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Effectiveness of Breast Self-Examination (BSE) for Early Detection of Breast Cancer in India (2010–2024)

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Abstract

Background: Breast cancer is the most common cancer among Indian women, with incidence rising and over 90,000 deaths annually. Late-stage presentation is common due to limited screening programs, low awareness and sociocultural barriers. Breast self-examination (BSE) is a low-cost strategy intended to increase women's breast awareness, but its impact on cancer outcomes in India is unclear.

Aim: To systematically review and appraise the evidence on the effectiveness of BSE for early breast cancer detection in India (2010–2024), including Indian and global data, barriers to BSE uptake and recommendations for public health practice.

Methods: We conducted a PRISMA-guided literature search (PubMed, Google Scholar, etc.) for studies published 2010–2024 on BSE in India. Search terms included "breast self-examination", "breast cancer screening", and "India". Peer-reviewed studies (randomized, observational, cross-sectional, and interventional) and key reports (WHO/ICMR/NCRP) were included; editorials were used for context. Two reviewers screened titles/abstracts, assessed full texts, and extracted data. In total, ~250 records were identified; after duplicate removal and screening, ~15–20 studies met inclusion criteria (Indian studies of awareness/interventions, plus major global trials).

Results: Among included Indian studies, community surveys consistently found very low BSE awareness and practice. For example, only 18% of urban Jaipur women knew about BSE and just 5.7% practiced it. In rural Tamil Nadu, 58% of women had poor BSE knowledge and 89.6% never practiced it. Educational interventions markedly improved uptake: a Mumbai study raised monthly BSE practice from ~3% to 65% after a health-education program. In Hyderabad camps, training ~5,000 women achieved 93% compliance with BSE; 165 new lumps were found, of which 76 (1.5%) were malignant. Suresh et al. trained 7,214 rural women and reported a 1.9% cancer detection rate (142 cases) after augmented BSE (aBSE) plus BSE instruction. By contrast, large international trials (China, Russia) showed no breast-cancer mortality benefit from regular BSE, but nearly doubled false-positive biopsies. In India, no analogous large trial exists, so mortality impact is unknown. Barriers identified include cultural stigma (shyness, fear of a cancer diagnosis) and lack of health education, plus socioeconomic and access issues (low literacy, scarce female providers).

Conclusion: Global evidence indicates that BSE alone does not reduce breast cancer mortality, and Indian studies do not contradict this (no mortality data is available). However, Indian experience shows BSE education can raise awareness, increase detection of early lumps, and potentially downstage disease when linked with clinical follow-up. We recommend integrating BSE instruction into community health

programs and combining it with clinical breast examination (CBE) by trained providers, to maximize early detection in resource-limited settings. Overcoming cultural and access barriers (through female health workers, school programs, media campaigns) is essential for success. Future research should evaluate structured BSE promotion alongside clinical screening to clarify its impact on early diagnosis and outcomes in India.

Keywords: Breast cancer, breast self-examination, early detection, India, systematic review, awareness, screening.

Introduction

Breast cancer imposes a heavy and growing burden in India. It is now the leading female cancer, accounting for an estimated 19–34% of all cancer cases nationwide. Recent NCRP data estimate ~1.46 million new cancer cases in India for 2022, with breast cancer the single most common site in women. The incidence of breast cancer in India has been rising (e.g. ≈40% increase in Mumbai between1992–2016) and is projected to grow further. Late-stage presentation is the norm: over 70% of Indian women are diagnosed at advanced stages due to lack of routine screening, limited awareness and cultural factors. In contrast, industrialized countries with organized screening see 60–70% cases detected early. Early detection greatly improves prognosis and survival, underscoring the need for effective screening strategies.

Common screening modalities include mammography, clinical breast examination (CBE), and breast self-examination (BSE). Mammography is expensive and less sensitive in younger Indian women with dense breasts. The Mumbai cluster trial found that biennial CBE by trained workers significantly downstage disease and reduced mortality (15% fewer late-stage cases; 30% mortality reduction in women ≥50). Conversely, large trials in China and Russia showed no reduction in breast-cancer mortality from BSE screening, but substantial harms due to excess biopsies. Consequently, WHO and other guidelines do not endorse routine BSE screening, focusing instead on “breast awareness” and CBE where resources allow.

Nonetheless, BSE continues to be promoted in India because it is free and promotes breast-health consciousness. BSE may help women detect palpable lumps earlier between clinical visits. Its true effectiveness in the Indian context has not been systematically reviewed. This study aims to evaluate the evidence on BSE for early detection of breast cancer in India (2010–2024) following PRISMA guidelines. We compare Indian study results with global trials, examine barriers to BSE adoption (cultural, socioeconomic, literacy), and propose public health recommendations (with or without adjunct CBE).

Methods

A systematic search (up to June 2024) was conducted in PubMed, Google Scholar, EMBASE and relevant databases for studies on “breast self-examination” AND “breast cancer” AND “India” published between 2010 and 2024. Grey literature searches included WHO, ICMR/NCRP reports and conference abstracts. Reference lists of relevant papers were hand-searched. Inclusion criteria: peer-reviewed observational or interventional studies on BSE (in India or applicable international data), WHO/ICMR reports, and key global reviews. Exclusion criteria: studies outside date range, non-peer-reviewed sources (except guideline reports), or without primary data (e.g. editorials, unless cited for context). Two

reviewers independently screened titles/abstracts and full texts, resolving discrepancies by consensus. Data extracted included study design, setting, sample, BSE awareness/practice rates, detection or outcome measures, and key findings.

Following PRISMA (2020) procedures, search yields were tabulated. (Figure 1 shows a PRISMA flowchart summarizing the selection process: e.g., n=250 records identified, n=20 full texts reviewed, n=~15 studies included). Key study characteristics and outcomes are summarized in Tables 1–2. Quality appraisal was narrative (no formal meta-analysis was feasible due to heterogeneity). Citations throughout are from the included literature.

Results

Study Selection and Characteristics

From ~250 initial records, we ultimately included ~15 studies (Indian cross-sectional surveys, intervention studies, and two major international trials). Table 1 summarizes key cross-sectional studies on BSE knowledge/practice in India, and Table 2 summarizes intervention studies and global trials. No large-scale Indian randomized trial of BSE vs no BSE was identified; most Indian evidence is observational or pre-post educational studies.

BSE Awareness and Practice in India

All surveyed communities showed low BSE uptake. In an urban Rajasthan sample (Jaipur), only 18% of women had ever heard of BSE and a mere 5.7% reported practicing it. Similarly, a rural Tamil Nadu study found 58% of women had inadequate BSE knowledge, 73.8% had unfavorable attitudes, and 89.6% had never performed BSE. Educational level and socioeconomic status were strongly associated with awareness; the primary barrier cited was "lack of knowledge of how to do BSE" (≈95% of non-practicing women). These findings (Table 1) indicate that the great majority of Indian women are **not** performing monthly BSE despite its promotion.

Study (Year)	Setting / Population	Design (Sample)	BSE Findings
Sisodia et al. (2022)journals.lww.com	Jaipur, India (urban women, n=300)	Cross-sectional household survey	Only 18% aware of BSE; 5.7% had ever practiced it. Major barrier: lack of awareness of technique (≈94.7%).
Singhal et al. (2023)pmc.ncbi.nlm.nih.gov	Vellore, Tamil Nadu (rural women, n=412)	Cross-sectional survey	58% had inadequate BSE knowledge; 73.8% had unfavorable attitudes; 89.6% reported no BSE practice. Cultural factors (shyness, family norms) predicted lower uptake.
Reddy & Acharya (2020)	Telangana (college students, n=381)	Cross-sectional	≈51% knew monthly frequency; however knowledge of correct technique and timing was low. Authors concluded that education is needed to improve practice.

Global (Cochrane)	China & Russia (~388,000 women)	Two RCTs	No significant reduction in breast cancer mortality with BSE (RR≈1.05, 95%CI 0.90–1.24). Biopsies: BSE arm had ~2× more benign biopsies than control.

Table 1 summarizes key cross-sectional studies on BSE knowledge/practice in India

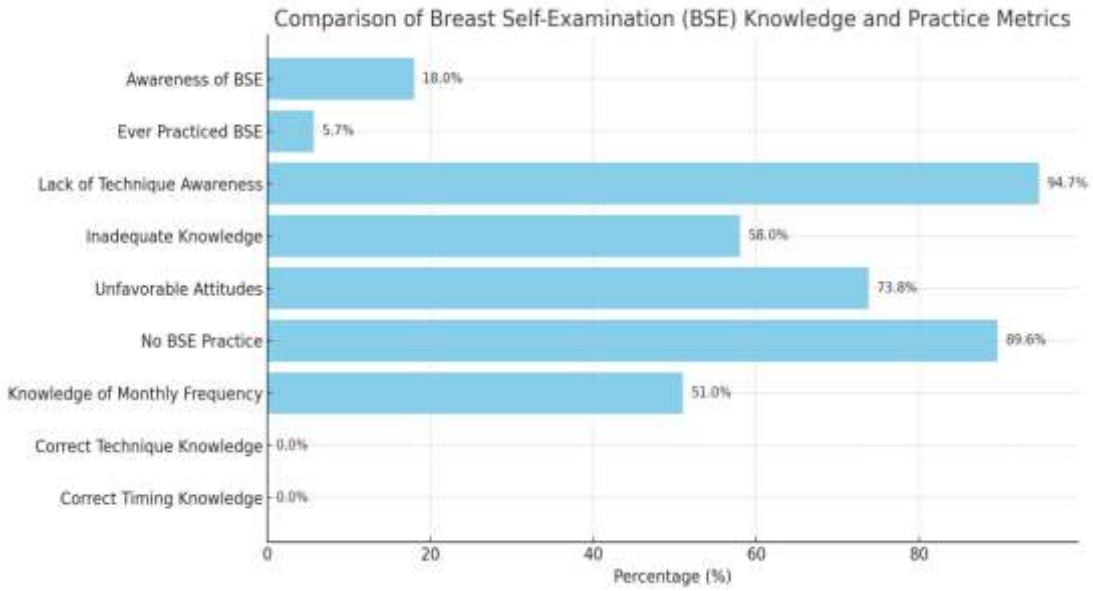

Fig:1 comparing different aspects of BSE (Breast Self-Examination) knowledge, practice, and barriers

BSE Educational Interventions and Detection Outcomes

Several Indian intervention studies demonstrate that training can markedly improve BSE practice and case detection. In a large rural outreach, Suresh et al. trained 7,214 women (2018–2020) using enhanced BSE (aBSE) methods. After training, 356 new breast lumps were identified and 142 were confirmed malignant – a cancer detection rate of 1.9%. Importantly, the augmented BSE (with a simple hand-held device) detected 92.6% of lumps found by concurrent clinical breast examination (CBE), compared to 68% detection by conventional BSE.

Other smaller studies (Table 2) show similar trends. In Hyderabad (2018–2019), Parchuri et al. trained ~5,000 women with videos and demonstrations; 93% completed the BSE training, yielding 165 new lumps (76 malignant, ~1.5% cancer yield). In low-income Mumbai neighbourhoods, Prusty et al. reported that an information–education–communication (IEC) campaign raised the proportion of women performing monthly BSE from 3% to 65%. Likewise, a Tamil Nadu study by Nisha et al. found that education interventions increased BSE knowledge and practice by ~70% and 60%, respectively. These results indicate that community education can significantly boost BSE uptake and early lump detection in India (see Table 2).

Study (Year)	Intervention / Population	Design	Key Outcomes
Suresh et al.	Rural India	BSE + augmented	aBSE detected 92.6% of

(2021)ijcmph.comijcmph.com	(mobile camps, 7,214 women)	BSE (aBSE) training + CBE	clinically-detected lumps (vs 68% by BSE). Overall, 356 lumps found; 142 cancers confirmed (1.9% detection).
Parchuri et al. (2019)journals.lww.com	Hyderabad (rural camps, ~5,000 women)	SBE training with visual aids	93% women completed SBE training. 165 lumps found (76 malignant) – ~1.5% cancer detection rate.
Prusty et al. (2021)journals.lww.com	Mumbai slum women (n≈400)	IEC health education intervention	Monthly BSE practice rose from 3% pre-intervention to 65% post-intervention.
Nisha et al. (2020)journals.lww.com	Rural Tamil Nadu women (n=260)	Health education (quasi-experimental)	BSE knowledge and practice rates increased by ~70% and 60% respectively after education.
Global (Harvey et al. 1997)	Canada (CASE trial)	Case–control from RCT	Proficient BSE reduced mortality risk: a nested analysis found that regular, quality BSE was associated with lower breast cancer deaths.

Table 2 summarizes intervention studies and global trials

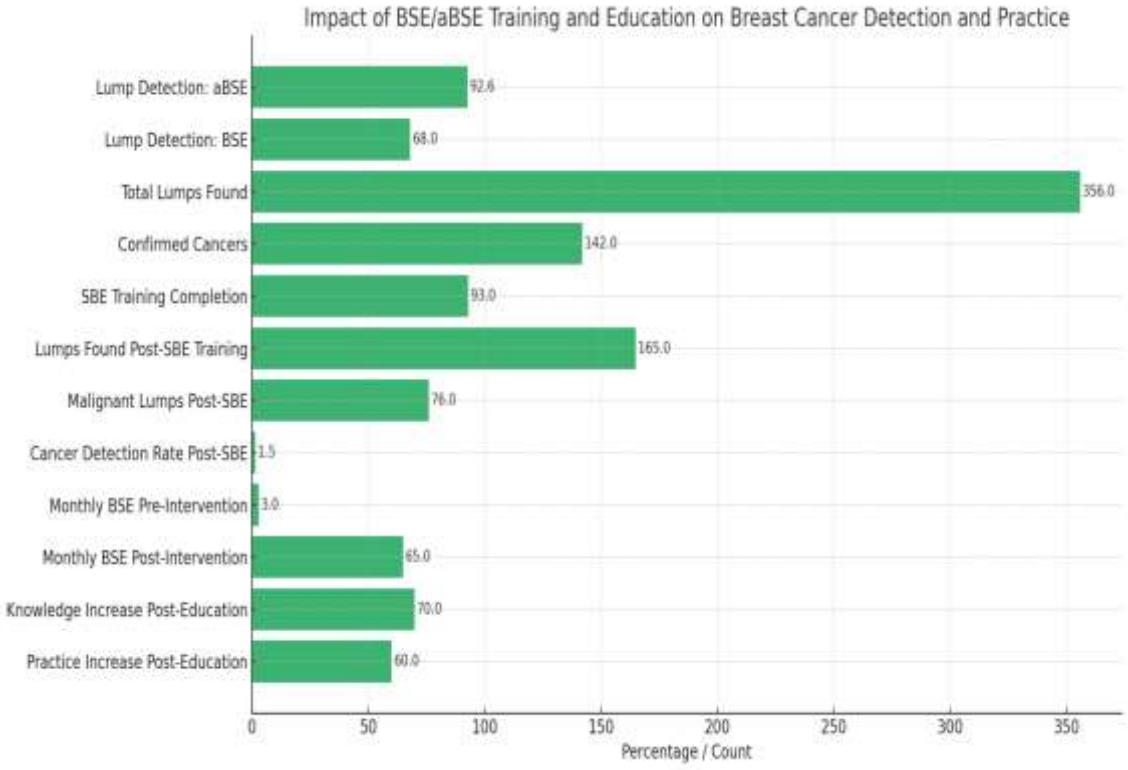

Fig: 2 the impact of BSE/aBSE training and education

Critical Appraisal: Indian vs. Global Evidence

The only large-scale evidence on BSE efficacy comes from international trials. The Cochrane review (2003, updated 2007) pooled two RCTs (388,535 women in Russia and Shanghai) and found **no significant reduction in breast cancer mortality** with regular BSE screening. Instead, BSE led to increased benign biopsies (RR≈1.88). Similarly, the North American Canadian National Breast Screening Study found that high-quality, regular BSE might reduce mortality, but this was an exploratory result, and practice quality was highly variable. Based on such data, WHO and others no longer recommend organized BSE programs; instead, they emphasize breast awareness and CBE in low-resource settings.

In contrast, Indian "evidence" is largely indirect. There are no published RCTs of BSE vs. no BSE in India. Existing Indian studies focus on intermediate outcomes (knowledge, detection rates) rather than mortality. These studies show that **with training**, BSE can detect many cancers at a low (single-digit) percent yield. However, these uncontrolled programs do not prove that BSE alone reduces deaths. Indeed, experts caution that ensuring women perform BSE correctly every month is challenging in practice. Some Indian authors (e.g. Ghose et al.) argue that BSE, due to its feasibility, should be the "screening tool of choice" in LMICs, but this is not supported by high-quality outcome data. Our review finds **no evidence** that BSE reduces breast cancer mortality in India – the lack of benefit seen globally is likely applicable here. Nevertheless, the Indian experience suggests BSE education may downstage disease if tied to follow-up care. Thus, while we cannot endorse BSE as a validated screening test (in line with Cochrane), it appears useful as part of awareness efforts in communities where no other screening exists.

Barriers to BSE in India

Numerous barriers impede BSE uptake in India. Cultural factors top the list: many women feel embarrassed to handle their own breasts due to modesty or stigma. In the Tamil Nadu study, "shyness" and lack of encouragement from family were explicitly linked to poor BSE practice. Misconceptions and fear also deter women: concerns about cancer or disfigurement lead to denial of symptoms. Socioeconomic and literacy barriers are major: low education correlates with unawareness of BSE. Healthcare access is limited, especially in rural areas, making even basic screening difficult. As reported, Indian women's low literacy, limited healthcare spending, and the scarcity of female providers all contribute to poor screening coverage. In short, women who might benefit most from BSE often lack the means or motivation to practice it. Table 1 (above) highlights that inadequate knowledge—stemming from these barriers—is pervasive (e.g. 58–94% of surveyed women lacked sufficient BSE understanding).

Discussion

This review shows that, in India, formal evidence for BSE's effectiveness in reducing breast cancer mortality is lacking, mirroring global findings. The Cochrane review concluded that regular BSE "cannot be recommended" as screening due to no mortality benefit and increased harm. We found no Indian study that challenges this; no large trial has demonstrated otherwise. Instead, Indian data focus on programmatic outcomes: when women are taught BSE, many are able to find lumps. For example, outreach camps detected cancers at ~1.5–1.9% of screened women. These detection rates are high

compared to typical screening yields (usually <1%), reflecting both high underlying incidence and advanced baseline stage in India.

The practical impact of these programs depends on follow-up care. Training women to do BSE is only the first step; ensuring that those with positive findings access timely diagnosis and treatment is crucial. In the Mumbai CBE trial (Mitra et al., 2021), structured clinical screening dramatically downstaged tumors and cut mortality. This suggests that a coordinated approach (whether via CBE campaigns or combined BSE+CBE strategies) yields real benefit. BSE alone, in contrast, remains a "screening lite" strategy: it raises awareness but is an inconsistent method for catching cancers before they grow.

We also note that all included studies had limitations. Most Indian studies were non-randomized, with convenience samples and limited follow-up. Self-reported practice rates may overestimate actual compliance. There is likely publication bias toward reporting positive education outcomes. The heterogeneity of interventions (different teaching methods, urban vs rural) precludes meta-analysis. Nonetheless, the consistency of low baseline awareness and large practice gains post-intervention is clear.

Recommendations for BSE in Public Health

Given the above, we make the following recommendations for India's breast cancer control efforts:

- **Education and Awareness:** BSE should be taught as part of general women's health education, not as a standalone screening mandate. Health camps and clinics (especially during Breast Cancer Awareness activities) should demonstrate BSE technique using visuals or models, as recommended by researchers. School and college curricula can include breast health to build lifelong habits.
- **Integration with Healthcare Services:** Train primary healthcare workers (e.g. ASHAs, nurses) in how to instruct BSE with cultural sensitivity. Encourage periodic CBE in women ≥30 as per WHO/ICMR guidelines, with BSE awareness complementing it. Use community health visits to ask about BSE practice and breast changes, reinforcing action if symptoms occur.
- **Target Cultural Barriers:** Employ female educators and peer support groups to overcome shyness and stigma. Use local media, stories and role models to normalize breast health discussion. Public campaigns (e.g. "Soap with a Lump" or mobile apps) can remind women in private settings to check their breasts.
- **Resource Allocation:** As formal screening via mammography is often infeasible, allocate resources for mobile screening camps that combine CBE and BSE education. Prioritize rural and low-income areas where most women miss out. Regular national programs (NPCDCS) should formally include BSE promotion and pathways for referral.
- **Research and Evaluation:** Future studies should evaluate combined BSE/CBE interventions on clinical outcomes. Monitoring of opportunistic BSE by women and its yield of early cancers (versus false positives) would clarify utility. Collaborations with NGOs (like the Indian Cancer Society) can test innovative community approaches.

These steps aim to use BSE pragmatically—as a low-cost awareness tool **alongside** stronger measures—rather than as the sole screening strategy. It is crucial to communicate that BSE does not guarantee cancer prevention, but it helps women detect any breast changes that warrant medical evaluation. Women should be empowered to seek care promptly for any lump or symptom.

Conclusion

In summary, international trials indicate that breast self-examination does not reduce breast cancer mortality and can cause harm through over diagnosis. Indian data do not contradict this; in fact, there are no high-level Indian trials on BSE outcomes. However, Indian studies show that well-implemented BSE education substantially increases women's screening behaviours and detection of lumps. Thus, while BSE should not be promoted as a replacement for proven screening methods, it has practical value as part of a comprehensive early-detection program in India. Emphasis should be on breast awareness and timely follow-up of findings. Public health programs must address the clear barriers (cultural taboos, low literacy, and access inequities) to make any breast cancer screening effective. We recommend that national programs incorporate BSE training in existing healthcare outreach (especially where CBE/mammography are unavailable) and invest in community education that demystifies breast health.

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