-cost mammograms, making appointments, mobile vans, or vouchers were included in 6 studies. For the comparison group, 15 studies (65%) provided no intervention or usual care; 6 studies, minimal intervention; and 2 studies, other active nonbreast intervention (e.g., education on cholesterol or physical activity). Self-report rather than medical records was more frequently used as a method of outcome measurement (74% vs. 26%). The Health Belief Model was the most popular theory and was used in 6 studies alone or in combination with other theories such as Transtheoretical Model of Change and Social Learning theory, although in 9 studies, the theoretical approach was unspecified. These theories offered a basis for targets of individualized tailoring (e.g., providing intervention materials attuned to the characteristics of a person) in 4 studies. Most interventions involved some form of cultural strategies except for 2 (both conducted in a healthcare setting). Culturally matched intervention materials and ethnically matched intervention deliveries were equally common, whereas 5 studies indicated participation of members of the target ethnic community as a way of increasing cultural sensitivity of their intervention. Nine (39%) of the studies received a high quality rating, whereas 14 (61%) were rated as low quality.

Pooled Results

The estimated intervention effect and 95% CI for each study are presented in Table 2. As shown in Table 2, the overall MWES for the 23 studies was 0.078 ($Z = 4.414$, $p < .001$) with a 95% CI of 0.043 to 0.113, indicating that the interventions were effective in improving mammography screening among ethnic minority women. This effect size was computed using a random-effects model to account for significant heterogeneity among interventions as indicated by a significant Q statistic ($Q = 92.95$, $df = 22$, $p < .001$).

Subgroup Analyses

Also shown in Table 2 is the effectiveness of the different intervention methods. Access-enhancing interventions had the biggest MWES of 0.155 (n = 6, Z = 4.488, p < .001), followed by individually directed interventions (n = 19, MWES = 0.099, Z = 6.552, p < .001). Estimated effect sizes for other intervention approaches involving mass media (n = 4, MWES = 0.065, Z = 1.759, p = .079), community education (n = 4, MWES = 0.013, Z = 0.324, p = .746), or social networks (n = 6, MWES = −0.023, Z = −0.817, p = .414) were not statistically significant.

Tailoring an intervention according to the individual's characteristics based on valid behavioral theory was more effective than not doing so, with the MWES being 0.101 (n = 4, Z = 4.476, p < .001) and 0.076 (n = 19, Z = 3.677, p < .001), respectively. Theory-based interventions (n = 14) resulted in a bigger effect size compared with nontheory-based interventions (n = 9; effect sizes = 0.090 vs. 0.062, respectively; p < .05 for all tests). Of cultural strategies, eth nically matched intervention deliveries (n = 14, MWES = 0.067, Z = 2.516, p = .012) and culturally matched intervention materials (n = 15, MWES = 0.051, Z = 2.365, p = .018) significantly improved mammography screening. Interventions involving members of the target community were a cultural strategy, with the biggest effect size of 0.074 (n = 5, Z = 1.124, p = .261), but the result was not significant. Interventions delivered in healthcare settings (n = 4) were associated with a bigger effect size compared with interventions done in community settings (n = 19; MWES = 0.113 vs. 0.067; p < .01 for all models). When combined intervention effects were examined for each ethnic group (included studies with samples >40% of specified ethnic groups), the estimated intervention effect was significant for African American women with a MWES of 0.098 (n = 9, Z = 2.550, p = .011). Studies with other ethnic minority women yielded no significant findings with a MWES of 0.094 for Asian and Pacific Islanders (n = 5, Z = 1.955, p = .051) and 0.036 for Hispanic women (n = 5, Z = 1.004, p = .315).

Sensitivity Analyses

Sensitivity analyses were conducted using potentially influential studies such as Kim and Sarna (2004), Sauaia et al. (2007), and Welsh, Sauaia, Jacobellis, Min, and Byers (2005) to gauge the impact on the variability of effect sizes. When the Kim and Sarna study was removed, the MWES for remaining studies was 0.069 (Z = 4.153, p < .001). Removing Sauaia et al. resulted in a MWES of 0.082 (Z = 4.292, p < .001) for the remaining studies. Without Welsh et al., the MWES for the other 22 studies was 0.085 (Z = 5.198, p < .001). Also performed were analyses with studies of high versus low quality ratings (quality rating 3–4 vs. 1–2). The MWES for the high-quality studies (n = 9) was 0.099 (Z = 8.452, p < .001), whereas the MWES for the low-quality studies (n = 14) was 0.061 (Z = 2.239, p = .025).

Publication Bias

The likelihood of publication bias was examined by first plotting the standard error by the natural logarithm of the logged odds ratio for the estimated effect sizes. The funnel plot appeared slightly asymmetrical. The fail-safe N, however, indicated that 411 nonsignificant studies would be necessary (cutoff = 125) to show that these interventions used to promote mammography screening among traditionally nonadherent ethnic minority women have no effect on mammography adherence, making the aggregate result from this analysis fairly robust.

Discussion

The results indicate that there was an average of 7.8% increase in the rate of mammography use for minority women in the treatment groups receiving a variety of interventions. Access-enhancing interventions yielded the biggest increase in mammography use (15.5%), followed by individually directed interventions (9.9%). Even though the result cannot be compared directly with those of other meta-analyses due to different study selection criteria and intervention typology, this finding is similar to that of Legler et al. (2002) and Yabroff and Mandelblatt (1999).

Interventions using social networks such as *promotoras* or lay health advisors were associated with a small and negative effect size (i.e., reduced mammography screening rates after intervention). The finding of the negative effect size associated with *promotora* interventions might have been a result of study design. Specifically, the six *promotora* interventions included in the meta-analysis (Earp et al., 2002; Fernandez-Esquer, Espinoza, Torres, Ramirez, & McAlister, 2003; Nguyen, Vo, McPhee, & Jenkins, 2001; Powell et al., 2005; Sauaia et al., 2007; Welsh et al., 2005) were all nonrandomized, community-based trials with mostly large sample sizes (mean sample size = about 2,299) and low quality ratings; five studies received a quality rating of 2 and one study received a quality rating of 1. Our finding indicates that *promotora* interventions may be better suited for smaller community applications. When a large-scale community-based intervention trial is planned, interventions using *promotoras* may need to be considered as an alternative with well-prepared *promotora* training and a rigorous monitoring plan.

In analyzing effect sizes by the use of theory, the results indicated that theory-based interventions were more effective than nontheory-based interventions. Tailored interventions guided by theory also resulted in a greater effect size than did nontailored interventions. Indeed, tailored interventions included in this meta-analysis used single or multiple theories to structure the content of the intervention messages. Considering the few tailored interventions with larger improvement in mammography screening, more tailored intervention studies based on valid theories are warranted.

Interventions involving target community members as a way to enhance cultural sensitivity yielded a bigger effect size as compared with interventions using other cultural strategies (e.g., providing culturally matched materials or matching intervention deliveries), although the random-effects model for testing of its effect was not statistically significant. We cannot compare the result with those of other meta-analyses because no previous meta-analyses specifically examined cultural strategies as part of intervention typology. The nonsignificance might be attributable to the small number of studies in this category (n = 5). Although the finding offers some implications in designing mammography-enhancing interventions for ethnic minority women, future meta-analysis is needed as more empirical evidence becomes available.

Consistent with previous meta-analysis (Legler et al., 2002), it was found that the intervention effect was bigger for studies conducted in a healthcare setting (e.g., health maintenance organizations and community health centers) than for the community-based studies. Healthcare settings naturally offer increased contact with medical providers. It is likely that women in the healthcare setting might have had fewer barriers to screening, with more support for obtaining mammograms through individualized letters or counseling (Champion et al., 2007; Young, Waller, & Smitherman, 2002), scheduling of screening appointments (Beach et al., 2007), or case management (Beach et al., 2007; Dietrich et al., 2006). As Legler et al. (2002) pointed out, additional support or cues are necessary to facilitate mammography use even when access may no longer be a problem.

Effect sizes for studies including more than 40% African American and more than 40% Asian or Pacific Islander women were similar (9.8% and 9.4%, respectively), although the effect size for Asian or Pacific Islander women was marginally significant (p = .051); however, the MWES (3.6%) was not statistically significant for comparisons consisting of more than 40% Hispanic women. The estimated effect for intervention groups with more than 40% African American women in the Legler et al. (2002) meta-analysis was 11.6% (95% CI = 6.4–16.7), slightly bigger than that in this study. Although no published analysis of intervention effects for Asian or Pacific Islanders or Hispanic women were found, the nonsignificant result might have been due, in part, to the small number of studies available for these subgroup analyses (five studies each for Asian or Pacific Islander and Hispanic women). A careful examination of the characteristics of each individual study included in the ethnic subgroup analyses also revealed some design issues—particularly for studies involving Hispanic women—that are worth pointing out: three out of five studies with more than 40% Hispanic women (Fernandez-Esquer et al., 2003; Sauaia et al., 2007; Welsh et al., 2005) used a nonrandomized experimental design with a large sample size ($N > 5{,}000$ for Sauaia et al., 2007, and Welsh et al., 2005). A large-scale community trial is likely to put researchers in a less controlled situation. Diffusion might occur between groups or control communities may receive interventions with substantial amount through other mechanisms (e.g., the Breast and Cervical Cancer Program for free mammograms). A traditional randomized controlled trial could pose ethical and logistical dilemmas in community research because control groups do not benefit from study participation, which is often perceived as *unfair* (Learmonth, 2000). Nevertheless, this analysis suggests that more tightly controlled trials may be necessary to improve mammography screening among minority groups, particularly Hispanic women. Researchers may need to consider and engage more actively in alternative research designs (e.g., waiting list design and attention control design) to ensure that the benefits of the research are made available to all ethnic minority communities (Corbie-Smith et al., 2003).

Several limitations of this meta-analysis should be noted. One limitation is the reliance of this review on published sources in Medline, CINAHL, PsycINFO, and Web of Science databases. This might have led to an overestimation or underestimation of effect sizes by excluding unpublished sources (e.g., dissertations) or government documents that might not be readily available, although researchers have found no differences related to inclusion or exclusion of unpublished literature (Conn, Valentine, Cooper, & Rantz, 2003). Second, due to the focus of interest in ethnic minority women in the United States who face unique cultural and linguistic challenges, this review was limited to articles of samples in the United States; thus, the findings may not be generalizable to studies that have been conducted in other countries. Third, as is common in meta-analyses, the uneven quality and quantity of studies are also limitations. An attempt was made to address this issue by offering estimates for high- versus low-quality studies. Several analyses included only four to six studies with nonsignificant MWES. Findings from the analyses with only a small number of studies should be considered as preliminary evidence and not definitive estimates of the effectiveness of the studies. It will be important to conduct additional analyses when results from more studies become available. Finally, most studies included in this meta-analysis used multiple intervention components. One problem in interventions with multiple components is that it is difficult to tease out the effect of each individual component. Some researchers suggest conducting factorial design studies to address this issue (Legler et al., 2002), although the cost to conduct such studies would likely be higher.

In conclusion, uniform improvement in cancer screening is a national goal to address cancer disparities among ethnic minority communities in the United States. The results of this meta-analysis suggest important directions for the design of future interventions to promote mammography screening among ethnic minority women. Access-enhancing strategies are an important intervention component for minority women who are likely to lack the resources to obtain mammography screening readily. Also highlighted in this analysis is a need for increased use of a theory-based, tailored approach. More active engagement of community partners in the research process should be considered also to improve screening outcomes. Finally, based on the pooled MWES estimated in this meta-analysis, well-controlled studies are needed to improve the effectiveness of mammography intervention programs among ethnic minority women, particularly among Hispanic women. Consistent use of the rate difference of mammography screening as an outcome measure is important for additional meta-analyses and promotion of further knowledge development in this important area.

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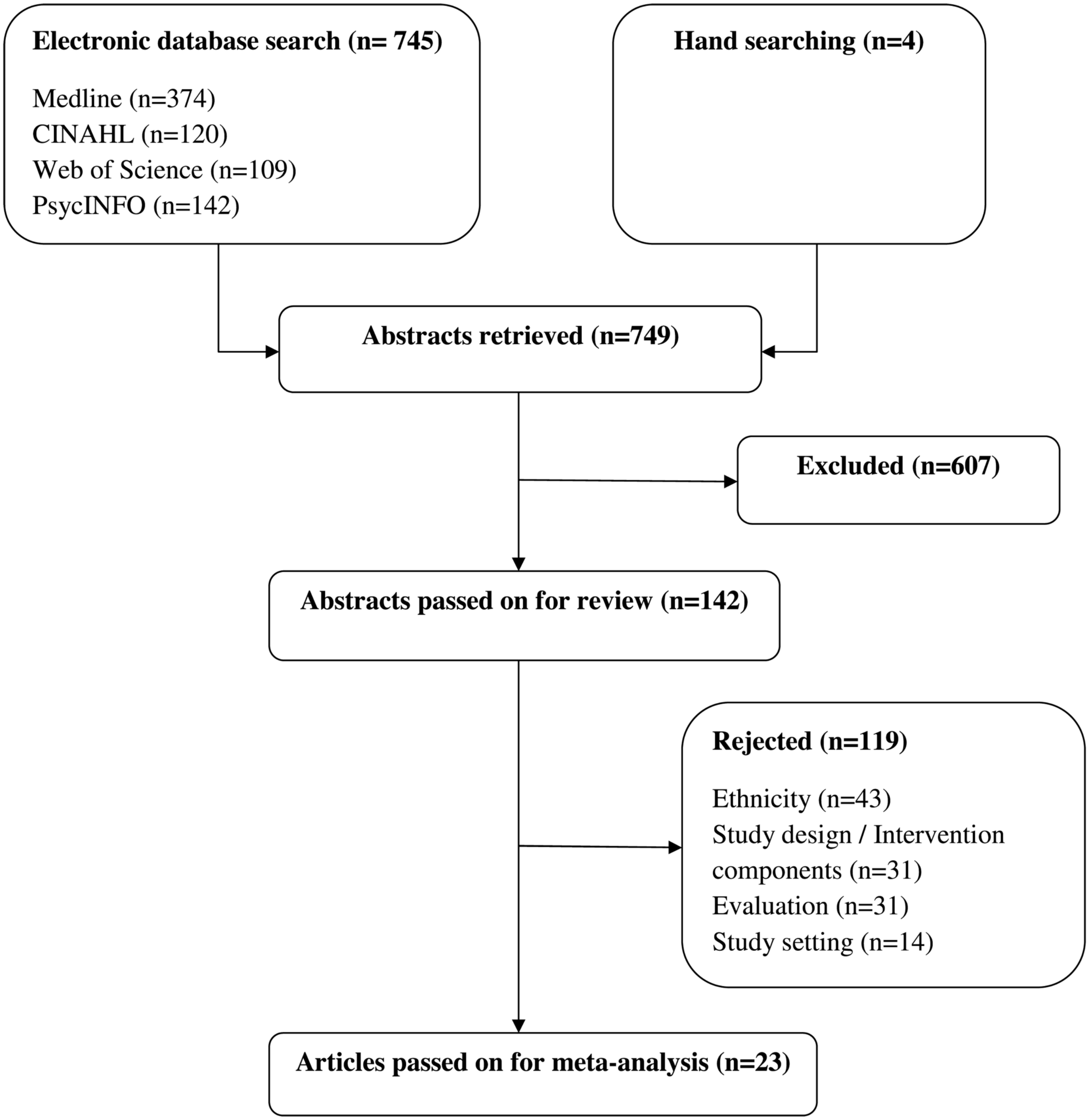

FIGURE 1.
Summary of the study selection process.

TABLE 1

Study Quality Ratings

Items	Scores
Study design	0 = Nonrandomized prospective experiment
	1 = Randomized experiment
Outcome measure	0 = Subjective measure of mammogram receipt (self-reports)
	1 = Objective measure of mammogram receipt (claims data, chart review)
Clarity of outcome definition	0 = No definition of study outcome (mammogram adherence)
	1 = Clearly defined mammogram adherence
Information on withdrawal	0 = Not clearly discussed
	1 = The number and the reasons for withdrawals in each group are stated

TABLE 2

Estimated Effect Sizes With 95% Confidence Intervals (CIs)

Element	Category	No. of Studies	Effect Size (95% CI)
Overall		23	0.078 (0.043 to 0.113)
Intervention type[a, b]	Individual directed	19	0.099 (0.073 to 0.110)
	Access enhancing	6	0.155 (0.087 to 0.223)
	Social network	6	−0.023 (−0.078 to 0.032)
	Community education	4	0.013 (−0.067 to 0.094)
	Mass media	4	0.065 (−0.007 to 0.138)
Theory	Theory based	14	0.090 (0.042 to 0.137)
	Nontheory based	9	0.062 (0.009 to 0.116)
Tailored	Yes[c]	4	0.101 (0.057 to 0.145)
	No	19	0.076 (0.035 to 0.116)
Cultural strategies[b]	Involved target community members	5	0.074 (−0.055 to 0.203)
	Culturally matched materials	15	0.051 (0.009 to 0.092)
	Matched intervention deliveries	14	0.067 (0.015 to 0.120)
Setting	Healthcare[c]	4	0.113 (0.081 to 0.114)
	Community	19	0.067 (0.027 to 0.107)
Ethnic groups[d]	African American	9	0.098 (0.023 to 0.174)
	Asian Pacific Islanders	5	0.094 (0.000 to 0.189)
	Hispanic	5	0.036 (−0.034 to 0.106)
Quality	High (3 or 4)[c]	9	0.099 (0.076 to 0.122)
	Low (1 or 2)	14	0.061 (0.008 to 0.114)

[a]Type of intervention: individual directed = counseling (in person, telephone), letters, reminders; access enhancing = facilitated scheduling, mobile vans, vouchers, reduced-cost or free mammograms; social network = peer leaders or lay health advisors; community education = community workshops, seminars.

[b]Studies may be classified as using more than one type of intervention or cultural strategies.

[c]Fitted with a fixed-effects model (p for Q statistic > .05).

[d]Included studies with samples >40% of specified ethnic groups.