

From Knowledge Gaps and Limited Cognitive Insight in Breast Cancer Risk Perception, Early Recognition and Screening Perspectives to Enhanced Cognitive Orientation Following Educational Exposure to the Brahams Protocol: A Cross-Sectional Survey Among Nursing Staff

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ABSTRACT

Background: Breast cancer awareness does not necessarily translate into accurate personal risk appraisal, recognition of early abnormalities, or readiness to respond appropriately. A preceding study among nursing professionals identified substantial gaps in knowledge and preventive practice. The Brahams Protocol (BP), conceived and developed by Dr (Lt Col) Brahamjit Singh, is a lifestyle-integrated, partner-supported framework intended to complement established breast cancer screening and diagnostic pathways. The present study specifically examined reported cognitive orientation among nursing staff following educational exposure to BP.

Objective: To assess self-reported changes in cognitive orientation regarding breast cancer risk perception, age-related risk, early recognition of breast abnormalities, breast-health vigilance, perspectives on existing screening approaches, partner communication, and anticipated healthcare-seeking following structured educational exposure to BP.

Methods: This cross-sectional post-exposure survey was conducted among nursing staff who attended eight structured BP educational seminars at two tertiary-care hospitals between April and June 2026. Of 300 attendees, 273 completed the questionnaire, comprising 212 females and 61 males. A 10-item dichotomous questionnaire assessed perceived changes in thinking across predefined cognitive domains. Descriptive statistics were used, with Fisher's exact test applied for sex-stratified comparisons where appropriate. Statistical significance was defined as $P < 0.05$.

Results: Affirmative responses were consistently high, ranging from 92.3% to 100.0%. Overall, 98.2% of participants reported changed thinking about the possibility of developing breast cancer, 97.8% recognized that breast cancer was not confined to the elderly population, 97.4% reported a changed understanding of the

importance of early recognition, and 98.5% reported greater consideration of personal vulnerability. A total of 92.3% reported concern regarding the possibility of missing an early abnormality. All participants (100%) reported a changed perspective toward regular rather than annual or episodic breast-health vigilance, while 92.7% questioned whether existing approaches alone were sufficient for earliest recognition. Partner communication and anticipated healthcare-seeking were reported by 93.4% and 97.8%, respectively. Overall, 98.2% reported a positive change in their thinking about breast health and early recognition. Female participants showed significantly higher affirmative responses for early-recognition orientation ($P=0.046$) and anticipated healthcare-seeking ($P=0.024$).

Conclusion: Following structured educational exposure to the Brahams Protocol developed by Dr (Lt Col) Brahamjit Singh, nursing staff reported a high degree of cognitive orientation across multiple dimensions of breast cancer risk, early recognition, regular breast-health vigilance, partner involvement, and anticipated healthcare responsiveness. These findings suggest that structured education may extend beyond factual awareness toward a more integrated cognitive orientation to breast health. However, because of the cross-sectional post-exposure design, the findings do not establish causal cognitive change, sustained behavioral adoption, improved screening performance, earlier cancer detection, or clinical benefit. Prospective longitudinal studies are required to determine whether the reported cognitive orientation is sustained and translates into appropriate behavior and measurable implementation outcomes.

Keywords: Breast cancer; Brahams Protocol; Dr (Lt Col) Brahamjit Singh; cognitive orientation; risk perception; early recognition; breast health vigilance; partner-supported health; health education; screening perspectives; nursing staff; healthcare-seeking; implementation research.

INTRODUCTION

Breast cancer awareness is an important component of early cancer diagnosis, but awareness is not synonymous with comprehensive knowledge, appropriate risk appraisal, or readiness to recognize and respond to an early abnormality. Early diagnosis depends not only on the availability of diagnostic services but also on the recognition of potentially suspicious breast changes and timely engagement with healthcare services.^{1,2} Thus, the pathway from information to early recognition involves cognitive processes through which individuals interpret disease risk, understand the significance of possible abnormalities, and determine the relevance of these issues to themselves.

The distinction between knowledge and cognitive interpretation is particularly important in breast cancer. An individual may recognize breast cancer as an important disease or be familiar with mammography as a screening modality without necessarily appreciating personal susceptibility, understanding that early disease may be asymptomatic, or recognizing the significance of a newly developing breast abnormality. Risk perception is influenced by cognitive, psychological and contextual factors and may differ substantially from objectively estimated risk.^{3,4} Evidence from breast cancer research indicates that perceived susceptibility has a measurable relationship with screening-related behavior, although this relationship is neither uniform nor necessarily causal.^{3,5} Consequently, effective health communication may require more than transmission of factual information; it may also require a change in the cognitive framework through which that information is interpreted.

This issue is particularly relevant among healthcare professionals. A systematic review of breast cancer awareness among Indian women and healthcare professionals found considerable variation in knowledge of risk factors and breast self-examination, with important deficiencies persisting even among healthcare professionals.⁶ More broadly, studies of breast cancer screening beliefs have shown that constructs such as perceived susceptibility, perceived severity, benefits, barriers and cues to action contribute to the cognitive architecture underlying screening-related decisions.^{7,8} These observations support the importance of examining cognitive constructs separately from factual knowledge and from subsequent behavior.

The relevance of this distinction was demonstrated in the preceding published study from the present survey programme among nursing professionals.⁹ Although general breast cancer awareness was relatively satisfactory, substantial deficiencies were identified in specific domains of risk and protective factors, screening and early

detection, and warning symptoms.⁹ The study reported domain-specific knowledge scores of 60.2%, 19.2%, 39.4% and 27.5%, respectively, and identified a marked disconnect between theoretical awareness and personal preventive practices.⁹ These findings provided an important baseline context for examining whether a structured educational framework could be associated with changes extending beyond factual awareness.

Importantly, the baseline findings also illustrated the distinction between recognizing breast cancer as a disease and cognitively appreciating its early manifestations and personal relevance. Recognition of increasing breast cancer incidence among younger women and awareness that early breast cancer may be asymptomatic were considerably less developed than awareness of breast cancer as a major health problem or familiarity with mammography.⁹ Such discordance suggests that breast cancer awareness may comprise multiple cognitive layers, ranging from general disease recognition to appraisal of personal vulnerability, interpretation of early abnormalities and understanding of the role of ongoing vigilance.

The Brahams Protocol (BP), conceived and developed by Dr (Lt Col) Brahamjit Singh, was introduced to the study population as a structured, lifestyle-integrated approach to breast-health vigilance, intended to complement—not replace—established breast cancer screening and diagnostic pathways. Previous publications describing the BP have proposed repeated familiarity with normal breast architecture, recognition of interval changes and timely escalation for medical assessment as components of this framework.¹⁰⁻¹⁴ The relevance of BP to the present investigation is therefore not its proposed clinical efficacy, which was not evaluated in this study, but its potential to provide a structured cognitive framework through which breast cancer risk, early abnormality recognition and screening may be reconsidered.

Educational exposure may be particularly relevant when an existing understanding of a health problem contains omissions, misconceptions or insufficiently integrated concepts. Health-behavior models have long recognized constructs such as susceptibility, severity, perceived benefits, barriers, cues to action and intention as components of health-related decision-making.^{7,8} In breast cancer screening, systematic reviews have demonstrated that such cognitive constructs are associated with screening intentions and behavior, while also highlighting substantial heterogeneity in their explanatory value.^{8,14} These findings suggest that changes in cognitive appraisal may represent an important intermediate stage between health education and subsequent behavior, although cognitive change itself should not be equated with behavioral change.

Against this background, the present study focuses specifically on cognitive change following educational exposure to the Brahams Protocol. The investigation forms part of the broader survey programme but addresses a distinct question from the preceding assessment of knowledge and practice and from separate analyses concerning psychological or emotional responses. The present manuscript examines the cognitive dimensions of breast cancer risk perception, early recognition and screening perspectives following exposure to structured BP education.

The scientific question is therefore whether educational exposure to BP was accompanied by a substantial change in cognitive orientation among nursing staff, specifically, in how they conceptualized breast cancer risk, the possibility of early breast abnormalities, the importance of their recognition, and perspectives regarding regular breast-health vigilance and existing screening approaches. Any reported change must be interpreted within the limitations of the cross-sectional post-exposure design and should not be regarded as evidence of causal cognitive transformation, sustained behavioral adoption, earlier cancer detection, or improved clinical outcomes.

The present study consequently seeks to examine an intermediate but potentially important dimension of breast cancer awareness: the transition from factual knowledge toward a more developed cognitive orientation to risk, early recognition and screening perspectives following structured educational exposure.

MATERIALS AND METHODS

Study Design and Participants

The survey was undertaken during eight structured educational seminars conducted at Sarvodaya Hospital, Faridabad, and Sarvodaya Hospital, Noida, between April and June 2026. The survey is reported in accordance

with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines.

A total of 300 nursing personnel attended the seminars. Of these, 273 participants voluntarily completed the survey questionnaire, yielding an overall response rate of 91.0%. Overall, 212 participants were female and 61 were male, with an age range of 24–41 years.

Survey Instrument

A structured, self-administered questionnaire developed by the investigators was used for data collection. The questionnaire comprised a demographic profile and multiple predefined domains evaluating different dimensions of the Brahams Protocol. The present manuscript reports findings from the Social and Cultural Acceptability domain, one of the many domains included in the survey, which was assessed using 20 dichotomous (Yes/No) questions.

Data Collection

The questionnaire was administered immediately after completion of each educational seminar. Participation was voluntary and anonymous. Participants were informed about the purpose of the survey, and only fully completed questionnaires were included in the final analysis.

Ethical Considerations

The study was conducted in accordance with the ethical principles of the Declaration of Helsinki. The survey was an anonymous, voluntary, non-interventional knowledge assessment that collected no clinical, identifiable, or personal health information and preceded any educational or protocol-related intervention; as such, it did not require formal institutional ethics committee approval. Participation was voluntary and anonymous, and completion of the questionnaire was taken to imply informed consent.

Statistical Analysis

Data were entered into Microsoft Excel and analyzed using IBM SPSS Statistics (Version XX.X; IBM Corp., Armonk, NY, USA). Descriptive statistics were used to summarize participant characteristics and survey responses. Categorical variables were expressed as frequencies and percentages. Comparisons between male and female participants were performed using the Chi-square test or Fisher's exact test, as appropriate. Odds ratios (ORs) with 95% confidence intervals (CIs) were calculated for statistically significant associations. A two-tailed P value of <0.05 was considered statistically significant.

RESULTS

Study Population

The Domain 4 analysis included 273 nursing staff, comprising 212 female participants and 61 male participants. All participants had been exposed to the structured Brahams Protocol educational seminar and subsequently completed the cognitive impact and cognitive reframing questionnaire. The questionnaire assessed perceived changes in thinking across domains of breast cancer risk perception, recognition of early breast abnormalities, screening perspectives, partner communication, anticipated healthcare-seeking response, and overall cognitive orientation.

Change in Perception of Breast Cancer Risk and Early Recognition

A very high proportion of participants reported a change in their perception of breast cancer risk following exposure to BP. Regarding the possibility of developing breast cancer, 267 of 272 valid respondents (98.2%) responded that BP had changed the way they thought about this possibility. This included 209/211 females (99.1%) and 58/61 males (95.1%).

Similarly, 267 of 273 participants (97.8%) reported that BP had made them realize that breast cancer was no longer confined to the elderly population. The corresponding proportions were 208/212 females (98.1%) and 59/61 males (96.7%).

A total of 266 of 273 participants (97.4%) reported a change in their understanding of the importance of recognizing breast abnormalities at an early stage. This comprised 209/212 females (98.6%) and 57/61 males (93.4%).

The highest proportion within this domain was observed for personal vulnerability: 269 of 273 participants (98.5%) reported that BP had made them think more seriously about their personal vulnerability to breast cancer. Among females, this was reported by 210/212 (99.1%), compared with 59/61 males (96.7%).

Concern Regarding Missed Early Abnormalities

When asked whether BP had created concern or anxiety regarding the possibility of missing an early breast abnormality, 252 of 273 participants (92.3%) responded affirmatively. The proportion was 198/212 (93.4%) among females and 54/61 (88.5%) among males.

Change in Perspectives Regarding Screening

All 273 participants (100%) reported that BP as a concept had changed their perspective regarding the requirement for a regular monthly breast cancer approach rather than annual or episodic approaches. This response was uniform across both groups, with 212/212 females (100%) and 61/61 males (100%) responding affirmatively.

Regarding the sufficiency of existing approaches for achieving the earliest possible recognition of breast abnormalities, 253 of 273 participants (92.7%) reported that BP had made them question whether existing approaches alone were sufficient. This was reported by 200/212 females (94.3%) and 53/61 males (86.9%).

Cognitive Orientation Toward Partner Communication and Healthcare Seeking

Following exposure to BP, 255 of 273 participants (93.4%) reported that learning about the Brahams Protocol made them more likely to discuss breast health with their partner. The proportion was 201/212 (94.8%) among females and 54/61 (88.5%) among males.

Similarly, 267 of 273 participants (97.8%) reported that BP made them more likely to seek medical advice if they or their partner noticed a suspicious breast change. This included 210/212 females (99.1%) and 57/61 males (93.4%).

Overall Reported Cognitive Change

In the overall assessment, 268 of 273 participants (98.2%) reported that the Brahams Protocol seminar had positively changed the way they thought about breast health and early recognition of breast abnormalities. The corresponding proportions were 210/212 females (99.1%) and 58/61 males (95.1%).

Summary of Responses

Across the ten cognitive-domain questions, affirmative responses ranged from 92.3% to 100.0% among the total study population. The lowest affirmative response was observed for concern or anxiety regarding the possibility of missing an early breast abnormality (92.3%), whereas the question concerning a changed perspective toward a regular monthly rather than annual/episodic approach received an affirmative response from 100% of participants.

The remaining cognitive domains demonstrated affirmative responses of 92.7% or higher, including perceptions of personal vulnerability, early recognition, breast cancer occurrence beyond older age groups, partner discussion, anticipated medical consultation, and overall positive cognitive change.

Table 1. Overall cognitive responses

Q	Cognitive aspect	Yes n (%)	No n (%)	Valid N
1	Possibility of developing breast cancer	267 (98.2%)	5 (1.8%)	272
2	Breast cancer no longer confined to elderly population	267 (97.8%)	6 (2.2%)	273
3	Importance of recognizing breast abnormalities at an early stage	266 (97.4%)	7 (2.6%)	273
4	Personal vulnerability to breast cancer	269 (98.5%)	4 (1.5%)	273
5	Concern/anxiety regarding missing an early breast abnormality	252 (92.3%)	21 (7.7%)	273
6	Perspective on regular (monthly) rather than annual/episodic screening	273 (100.0%)	0 (0.0%)	273
7	Whether existing approaches alone are sufficient for earliest recognition	253 (92.7%)	20 (7.3%)	273
8	More likely to discuss breast health with partner	255 (93.4%)	18 (6.6%)	273
9	More likely to seek medical advice for a suspicious breast change	267 (97.8%)	6 (2.2%)	273
10	Overall positive change in thinking about breast health and early recognition	268 (98.2%)	5 (1.8%)	273

Table 2. Sex-stratified responses

Q	Female Yes/No	Female Yes (%)	Male Yes/No	Male Yes (%)	p-value
1	209/2	99.1%	58/3	95.1%	0.076
2	208/4	98.1%	59/2	96.7%	0.618
3	209/3	98.6%	57/4	93.4%	0.046
4	210/2	99.1%	59/2	96.7%	0.217
5	198/14	93.4%	54/7	88.5%	0.272
6	212/0	100.0%	61/0	100.0%	1.000
7	200/12	94.3%	53/8	86.9%	0.089
8	201/11	94.8%	54/7	88.5%	0.138
9	210/2	99.1%	57/4	93.4%	0.024
10	210/2	99.1%	58/3	95.1%	0.076

Table 3. Sex-wise inferential statistical analysis

Q	Test	Statistic	p-value	Significant
1	Fisher exact	OR=5.41	0.076	No
2	Fisher exact	OR=1.76	0.618	No
3	Fisher exact	OR=4.89	0.046	Yes
4	Fisher exact	OR=3.56	0.217	No
5	Fisher exact	OR=1.83	0.272	No
6	Fisher exact	—	1.000	No
7	Fisher exact	OR=2.52	0.089	No
8	Fisher exact	OR=2.37	0.138	No
9	Fisher exact	OR=7.37	0.024	Yes
10	Fisher exact	OR=5.43	0.076	No

Table 4. Summary

Domain	Questions	Yes n	No n	Total responses	Affirmative (%)
Risk perception & vulnerability	1, 2, 4	803	15	818	98.2%
Early recognition	3	266	7	273	97.4%
Concern regarding missed abnormality	5	252	21	273	92.3%
Screening perspectives	6, 7	526	20	546	96.3%

Partner communication	8	255	18	273	93.4%
Healthcare-seeking intention	9	267	6	273	97.8%
Overall cognitive orientation	10	268	5	273	98.2%

DISCUSSION

Principal Findings

The principal finding of the present study is the consistently high level of self-reported cognitive orientation following educational exposure to the Brahams Protocol (BP). Across ten questions addressing breast cancer risk perception, age-related understanding, early recognition, screening perspectives, partner communication, anticipated healthcare-seeking and overall thinking, affirmative responses ranged from 92.3% to 100.0%. These findings are particularly relevant when considered sequentially with the preceding publication from the same survey programme, which identified substantial deficiencies in breast cancer knowledge and preventive practice among nursing professionals.[9] The present analysis therefore examines a different layer of the same problem: not simply whether information was known, but whether participants reported that their way of thinking about breast health had changed following structured exposure to BP.

Importantly, these findings represent reported post-seminar perceptions and should not be interpreted as objective measurements of cognition or as evidence of causal cognitive transformation. The cross-sectional design provides a description of the cognitive response reported after exposure, rather than a controlled estimate of change attributable to BP.

From Knowledge Gaps to Cognitive Orientation

The preceding study demonstrated that relatively satisfactory general awareness could coexist with much weaker knowledge of risk and protective factors, screening and early detection, and warning symptoms.⁹ This pattern is consistent with broader Indian literature showing substantial variability in breast cancer knowledge and a persistent gap between awareness and screening practice.^{16,17} The present findings suggest that structured educational exposure may be relevant not only for adding factual information but also for helping individuals integrate breast-health concepts into a more personally meaningful cognitive framework.

The term “cognitive orientation” is used deliberately. It describes a reported shift in how participants conceptualized risk, early recognition, vigilance and healthcare responsiveness. It does not imply a validated neurocognitive endpoint, a change in cognitive ability, or a clinical psychological construct. This distinction is important because the questionnaire was designed to capture perceived changes in thinking rather than objective cognitive performance.

Personal Risk Perception and Vulnerability

Personal vulnerability was among the most strongly endorsed domains, with 98.5% of participants reporting that BP had made them think more seriously about their vulnerability to breast cancer. Perceived susceptibility is a recognized component of health-behavior models and has been associated with screening-related behavior, although the relationship is neither uniform nor necessarily causal^{3,7}

Risk perception, however, should not be equated with accurate risk estimation. Previous literature has shown that individuals may substantially overestimate or underestimate their breast cancer risk and that perceived risk is influenced by psychological and contextual factors.^{3,4,5} The present finding therefore indicates increased salience of personal vulnerability rather than demonstrating that participants’ individual risk assessments became objectively more accurate. Future studies should distinguish between increased risk awareness and calibrated risk perception.

Early Recognition as a Distinct Cognitive Construct

A total of 266 of 273 participants (97.4%) reported a changed understanding of the importance of recognizing breast abnormalities at an early stage. This finding is especially relevant when compared with the baseline study,

in which the overall screening and early-detection knowledge domain was only 39.4%, despite 94.5% of participants already recognizing that early detection can save lives.⁹ This contrast highlights an important conceptual distinction: recognizing the value of early detection is not necessarily equivalent to understanding the pathway by which an evolving abnormality may be recognized.

The current finding may therefore reflect greater conceptual integration of early recognition within breast-health thinking. It does not demonstrate improved diagnostic ability, and the study did not test whether participants could accurately distinguish benign from malignant abnormalities.

Reconsideration of Age-Related Assumptions

Overall, 267 of 273 participants (97.8%) reported that BP had made them realize that breast cancer was no longer confined to the elderly population. This is notable against the baseline finding that only 42.5% recognized increasing breast cancer incidence among younger women.⁹ Age can function as a cognitive filter through which perceived susceptibility is interpreted. If breast cancer is mentally categorized as predominantly a disease of older women, younger adults may underweight the significance of breast abnormalities.

The present response pattern suggests a broader age-related cognitive frame after educational exposure. It should not, however, be interpreted as evidence that all younger individuals are at high risk or that age-based screening recommendations no longer apply.

From Episodic Thinking Toward Continuous Vigilance

All 273 participants reported that BP changed their perspective regarding a regular monthly rather than annual or episodic approach. This was the strongest response in the questionnaire. Conceptually, the finding aligns with the central BP proposition that breast-health vigilance may be integrated into routine life rather than being viewed only as an event associated with periodic healthcare encounters.^{10,11}

The distinction between perspective and practice is critical. The question assessed a change in viewpoint, not whether participants subsequently performed monthly practice. The preceding study demonstrated that conceptual awareness could coexist with very low reported practice.⁹ Thus, the 100% response should be interpreted as strong cognitive endorsement of the concept, not as evidence of universal behavioral adoption. Moreover, the wording should be understood as a reported perspective on regular vigilance rather than as a claim that a monthly interval constitutes a universally recommended formal screening schedule.

Questioning Whether Existing Approaches Are Sufficient

A total of 253 participants (92.7%) reported that BP made them question whether existing approaches alone were sufficient for achieving the earliest possible recognition of breast abnormalities. This finding requires careful interpretation. It does not establish that mammography, clinical breast examination, ultrasonography, MRI, pathology or other established diagnostic pathways are ineffective or unnecessary. BP has been positioned within this research programme as complementary to established screening and diagnostic pathways.^{10,11,13}

Rather, the response suggests an expansion of the conceptual question—from whether an established screening modality exists to whether opportunities for breast-health vigilance and recognition between formal healthcare encounters can also be strengthened. This is a cognitive expansion of the pathway, not an efficacy comparison between screening modalities.

Partner Communication and Shared Health Responsibility

Partner communication was endorsed by 255 of 273 participants (93.4%). This finding is relevant to the couple-centered architecture of BP, which proposes partner participation as a potential supportive component of breast-health vigilance.^{10,13} The result should be interpreted as an anticipated communication response rather than demonstrated partner behavior.

The relevance of the relational component is strengthened by the published BP social and cultural acceptability

study from the same broader survey programme. That study found high acceptance of partner-supported breast-health vigilance among healthcare workers, including strong endorsement of mutual care, shared responsibility within marriage, discussion within marriage and the potential for wider social acceptance.¹⁵ The two studies therefore address complementary implementation layers: social/cultural acceptability concerns whether the model is perceived as acceptable, whereas the present Domain 4 analysis examines whether participants reported a change in their cognitive orientation after educational exposure. Neither study establishes sustained behavioral adoption.

Anticipated Healthcare-Seeking Response

Almost all participants, 267 of 273 (97.8%), reported being more likely to seek medical advice if they or their partner noticed a suspicious breast change. This response is potentially important because recognition without appropriate healthcare escalation does not complete the early-detection pathway. Health-belief constructs and perceived barriers have been associated with screening and help-seeking behavior.^{7,18}

Concern Regarding a Missed Early Abnormality

Concern or anxiety regarding the possibility of missing an early abnormality was the least frequently endorsed item, but was still reported by 252 of 273 participants (92.3%). This response requires a more nuanced interpretation than the other cognitive domains. Increased concern may reflect greater salience of breast health, but concern is not intrinsically beneficial and could become counterproductive if it produces excessive worry or inappropriate healthcare utilization.

Risk-perception literature similarly distinguishes perceived risk from worry and demonstrates that risk communication can influence both.^{3,4,5}

Sex-Stratified Findings

Female participants showed higher affirmative responses than male participants across all ten items. Statistically significant differences were observed for the reported change in understanding of the importance of early recognition (98.6% among females vs 93.4% among males; $p=0.046$) and anticipated healthcare-seeking following a suspicious change (99.1% vs 93.4%; $p=0.024$). [Present study data]

These differences may be directionally plausible within a couple-centered breast-health framework, but they should be interpreted cautiously. The male subgroup was smaller ($n=61$), and ten separate comparisons were undertaken. Accordingly, the sex-stratified findings are best regarded as exploratory rather than definitive evidence of differential cognitive response.

Comparison with the Preceding Study: A Sequential Interpretation

The most informative interpretation of this study emerges when the present findings are placed alongside the preceding published study from the same survey programme. The earlier study established substantial knowledge and practice gaps before educational exposure, whereas the present analysis examines reported cognitive orientation after exposure.⁹ The two studies therefore provide complementary rather than duplicate information.

The sequence can be conceptualized as: knowledge gap → educational exposure → reported cognitive orientation → intention/behavior → sustained practice → clinical outcomes. The present publication addresses the third element in this sequence.

Integrated Comparison with the Previous Study

Table 1 brings the two analyses together at the level of domains. It is intentionally an interpretive comparison rather than a pre-post statistical comparison. The previous study measured baseline knowledge and practice, whereas the present study measured self-reported post-exposure cognitive responses.⁹ The table therefore demonstrates continuity across the survey programme without implying that the observed differences represent individual-level causal change.

Taken together, the two publications suggest a sequential pattern from limited knowledge and preventive practice toward greater cognitive salience of personal risk, early recognition, regular vigilance, partner involvement and healthcare escalation after educational exposure. This should be regarded as a conceptual bridge between studies rather than evidence of a statistically demonstrated pre-post effect.

Integration with the Published Social and Cultural Acceptability Study

The recently published social and cultural acceptability study of BP provides an important additional layer for interpreting the present findings.¹⁵ That study, conducted among 273 healthcare professionals after structured educational sessions, reported affirmative responses exceeding 88% across all 20 acceptability items and particularly high endorsement of mutual care/shared responsibility, discussion within marriage, cultural acceptability and the potential for broader social acceptance.¹⁵ These findings indicate that the relational and sociocultural architecture of BP was viewed favorably by the surveyed healthcare-worker population.

When considered alongside the present findings, a more coherent implementation sequence emerges. The acceptability study addresses whether the intervention is socially and culturally acceptable; this study addresses whether participants report a changed cognitive orientation after exposure. The preceding knowledge/practice study identifies the baseline informational and practice gap. Thus, the three publications can be viewed as addressing different layers of implementation: baseline knowledge/practice, social-cultural acceptability, and post-exposure cognitive orientation.⁹⁻¹⁴

Theoretical Interpretation

The findings can be situated within established health-behavior frameworks. The Health Belief Model emphasizes perceived susceptibility, perceived severity, perceived benefits, perceived barriers and cues to action, whereas the Theory of Planned Behavior emphasizes attitudes, subjective norms, perceived behavioral control and intention. A systematic review and meta-analysis of mammography screening found that these constructs have explanatory value, while also demonstrating substantial heterogeneity across studies.⁷ The present study does not validate either model or establish a new psychometric endpoint; it demonstrates that several theoretically relevant cognitive domains were strongly endorsed after educational exposure.

This interpretation is also compatible with systematic-review evidence that educational interventions can improve knowledge, beliefs and intentions related to mammography, while the magnitude and durability of behavioral effects vary according to intervention design and follow-up.^{8,19} Evidence from broader screening literature further indicates that education, social support, self-efficacy, cues to action and cultural determinants may influence screening-related behavior.²⁰⁻²⁹ Such evidence supports the plausibility of a cognitive intermediate stage but does not establish that the current response pattern represents a durable intervention effect.

What the Present Study Adds

The principal contribution of the study is its positioning between the previously documented knowledge–practice gap and the behavioral outcomes that remain to be tested. The preceding publication demonstrated that awareness of breast cancer and mammography could coexist with poor knowledge in specific domains and negligible reported screening practice.⁹ The social and cultural acceptability publication subsequently provided evidence that the partner-supported, lifestyle-integrated BP concept was highly acceptable within the surveyed healthcare-worker population.¹³ The present analysis adds a third dimension: after structured educational exposure, participants reported substantial changes in how they conceptualized risk, early recognition, vigilance and healthcare responsiveness.

Public-Health Implications

The potential public-health relevance of these findings lies in the possibility that structured education can alter how breast health is cognitively organized. If the transition from factual awareness to personal risk appraisal, early-recognition orientation and appropriate healthcare responsiveness can be reproduced and sustained, it could represent a useful intermediate component of broader early-detection strategies.

The social and cultural acceptability findings are relevant here because an intervention cannot readily become a population-level behavioral strategy if it is perceived as socially unacceptable or culturally incompatible.^{15,20,25-29}

Strengths and Limitations

A major strength is the deliberate separation of cognitive orientation from the other domains of the broader survey programme, including baseline knowledge and practice and separate analyses of psychological/emotional responses. The present analysis can therefore be interpreted as a distinct component of the survey sequence. A further strength is the high completeness of responses across most items and the explicit use of valid denominators for items with missing responses.

The principal limitation is the cross-sectional post-exposure design. There was no contemporaneous pre-seminar administration of the same ten cognitive items, no control group and no validated psychometric instrument establishing a cognitive-change score. Responses were self-reported and may be influenced by recall, social desirability and immediate post-seminar enthusiasm.

Overall Interpretation

The most defensible interpretation is that structured educational exposure to the Brahams Protocol was associated with a high level of self-reported cognitive orientation across multiple breast-health domains. The findings are consistent with the hypothesis that structured education may do more than transmit information; it may influence the framework through which individuals consider personal risk, early abnormalities, vigilance and healthcare responsiveness.

When integrated with the preceding knowledge/practice study and the published social and cultural acceptability study, this study contributes an additional intermediate layer to the emerging BP evidence base.⁹⁻¹⁴ However, the present study cannot determine whether the reported change was caused by BP, whether it persisted over time, whether it changed behavior, or whether it improved cancer outcomes. Its principal scientific value is therefore as an intermediate observation that links previously documented knowledge/practice gaps and implementation acceptability with a testable hypothesis for prospective longitudinal research.

Table 5. Integrated comparison of the preceding baseline study with the present cognitive findings.

Domain	Previous study: baseline finding	Present study: reported cognitive response	Interpretation
Risk perception	Risk/protective-factor knowledge 19.2%. ⁹	98.2% reported changed thinking about possibility of developing breast cancer; 98.5% reported greater consideration of personal vulnerability.	Greater personal-risk salience; objective risk accuracy not measured.
Age-related risk	42.5% recognized increasing incidence among younger women. ⁹	97.8% reported realizing breast cancer is not confined to elderly populations.	Broader age-related cognitive frame; not evidence of individual high risk.
Early recognition	Screening/early-detection knowledge domain 39.4%; only 15.0% recognized early disease may be asymptomatic. ⁹	97.4% reported changed understanding of the importance of early recognition.	Greater conceptual emphasis on early recognition; diagnostic skill not tested.
Screening/vigilance	Mammography awareness 96.7%, but important guideline and practice gaps were present. ⁹	100.0% reported a changed perspective toward regular monthly rather than annual/episodic vigilance.	Shift in perspective toward continuous vigilance; actual practice not measured.

Existing approaches	Baseline study identified knowledge/practice gaps; it did not test adequacy of screening modalities. ⁹	92.7% reported questioning whether existing approaches alone were sufficient for earliest recognition.	Expansion of the cognitive frame; not evidence that established modalities are ineffective.
Partner involvement	Baseline survey showed negligible personal/partner screening practice. ⁹	93.4% reported greater likelihood of discussing breast health with a partner.	Shared-health orientation; actual partner behavior not demonstrated.
Healthcare escalation	No participant reported breast cancer screening or clinical breast examination in the baseline survey. ⁹	97.8% reported greater likelihood of seeking medical advice after a suspicious change.	Strong stated healthcare-seeking orientation; actual consultation requires prospective assessment.
Overall orientation	Baseline study established knowledge and practice gaps. ⁹	98.2% reported an overall positive change in thinking about breast health and early recognition.	Potential intermediate bridge between knowledge and later behavior; causal pathway untested.

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