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Presidente Prof.ssa Alessandra Andrisani

TESI DI LAUREA:

Breast Self-Examination (BSE) among Midwives and Midwifery Students: a National Survey

Relatore: Dott.ssa Vescio Vincenza Cynthia

Correlatore: Dott.ssa Honoria Ocagli

LAUREANDA: Alfonsi Chiara

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## **ABSTRACT**

**Background:** Breast cancer represents the most common cancer among women in 158 countries and the main cause of female cancer-related deaths in 107 countries. It constitutes the most common cancer in Italian women with 55.900 new cases every year and 15.500 deaths. Early detection of breast cancer is associated with improved outcomes, increased survival changes and better prognosis. The World Health Organization (WHO) recommends regular Breast Self-Examination (BSE) beginning from age 20. BSE is defined as the visual and tactile examination of the breast and of the axillary region to detect any persistent changes or potential signs of Breast Cancer. Numerous studies have revealed that only a limited percentage of women are adequately educated to perform BSE correctly and at appropriate intervals. In Italy, literature on the subject is quite limited and often presents conflicting results. Enhanced training for midwives, who play a key role in safeguarding women's reproductive health at every stage of life, in breast cancer prevention and screening could increase awareness and knowledge, help reduce risks and improve participation in screening programs. The available scientific literature investigating the practice of breast self-examination performed by midwifery personnel is not extensive.

**Objective:** This study intended to assess the knowledge and the Breast Self-Examination Practice among Italian Midwives and Midwifery Students.

**Material and methods:** A self-administered, standardized, anonymous questionnaire was developed to assess BSE practice developed thorough review of the existing literature on the subject and sent to Italian Midwifery Councils and thought social media.

**Results and discussion:** The survey's total sample comprised 1011 respondents, including 584 midwives and 427 midwifery students from across the Nation. Fifty percent of participants reported performing BSE monthly. 87% of midwives and 67% of students recognized all signs that should be examined during BSE, while 68% reported using the

hand opposite the breast being examined. Furthermore, 85% of participants indicated that they were either unaware of or did not utilize all the recommended positions for performing BSE, and 55% performed BSE at the recommended time during their menstrual cycle. Data analysis also revealed that 70% of the sample was unaware of the recommended age at which to begin performing BSE. 39% of the sample rated their knowledge of breast cancer prevention and screening as either very poor or extremely poor. 99% of respondents affirmed the necessity for obstetric professionals to receive comprehensive theoretical and practical education on breast cancer prevention and screening at the university level.

Overall, midwives exhibited a higher level of theoretical and practical knowledge regarding breast cancer prevention and screening compared to midwifery students. However, students studying in Southern Italy and those in their third year demonstrated greater theoretical and practical knowledge of BSE and the use of related devices

**Conclusion:** Expanding the knowledge of midwives and midwifery students on breast cancer prevention and screening is essential, not only to encourage higher participation in mammography screening but also to ensure a high standard of healthcare.

## ABSTRACT

**Background:** Il carcinoma mammario rappresenta il tumore più frequente tra la popolazione femminile in 158 Paesi e la principale causa di morte per neoplasia in 107 Paesi. In Italia conta 55.900 nuove diagnosi ogni anno e 15.500 decessi. La diagnosi precoce, tramite la mammografia, l'esame clinico della mammella e a sua autopalpazione, si associa a migliori esiti in termini di sopravvivenza e prognosi. L'Organizzazione Mondiale della Sanità (OMS) raccomanda, a partire dai 20 anni d'età, l'autopalpazione della mammella intesa come l'autoesame visivo e tattile della mammella e della regione ascellare volto a rilevare precocemente eventuali cambiamenti persistenti e segni indicativi di carcinoma mammario. Numerosi studi evidenziano che solo una ridotta percentuale di donne possiede un'educazione tale da garantirne una corretta pratica nelle modalità e nei tempi corretti. In Italia la letteratura disponibile sull'argomento è limitata e offre risultati contrastanti. Una maggiore formazione del personale ostetrico, figura cardine nella tutela della salute riproduttiva della donna in tutte le sue fasi, in merito alla prevenzione e allo screening del carcinoma mammario potrebbe aumentare i livelli di consapevolezza, conoscenza favorendo la riduzione dei rischi, ed incrementare l'adesione ai programmi di screening. La letteratura scientifica disponibile sulle conoscenze e competenze nei confronti della pratica dell'autopalpazione della mammella da parte del personale ostetrico risulta tuttavia ancora molto limitata.

**Obiettivo:** Questo progetto mira ad indagare le conoscenze e le competenze da parte del personale ostetrico italiano attuale e futuro riguardo la pratica dell'autopalpazione della mammella.

**Materiali e metodi:** È stato sviluppato un questionario strutturato e a risposta multipla volto ad indagare la pratica dell'autopalpazione della mammella da parte delle ostetriche e studentesse di ostetricia italiane. Successivamente è stato inviato a ciascun Ordine della Professione Ostetrica e diffuso tramite le piattaforme Social.

**Risultati e discussione:** L'indagine ha coinvolto un campione complessivo di 1011 partecipanti, 584 ostetriche e 427 studentesse di ostetricia provenienti da tutto il territorio nazionale. È stato evidenziato come il 50% delle partecipanti effettuasse mensilmente l'autopalpazione della mammella e l'87% delle ostetriche ed il 67% delle studentesse riconoscesse tutti i segni da individuare durante l'ispezione, prima fase dell'autopalpazione. Inoltre, l'85% dei partecipanti ha indicato di non conoscere, e di conseguenza non utilizzare, tutte le posizioni raccomandate per la sua esecuzione ed il 70% del campione non era a conoscenza di quale fosse l'età indicata dalle Linee Guida per iniziare la sua regolare esecuzione. Infine, il 55% ha affermato di eseguire la BSE nel corretto periodo del ciclo mestruale. Il 39% del campione ha autovalutato la propria conoscenza in merito alla prevenzione e allo screening del carcinoma mammario come molto scarsa o estremamente scarsa. Il 99% degli intervistati ha affermato la necessità che il personale ostetrico riceva una maggior formazione universitaria teorico-pratica in merito.

Complessivamente, le ostetriche hanno dimostrato un livello di conoscenza maggiore rispetto alle studentesse, tuttavia, all'interno di quest'ultima categoria, le studentesse del Sud Italia e quelle del terzo anno di hanno dimostrato una maggiore conoscenza sull'autopalpazione della mammella e relativa ai dispositivi di simulazione.

**Conclusioni:** Ampliare le conoscenze delle ostetriche e delle studentesse di ostetricia sulla prevenzione e sullo screening del carcinoma mammario è fondamentale non solo per incentivare una maggiore adesione allo screening mammografico, ma anche per assicurare un elevato standard di assistenza sanitaria..



## INTRODUCING

Breast cancer is the leading global cause of morbidity and mortality among women, the most common cancer in 158 out of 183 countries (86%) and it's also the primary cause of female cancer deaths in 107 of these countries (58%) (World Health Organization, 2023). In 2022, 2.3 million women were diagnosed with breast cancer, and there were 670,000 deaths globally (World Health Organization). According to the American Cancer Society, the average age at breast cancer diagnosis is 62 (American Cancer Society, 2023).

Breast cancer constitutes the most common form of cancer among Italian women, with approximately 55,900 new cases and 15,500 deaths each year. The 5-year survival rate for breast cancer in Italy is 88% (AIOM- Associazione italiana Oncologia Medica, Associazione Italiana Registri Tumori, Aiom Fondazione, Osservatorio Nazionale Screening, 2023), an improvement from 85.5% in 2019. This rate is higher than both the European average of 81.8% and the Northern European average of 84.7% (Scuola Italiana di Senologia Onlus, 2019).

In Southern European countries, including Italy, there is relatively little variation in survival rates across different age groups. Specifically, the 5-year survival rate is 87.7% for younger women (aged 15-44), 89.3% for women aged 45-54, 87.7% for those aged 55-64, and 84.6% for women aged 65-74, with a slight decline to 76% among women over the age of 75. There are significant regional disparities in survival rates: 85-87% in Northern Italy, 86% in Central Italy, and 81% in Southern Italy (AIOM- Associazione italiana Oncologia Medica, Associazione Italiana Registri Tumori, Aiom Fondazione, Osservatorio Nazionale Screening, 2023).

Projections indicate an increase to 2.74 million new cases and 857,000 deaths annually by 2030, with further growth to 3.19 million cases and 1.04 million deaths by 2040. Breast cancer mortality among women under 70 years of age is expected to increase globally by 28% between 2020 and 2040 (World Health Organization, 2023).

Over the past four decades, significant improvements in breast cancer outcomes have been achieved. Between 1990 and 2020, 20 countries successfully reduced breast cancer mortality by at least 2% per year for three consecutive years (Siegel RL, 2022), (World Health Organization, 2023). The effective proven strategies in lowering breast cancer mortality are early detection, timely and accessible diagnostic services, and the implementation of effective multimodal therapies, including surgery, radiotherapy, and systemic anti-cancer treatment regimens (World Health Organization, 2023).

Approximately 66% of breast cancer cases are diagnosed at a localized stage (Breastcancer.org, 2024), making early detection crucial. Between 5% and 10% of breast tumors are metastatic at the time of diagnosis, though this percentage varies significantly across countries due to factors such as limited healthcare resources and low awareness of breast cancer and its symptoms (Wondmu KS, 2022). In developed countries, the rate is approximately 8%, whereas in developing countries it rises to 20-30% (Unger-Saldaña, 2014). In Italy, the percentage is lower, at around 6-7% (AIOM- Associazione italiana Oncologia Medica, Associazione Italiana Registri Tumori, Aiom Fondazione, Osservatorio Nazionale Screening,, 2023). Upon diagnosis of metastatic breast cancer (MBC), the 5-year survival rate is estimated to be around 38%. Early detection efforts focus on increasing awareness among both the public and healthcare professionals regarding the risk factors and clinical manifestations of breast cancer. Education on risk factors is the pivotal theme of breast cancer awareness programs which provide guideline on how environmental and occupational conditions may negatively impact on health (World Health Organization, 2016).

The essential tools in first detecting are: mammography, Clinical Breast Examination (CBE), and Breast Self-Examination (BSE)

Breast Self-Examination (BSE) is defined as a visual and tactile examination of the breasts and axillary region performed by the individual to detect any persistent changes or

abnormalities. This practice helps women become familiar with the normal appearance and texture of their breasts over time, enabling them to promptly recognize any alterations.

BSE is recommended for all women starting at the age of 20 and should be performed monthly—during the same point of the menstrual cycle in premenopausal women, and on the same day each month in postmenopausal women (World Health Organization, 2023).

The International Agency for Research on Cancer (IARC) has developed a comprehensive guide to provide women with detailed and thoughtful instructions on how to properly perform a BSE. The initial phase, known as inspection, requires the individual to adopt the correct posture, ideally standing in front of a mirror, to facilitate the detection of subtle changes. Inspection enables the identification of skin alterations that may indicate early signs of breast cancer (IARC-International Agency for Research on Cancer, 2024).

During BSE, it is recommended that women actively observe for any abnormalities, such as: lumps, bumps, or thickening; persistent pain in one breast or armpit; changes in skin colour or texture; *peau d'orange* (orange peel texture); redness or eczema; dimpling; puckering; nipple retraction; nipple discharge; or nipple bleeding.

It is strongly recommended that, BSE process, women adopt a series of specific positional adjustments to ensure a thorough and comprehensive examination:

- Stand upright with both arms relaxed at the sides.
- Place both hands firmly on the waist while applying slight pressure.
- Raise the arms above the head and position them behind the neck, pressing forward.
- Lean slightly forward with hands on the waist, gently bowing toward the mirror, allowing the breasts to fall forward naturally. Observe carefully for any noticeable changes in shape or contour.
- Adopt a seated position.
- Lie down on your back with a pillow or folded towel placed under the shoulder of the breast being examined, using the opposite hand to examine that breast.

Stand undressed in front of a mirror that allows for a clear view of the entire chest, with the arms relaxed at the sides. Using the pads of the three middle fingers, carefully examine

every part of the breast tissue. Employ small, circular motions to ensure thorough coverage of the entire breast, section by section, without lifting the fingers from the breast between palpations. To facilitate smooth movements, a small amount of powder, lotion, or soap may be applied to help the fingers glide effortlessly from one area to the next. If it is difficult to use or feel with the finger pads of one or both hands, the thumb or palm may be used as an alternative.

The palpation perimeter is defined by a boundary that begins at the midpoint of the armpit, extending downward to just below the breast. It then continues across the underside of the breast to the middle of the breastbone, before moving upward along the collarbone and returning to the midpoint of the armpit. It is important to note that the majority of breast cancers are detected in the upper outer quadrant of the breast.

For each designated small circular motion, it is essential to vary the amount of pressure applied to thoroughly examine the different layers of breast tissue. Each small circle should be palpated three times: first with light pressure, then with medium pressure, and finally with deep pressure, before moving on to the adjacent area. This graduated approach ensures a comprehensive assessment of the breast tissue at varying depths.

To ensure a thorough examination of the breast tissue, the following search pattern should be employed. Begin by palpating the armpit area, moving downward along the lower boundary of the breast. Gradually guide the fingers toward the center, continuing palpation upward until reaching the collarbone. This process should be repeated systematically until the entire breast area has been examined. It is crucial to palpate carefully beneath the nipple, ensuring no area is overlooked. Women who have undergone breast surgery should still examine the entire breast area, including the scar.

Continue moving the fingers toward the center and palpating upward until the collarbone is reached, repeating the process until the entire breast tissue has been thoroughly examined. Ensure that at least six strokes are made before reaching the nipple and at least four strokes after passing the nipple. Depending on the size of the breast, between 10 and 16 strokes may be required to fully cover all breast tissue.

After examining the breast tissue, it is equally important to carefully inspect the axillary area and the nipple. The purpose of nipple examination is to identify any abnormal blood secretions that may occur during BSE or may appear as traces on undergarments or outer clothing.

The role of BSE in early diagnosis is controversial. While most studies indicate that it does not reduce breast cancer mortality, some reports suggest that breast cancer is diagnosed at an earlier stage, and mortality is lower in women who perform BSE regularly (Dinas et al., 2018).

The American Cancer Society states that there is limited evidence to suggest that BSE contributes significantly to the early detection of breast cancer in women who also undergo regular mammographic screening. As a result, they do not recommend routine clinical or BSE as part of a standard breast cancer screening regimen.

Statistics on the practice of BSE remain low in many countries. Numerous studies have revealed that only a limited proportion of women feel confident performing BSE both accurately and regularly. For instance, a study conducted among university students in Gaza (Abo Al-Shiekh SS, 2021) reported that only 31.4% of participants practiced BSE. Even lower percentages were observed in a sample of Nigerian women, with only 15.5% engaging in BSE (Awogbayila M, 2023). This trend is reflected in other studies, such as one conducted in Palestine, where only 17.4% of women practiced BSE (Baloushah S, Practice and Barriers toward Breast Self-Examination among Palestinian Women in Gaza City, Palestine., 2020) 16.3% in Niger (Abdou A, 2020). 15.2% in Vietnam (Tuyen DQ, 2019), 17.4% in Turkey (Kayan S, 2022), and 19.6% in the United Arab Emirates (Rahman SA, 2019). Similarly low percentages were recorded in Bangladesh with 21.3% (Sarker R, 2022), 23.89% in Iran (Savabi-Esfahani M, 2017), and 23.89% in Ethiopia (Wondmu KS, 2022). In contrast, (Azhar Y, 2023) found a higher percentage among Indonesian women, with 43.14% of the sampled women performing BSE, and 30.67% in Namibia (Okyere J, 2023).

Although BSE alone is not sufficient for early detection, it empowers women to take responsibility for their own health, enhances their ability to recognize changes in breast tissue, and encourages the adoption of preventive health behaviors (Kösters JP, 2003); (Akhtari-Zavare M, 2013) (Fotedar V, 2013).

In Italy, the literature on the subject is limited and presents conflicting results. Conte et al. (2023) conducted a study on a sample of Italian women, revealing that only 4% of participants performed BSE, despite 96% acknowledging its importance (Conte L, 2023). Another study, albeit on a smaller sample of 100 women, indicated that 46% practiced BSE (Manna A, 2020). Additionally, the Italian National Institute of Health conducted a survey among university students, showing that 36.25% of women regularly performed BSE (Istituto Superiore di Sanità, 2020).

Midwives, within the scope of their competence, participate in the prevention and detection of cancers of the female reproductive system as established by Ministerial Decree N. 740 of September 14, 1994. Consequently, precisely due to the nature of their professional role, the midwife is the figure who interacts most closely with women throughout all stages of life, both during the reproductive years and menopause. It is essential for them to possess a broad and thorough knowledge in this field to directly influence women's behavior. Enhanced training for midwives in breast cancer prevention and screening could support women in adopting proactive measures, raise awareness about breast cancer, empower them to understand and manage risk factors, and increase adherence to regular screening programs.

The existing scientific literature investigating the practice of BSE among midwifery personnel is limited, although there are relevant articles addressing the topic. The study that inspired the development of the questionnaire (Dinas K, 2018) found that 57.1% of Greek midwives and 43.2% of Greek midwifery students reported regularly performing BSE. This study is comparable to research conducted among midwives in Niger, where 44.9% (Abdou

A, 2020) of the sample performed BSE regularly. Similarly, only 13.1% of Ethiopian midwifery students surveyed consistently performed BSE (Abera H, 2017). This figure aligns with another study from 2010 (Beydağ KD, 2010) in which only 11.6% of Turkish midwifery students reported regular BSE practice. This rate is consistent with the 14.4% observed among students in Istanbul (Gençtürk N, 2017) but is significantly lower than the 52.7% reported in another study involving Iranian nursing and midwifery students (Soodabeh A, 2006). In contrast, (Avcı IA, 2008) noted that only 17.5% of Turkish midwives in their sample regularly performed BSE. A higher percentage was observed among Iranian healthcare staff, including midwives, where 44% reported regular BSE practice (Sheikhalipour Z., 2024).

A recent investigation (Shallo SA, 2019) involved a sample of female healthcare professionals, including 57 midwives, and revealed that, several variables influenced the practice of BSE. These variables included educational attainment (diploma, degree, master's), years of work experience (less than 5 years or more than 5 years), and knowledge of BSE.

## **MATERIAL AND METHODS**

### **Objective**

This study arises from the intent to explore the knowledge and practices of Italian midwifery students and midwifery professionals regarding BSE.

### **Female population and BSE**

To assess whether further training on this topic might be necessary, a literature review was conducted to analyze the level of awareness, knowledge, and practice among the target population, specifically women, about BSE.

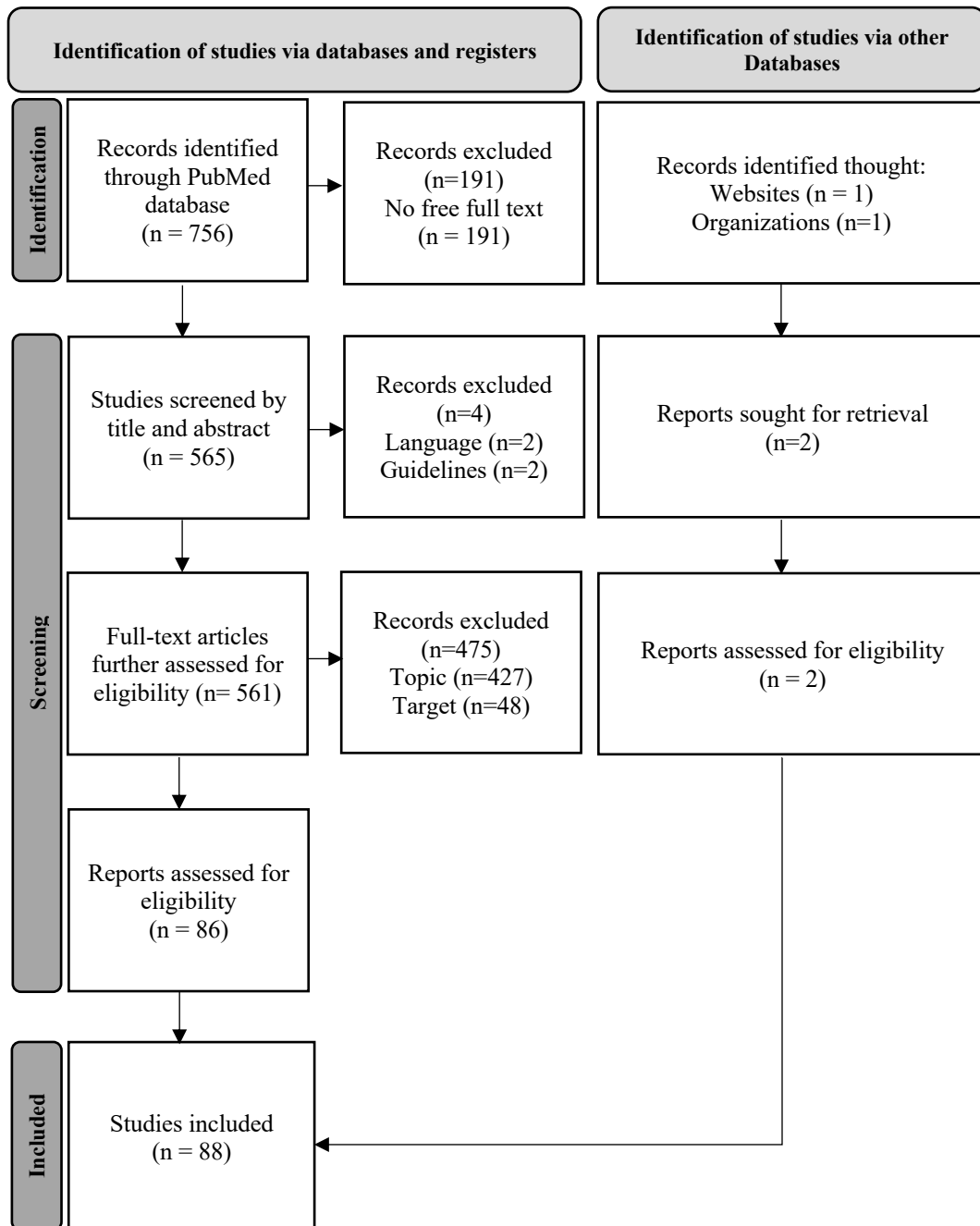
### **Search Strategy**

A literature review was conducted following the PRISMA 2020 guidelines for “Systematic Reviews and Meta-Analyses and it was carried out in PubMed databased from January to February targeting the key concepts: Woman and the Boolean operator “AND” with Breast Self-Examination.

### **Inclusion and exclusion Criteria**

The initial filter applied was based solely on the publication date focusing on articles published within the last 10 years (2014-2024). The search identified 736 articles through the PubMed database. From this set, articles not available in free full-text format (n=191), those not published in English (n=2) and guidelines (n=2) were excluded. An additional 475 articles were excluded for addressing topics unrelated to BSE or for analyzing a sample population different from the target group, the female population. The search was further supplemented by including two additional publications sourced from a different database, specifically a website and an organization (Istituto Superiore di Sanità, 2020), which were incorporate into the review.





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*Figure I. Prisma study selection diagram.*

## **Midwives and BSE**

Subsequently, once it was determined that the level of knowledge and practice of BSE among the female population was insufficient, a second literature review became necessary. This follow-up review aimed to investigate the existing literature regarding the role of midwives and their involvement in BSE.

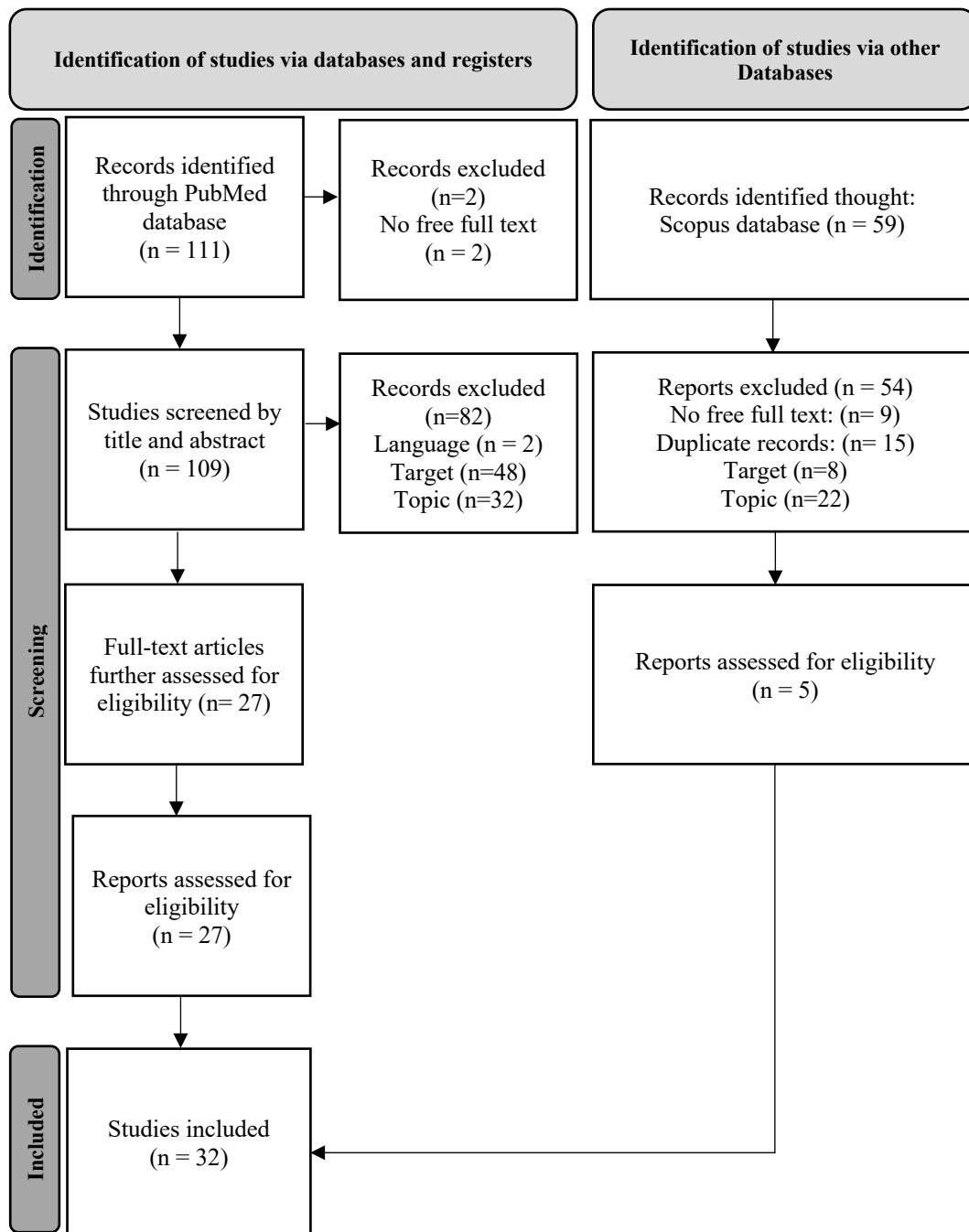
### **Search Strategy**

A literature review was conducted following the PRISMA 2020 guidelines for “Systematic Reviews and Meta-Analyses and it was carried out in PubMed databased from April to June 2024 targeting the key concepts: “Midwives” and the Boolean operator “AND” with Breast Self-Examination.

### **Inclusion and exclusion Criteria**

Initially, only articles published within the last 10 years (2014-2024) were considered, with the publication date being the primary filter. However, this resulted insufficient literature for a detailed analysis of the study’s focus. Therefore, the timeframe was expanded to include publications from the past 20 years (2004-2024). The search identified 111 articles, two of which were immediately excluded due to the lack of free full-text availability. Further exclusion criteria were applied following title and abstract screening: articles not published in English, those unrelated to BSE, and studies involving populations other than midwives (e.g., the general female population or healthcare professionals other than midwives and midwifery students).

A similar search was conducted using the Scopus database, applying the same 20-year time frame. Initially, 59 articles were identified. After applying exclusion criteria - lack of free full-text availability (n=9), duplicate records (n=15), differing target populations (n=8), and unrelated topics (n=22) - the number was reduced to 5. In total, the final number of relevant articles identified across both databases were 32.



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Figure II. Prisma study selection diagram.*

### **Material and methods of the actual study**

A self-administered, standardized, structured, and anonymous questionnaire was developed using Google Forms to evaluate the practice of BSE. This questionnaire was created in Italian following an extensive review of the existing literature on the topic. Its design was notably inspired by a pre-existing validated instrument titled “Breast Self-Examination in Greek Midwives and Midwifery Students,” authored by K. Dinas et al. and published in April 2018. (Dinas K, 2018). The methodological framework of the original instrument was carefully adapted to align with the specific cultural and linguistic context, ensuring its relevance and applicability to the Italian-speaking target population.

Before developing the questionnaire, the sample was defined, and the questions were subsequently tailored to align with the characteristics of the predefined population. The questionnaire was directed to all midwives and midwifery students across the country. The inclusion criteria were established as follows: participants had to be female, either a midwife or a midwifery student, willing to participate in the project, and capable of accessing and completing the questionnaire via Google Forms. Individuals who had studied or were currently studying abroad were not excluded from participation.

A total of 27 questions were meticulously crafted to capture the demographic and professional characteristics of the sample, as well as to assess their knowledge and practice of Breast Self-Examination (BSE). The questionnaire consisted entirely of multiple-choice and closed-ended items, facilitating streamlined data collection and analysis. Completing the questionnaire was notably quick, requiring only a minimal amount of time—typically just a few minutes.

The questionnaire was disseminated exclusively through online channels. An online form was sent to all Italian Midwifery Councils via email. Additionally, the questionnaire was promoted across various social media platforms, with a particular emphasis on Instagram, where numerous midwives were contacted directly through direct messaging. Data collection took place from July 26 to September 30, 2024.

The project engaged a total of 584 midwives and 427 midwifery students. Upon submission, responses were recorded in real-time, and the data became immediately accessible solely to the questionnaire's creator. Each submission remained anonymous, ensuring that individual responses were not visible to other participants. No scoring mechanism was implemented at the conclusion of the questionnaire; regardless of the responses provided, the final cumulative score was set to zero.

The questionnaire commenced with an introductory section outlining the project's objectives, followed by two distinct parts: the first addressed socio-demographic characteristics, while the second explored participants' knowledge and actual practice of BSE.

The first section of the questionnaire is dedicated to sociodemographic characteristics, differentiating respondents based on their status as either midwives or midwifery students. The section for midwives includes five questions: age (in years), professional experience (categorized as <5 years, 5-10 years, 11-20 years, or >20 years), current unit of service (options include delivery room, neonatal care, obstetric unit, family clinic, gynaecological or obstetric clinic, gynaecology unit, postpartum and postnatal care, Assisted Reproductive Technology, or self-employed midwife), the current Italian region of service, and the Italian region where their degree was obtained. An additional question is included to indicate the continent from which the degree was obtained if acquired abroad.

The second category, comprising midwifery students, requests information regarding their academic year (first year, second year, or third year), age (in years), and the Italian region or continent where they are currently pursuing their degree.

The second part of the questionnaire is shared by the entire study sample and consists of 16 questions focusing on the knowledge and practice of BSE among both current and future midwives. Topics explored in this section include the frequency of BSE, signs to observe, correct techniques for performing BSE (including palpation and positioning), the optimal timing in the menstrual cycle for conducting BSE, examination of the axillary region, and the recommended age to begin BSE. Additionally, the questionnaire assesses midwives'

and midwifery students' knowledge regarding mammographic screening. Participants are queried about their awareness of the age range recommended by the Ministry of Health for mammographic screening, as well as their knowledge of the screening programs available in the regions where they are currently employed or studying. Participants are also asked to specify their sources of information concerning breast cancer screening and prevention and to rate their own level of knowledge on the subject using a scale from 1 to 5.

Finally, the questionnaire concludes by querying participants about their perceptions regarding the necessity of further training on breast cancer prevention and screening for midwives. If such training is deemed necessary, respondents are invited to indicate the modalities they would consider most effective for delivering this instruction. The questionnaire ends with an exploration of respondents' familiarity with specialized devices designed to facilitate the learning of BSE technique.

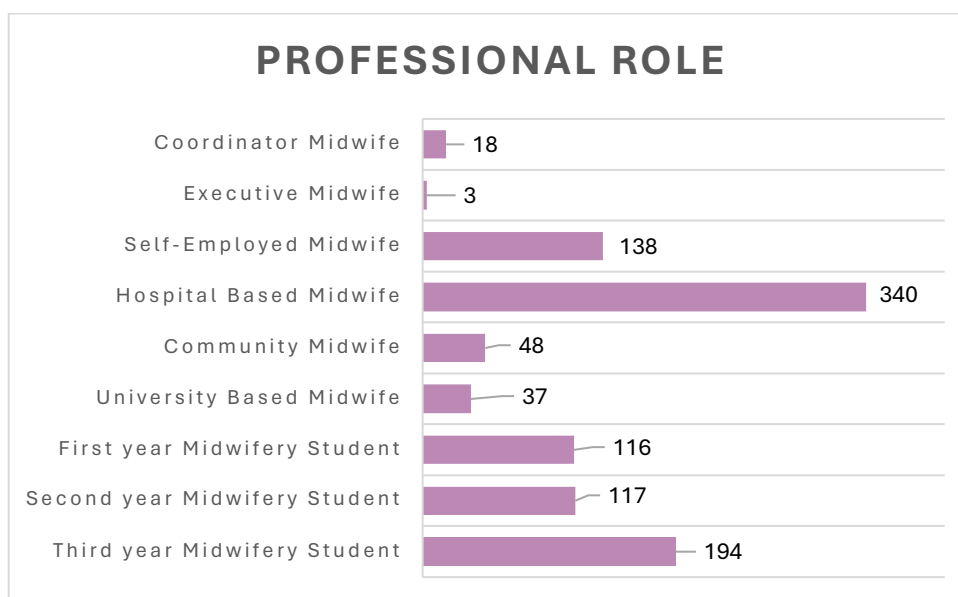


## RESULTS

### Demographic characteristics of the study population

The Survey's total sample comprised 1011 respondents who completed the self-administered questionnaire, including 584 certified midwives and 427 midwifery students from across the Nation. In total, 18 Coordinator Midwives, 3 Executive Midwives, 138 Self-Employed Midwives, 340 Hospital Based Midwives, 48 Community Midwives and 37 University Based Midwives participated in the survey. Among Midwifery Students, 116 were in their first year, 117 in their second year and 194 in their third year of study.

*Fig.1 Professional role distribution among Midwives and Midwifery students*



The table highlights significant generational and demographic distinctions: most of midwifery students fall within the younger age group (18-30 years), making up 98% of this subgroup. In contrast, the age distribution among midwives is more heterogenous. While 50% of midwives are also within the 18-30 age range, a substantial proportion (29%) are between 31 and 40 years old, 12% are between 41 and 50 years, and 9.2% are over 51.



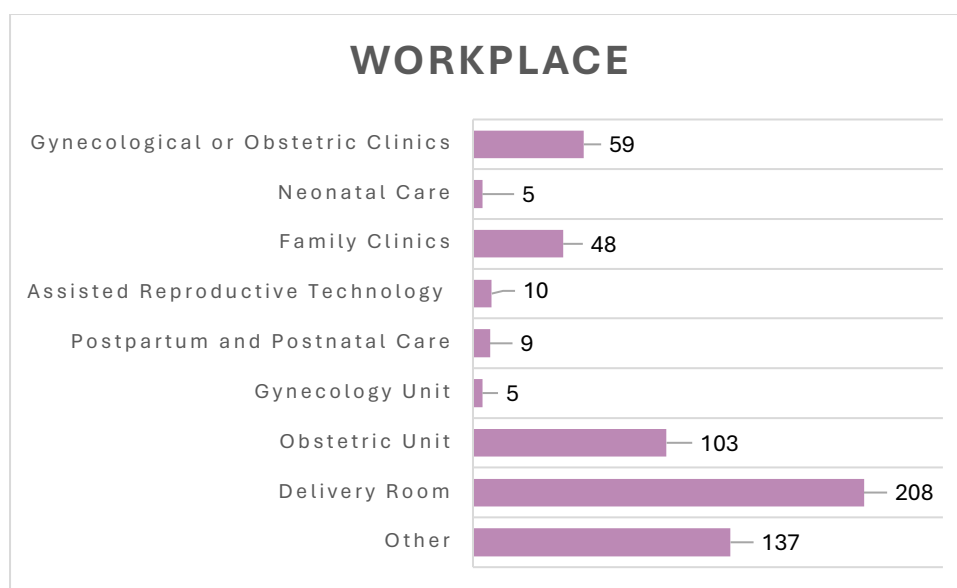
*Table 1. Age distribution of the study population (in years), (absolute numbers and percentages).*

	<b>Overall N= 1011</b>	<b>Midwives N=584</b>	<b>Midwifery students N= 427</b>
<b>Age (years)</b>			
<b>18-30 years</b>		290 (50%)	420 (98%)
<b>31-40 years</b>		169 (29%)	7 (1.6%)
<b>41-50 years</b>		70 (12%)	0 (NA%)
<b>&gt;51 years</b>		54 (9.2%)	0 (NA%)

The survey identified that 59 midwives (10%) work in Gynecological or Obstetric Clinics, with the following distribution: Coordinator Midwife 1 (5.6%), Self-Employed Midwife 34 (25%), Hospital Based Midwife 17 (5.0%), Community Midwife 4 (8.3%) University Based Midwife 3 (8.1%). The survey highlighted that 5 midwives (0.9% of the total) are engaged in Neonatal Care, while 48 midwives (8.2%) work in family clinic. The results indicate a strong presence of Community Midwives in Family Clinics, totaling 40 (83%). However, they are not the only professionals involved: Coordinator Midwives comprise 2 (11%), Self-Employed Midwives 3 (2.2%), Hospital Based Midwives 2 (0.6%), University Based Midwives 1 (2.7%). Furthermore, 10 midwives (1.7% of the total) are involved in Assisted Reproductive Technology which includes 1 (0.7%) Self-Employed Midwife, 6 (1.8%) Hospital Based Midwives, 2 (4.2%) Community Midwives and 1 (2.7%) University Based Midwife. In the area of Postpartum and Postnatal Care, Moreover, 9 midwives (1.5%) are employed with roles divided as follows: Self-Employed Midwives 2 (1.4%) and Hospital Based Midwives 7 (2.1%). Within the Gynecology Unit, 1 Coordinator Midwife (5.6%) and 4 (1.2%) Hospital Based midwives, totaling 5 midwives (0.9%). Data show that 103 midwives (18%) are engaged in the Obstetric Unit, with the following distribution across roles: Coordinator Midwives 5 (28%), Executive Midwife 1 (33%), Self-Employed Midwife 1 (0.7%), Hospital- Based midwives 90 (26%), University-Based Midwives 6 (16%). The Delivery Room employs a significant percentage of midwives, accounting for 36% (N=208) of the total. The distribution is as follows: Coordinator Midwives 4 (22%), Executive Midwife 1 (33%), Self-Employed Midwives 4 (2.9%), Hospital-Based

Midwives 193 (57%), University-Based Midwives 6 (16%). The final option, “Other” includes 137 midwives (23%) distributed as follows: Coordinator Midwives 5 (28%), Executive Midwife 1 (33%), Self-Employed Midwives 93 (67%), Hospital-Based Midwives 16 (4.7%), Community Midwives 2 (4.2%), University-Based Midwives 20 (54%).

*Fig 2. Italian Midwives' current workplace distribution.*

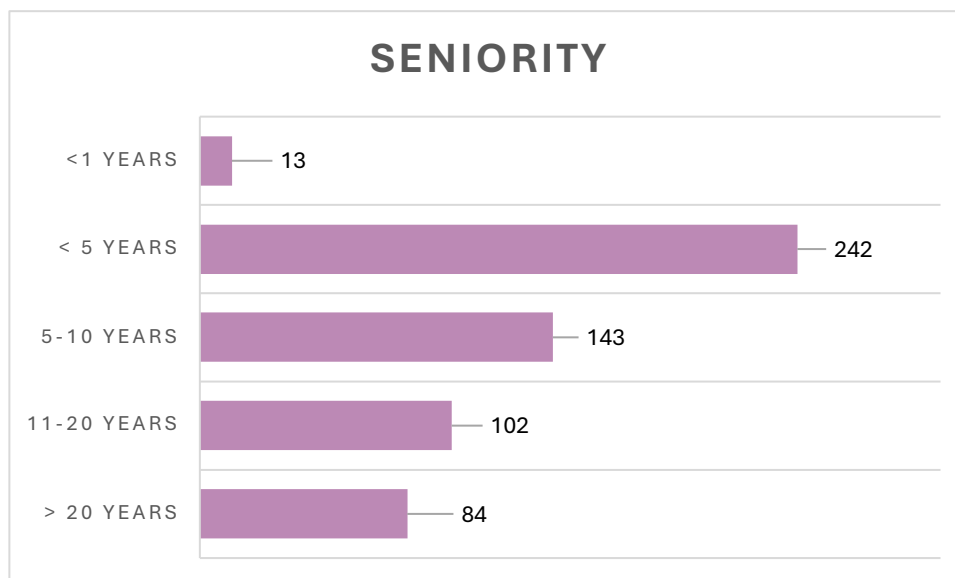


The graphic delineates the distribution of working experience across several age categories: under 1 year, under 5 years, between 5 and 10 years, between 11 and 20 years, and over 20 years.

- **< 1 Year:** The category with 13 units (2.2%) represents the lowest proportion, indicating that a significant number of individuals are at the initial stages of their professional careers.
- **< 5 Years:** This category, encompassing 242 units (41%), constitutes the most substantial segment and signifies a high concentration of individuals possessing relatively recent work experience.
- **5-10 Years:** With 143 units (24%), this age group illustrates a decrease compared to the preceding category.
- **11-20 Years:** With 102 units (17%)

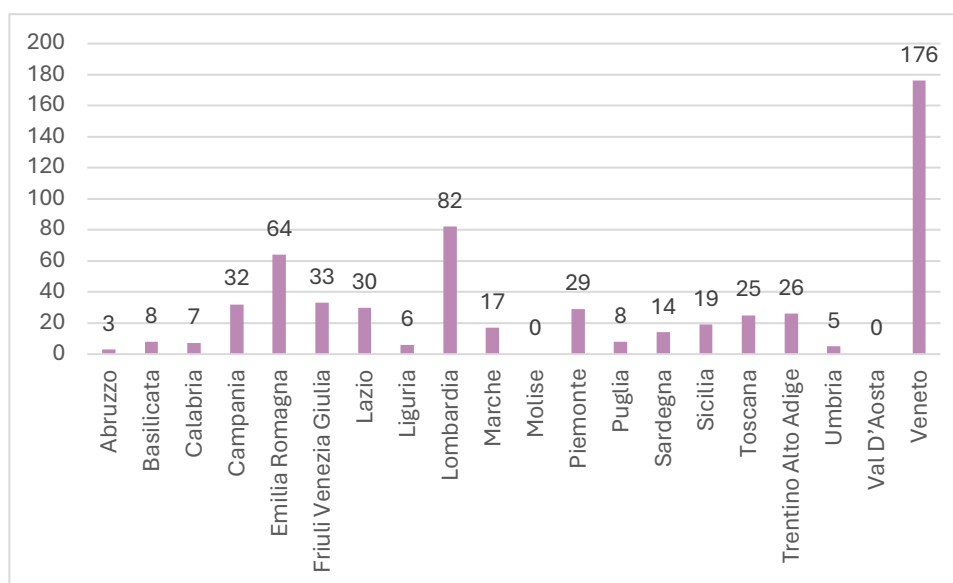
- **20 Years:** Comprising 84 units (14%).

*Fig. 3 Distribution of Seniority among Italian Midwives.*



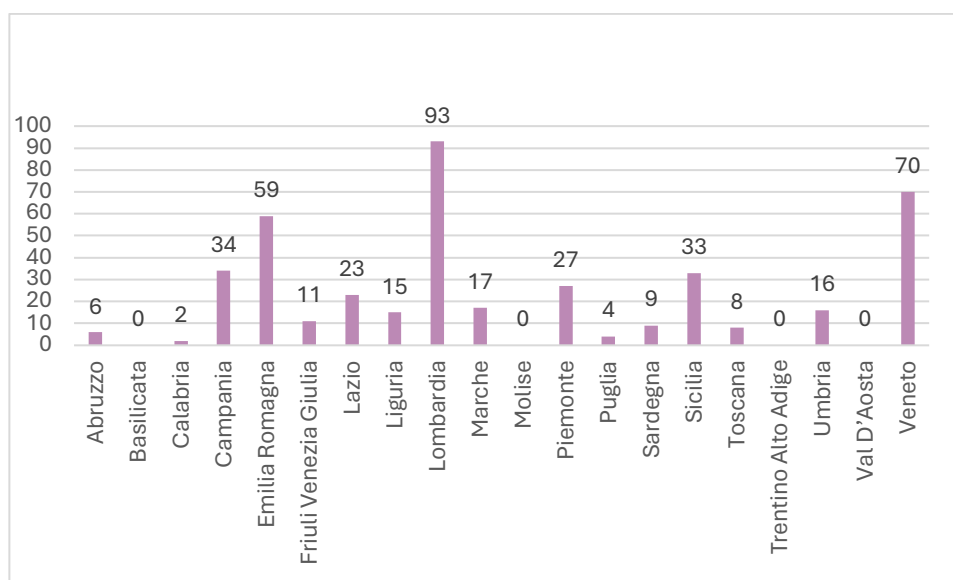
The question regarding the Italian region in which the respondents are currently providing services received highly heterogeneous responds. These responses have been represented in a vertical bar histogram. Abruzzo 3 (0.5%), Basilicata 8 (1.4%), Calabria 7 (1.2%), Campania 32 (5.5%), Emilia-Romagna 64 (11%), Friuli Venezia Giulia 33 (5.7%), Lazio 30 (5.1%), Liguria 6 (1.0%), Lombardia 82 (14%), Marche 17 (2.9%), Piemonte 29 (5.0%), Puglia 8 (1.4%), Sardegna 14 (2.4%), Sicilia 19 (3.3%), Toscana 25 (4.3%), Trentino-Alto Adige 26 (4.5%), Umbria 5 (0.9%), Veneto 176 (30%).

Fig. 4 Distribution of current Region of service among Midwives.



The total number of Italian midwifery students who responded to the questionnaire was 427, with 116 students (27%) in their first year, 117 students (27%) in their second year, and 194 students (45%) in their third year. Table 3 includes an embedded histogram detailing the regional distribution of midwifery students.

Fig. 5 Regional distribution of Italian Midwifery Students



The chart indicates that midwives are primarily employed in Northern Italy, specifically in the regions of Emilia-Romagna, Friuli Venezia Giulia, Liguria, Lombardy, Piedmont, and Veneto. This macro-region accounts for 416 midwives out of a total of 584. In Central Italy,

encompassing Lazio, Marche, Tuscany, and Umbria, 77 midwives currently work and responded to the survey. In Southern Italy, including Abruzzo, Basilicata, Calabria, Campania, Puglia, Sicily, and Sardinia, there are 91 midwives employed who participated in the survey (Fig 6)

Fig 6. Regional Distribution of Midwives by Frequency of Attendance in Degree Program.

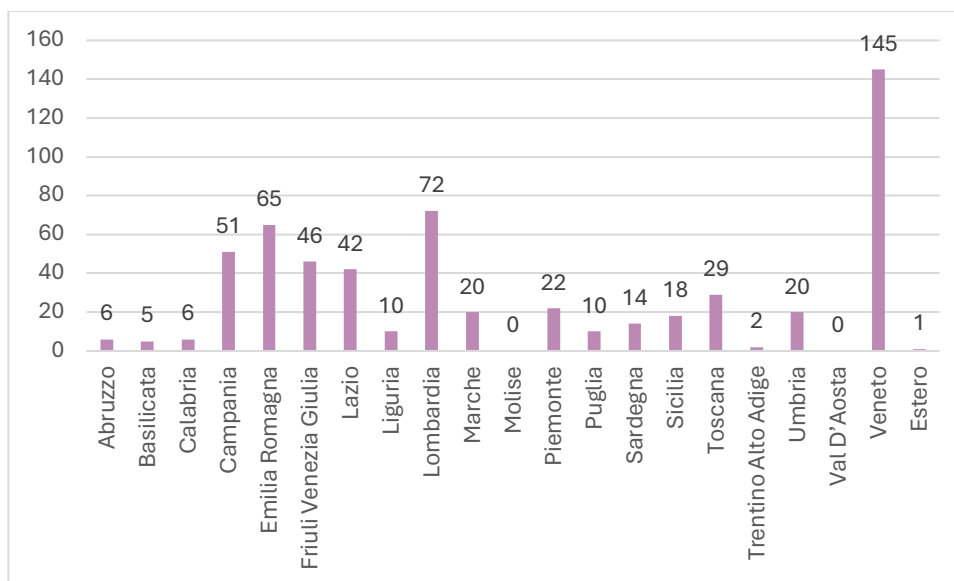


Table 2. Comparison between the Regions where Midwives and Midwifery Students attend their Bachelor's Degree Programs.

Italian Regions	Overall N = 1011 <sup>1</sup>	Midwives	Midwifery Students
Abruzzo		6 (1.0%)	6 (1.4%)
Basilicata		5 (0.9%)	0 (NA%)
Calabria		6 (1%)	2 (0.5%)
Campania		51 (8.7%)	34 (8.0%)
Emilia-Romagna		65 (11%)	59 (14%)
Friuli-Venezia Giulia		46 (7.9%)	11 (2.6%)
Lazio		42 (7.2%)	23 (5.4%)
Liguria		10 (1.7%)	15 (3.5%)

<b>Italian Regions</b>	<b>Overall N = 1011<sup>1</sup></b>	<b>Midwives</b>	<b>Midwifery Students</b>
Lombardia		72 (12%)	93 (22%)
Marche		20 (3.4%)	17 (4.0%)
Molise		0 (NA%)	0 (NA%)
Piemonte		22 (3.8%)	27 (6.3%)
Puglia		10 (1.7%)	4 (0.9%)
Sardegna		14 (2.4%)	9 (2.1%)
Sicilia		18 (3.1%)	33 (7.7%)
Toscana		29 (5.0%)	8 (1.9%)
Trentino-Alto Adige		2 (0.3%)	0 (NA%)
Umbria		20 (3.4%)	16 (3.7%)
Valle d'Aosta		0 (NA%)	0 (NA%)
Veneto		145 (25%)	70 (16%)
Estero (Europe)		1 (0.2%)	0 (NA%)

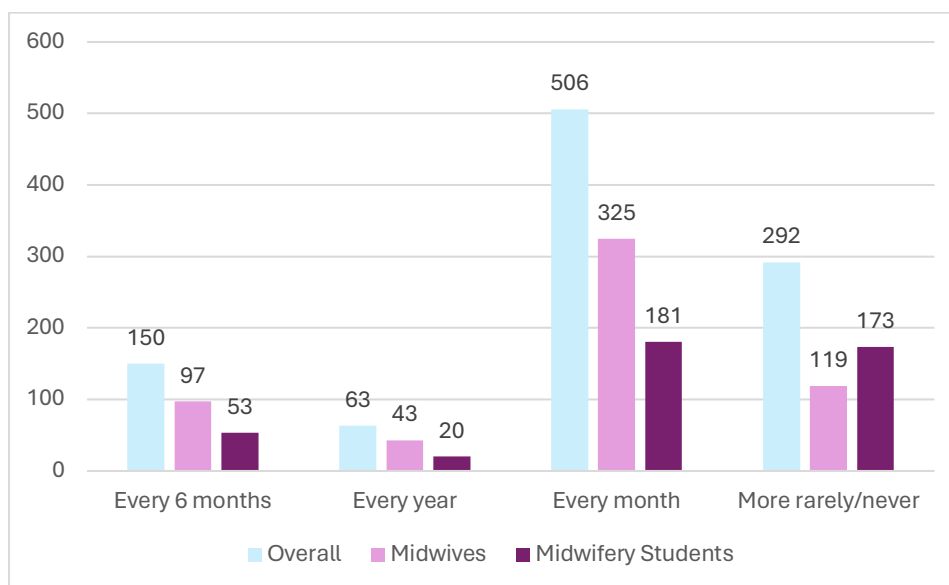
Most of participants have pursued or are currently pursuing their studies within Italy. Only one midwife reported completing her bachelor's degree abroad, specifically within Europe. Notably, 362 midwives obtained their degree in Northern Italy, followed by 111 in Central Italy and 110 in Southern Italy. A similar distribution is observed among current midwifery students, with enrollments predominantly in Northern Italy (N=275, 64%), followed by Central (N=64, 15%) and Southern regions (N=88, 21%). No students are currently enrolled in programs outside Italy.

### **How frequently do you perform BSE?**

For the analysis of BSE frequency and other variables, a statistical analysis was conducted using the Chi-Quadro Test, corrected for multiplicity using the Bonferroni correction. The Bonferroni correction was applied to control the risk of Type I errors due to multiple comparisons, thereby ensuring greater robustness in the results of the analysis. The Chi-Quadro Test assesses whether there is a significant association between the response variable (e.g., frequency of BSE) and other categorical variables. Specifically, the test evaluates whether the observed frequencies in each combination of categories differ from the expected frequencies under the null hypothesis of independence.

The sample comprised 1011 participants, of whom 58% (N=584) were midwives and 42% (N=427) were midwifery students. Statistical analysis indicated that 15% (N=150) of the total sample reported performing BSE biannually (every six months), while 6.2% (N=63) reported conducting it annually. Adhering to recommended guidelines, 50% (N=506) performed BSE monthly, whereas 29% (N=292) either seldom or never engaged in this preventive practice. (Fig 7). In detail, 17% of midwives reported conducting BSE every six months, 7.4% on an annual basis, and 56% monthly, while 20% indicated that they never or infrequently perform the examination. In comparison, midwifery students reported performing BSE as follows: 12% every six months, 4.7% annually, 42% monthly, and 41% indicated they do so rarely or never.

Fig 7. How frequently do you perform BSE?



Midwives perform BSE more frequently than midwifery students. A total of 506 respondents indicated that they perform BSE monthly. Among these participants, 64% (N=325) identified as midwives, while the remaining 36% (N=181) were midwifery students. This distribution suggests a significant prevalence of regular self-examination practices among midwives compared to their student counterparts. Confirming this, 41% of students reported that they never or rarely perform BSE, compared to 20% of midwives. (Tab 3).

The low p-value (0) indicates a significant association between the frequency of BSE and the professional role of the participants, suggesting that the analyzed groups differ in their practice of BSE. Thus, there is a significant correlation between professional role and performance of BSE. A second correlation was identified between the year of study among students and the performance of BSE (p-value=0). The third-year students are the group that performs it most regularly. In fact, 56% of third-year female students conduct it monthly, compared to 37% of second-year students and 30% of first-year students. (Table 3). An additional correlation (p-value 0) emerged between the Macro-region in which the students are enrolled in their degree program (Central Italy, Northern Italy, and Southern Italy) and frequency of performance of BSE. In fact, Students currently studying in



Southern Regions of Italy have stated that they perform BSE more regularly compared to those in other regions. In detail, BSE is performed by 64% of female students in Southern Italy, 56% in Central Italy, and 40% in Northern Italy. In contrast, the age of the students (p-value=1) categorized into groups (18-30 years, 31-40 years), the years of service of midwives (p-value=1), and the region in which they are currently working (p-value=1) do not appear to influence the performance of BSE (Tab 3)

*Table 3. How frequently do you perform Breast Self-Examination (BSE)?*

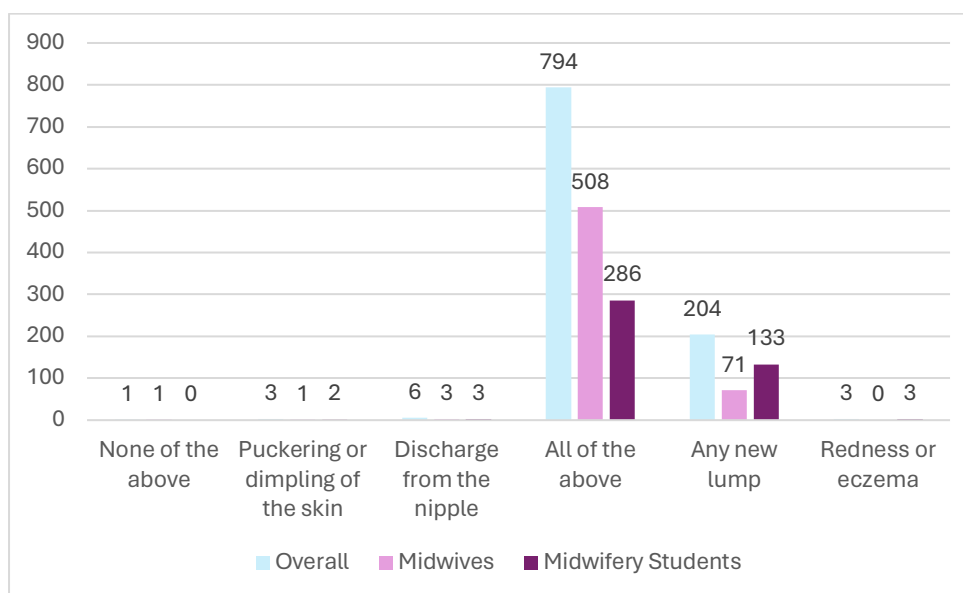
<b>Characteristic</b>	<b>Overall</b> N=1,011	<b>Every 6 month</b> N = 150	<b>Every year</b> N = 63	<b>Every month</b> N = 506	<b>More rarely/ never</b> N = 292	<b>p-value<sup>2</sup></b>
<b>Professional role</b>						0
Midwives	584 (58%)	97 (65%)	43 (68%)	325 (64%)	119 (41%)	
Midwifery Students	427 (42%)	53 (35%)	20 (32%)	181 (36%)	173 (59%)	
<b>Academic year</b>						0
First year Midwifery Students	116 (27%)	15 (28%)	8 (40%)	30 (17%)	63 (36%)	
Second year Midwifery Students	117 (27%)	15 (28%)	7 (35%)	43 (24%)	52 (30%)	
Third year Midwifery Students	194 (45%)	23 (43%)	5 (25%)	108 (60%)	58 (34%)	
<b>Age (Students)</b>						1
18-30 years	420 (98%)	53 (100%)	19 (95%)	177 (98%)	171 (99%)	
31-40 years	7 (1.6%)	0 (0%)	1 (5.0%)	4 (2.2%)	2 (1.2%)	
<b>Current Macro-region of Study (Midwifery Students)</b>						0
Central Italy	64 (15%)	2 (3.8%)	5 (21%)	36 (18%)	21 (14%)	
Northern Italy	275 (64%)	39 (75%)	11 (46%)	110 (54%)	115 (77%)	
Southern Italy	91 (21%)	11 (21%)	8 (33%)	58 (28%)	14 (9.3%)	

<b>Characteristic</b>	<b>Overall</b> N=1,011	<b>Every 6 month</b> N = 150	<b>Every year</b> N = 63	<b>Every month</b> N = 506	<b>More rarely/ never</b> N = 292	<b>p-value<sup>2</sup></b>
<b>Seniority</b>						1
< 5 years	255 (44%)	38 (39%)	16 (37%)	142 (44%)	59 (50%)	
> 20 years	84 (14%)	12 (12%)	5 (12%)	52 (16%)	15 (13%)	
11-20 years	102 (17%)	16 (16%)	11 (26%)	58 (18%)	17 (14%)	
5-10 years	143 (24%)	31 (32%)	11 (26%)	73 (22%)	28 (24%)	
<b>Current Macroregion of service (Midwives)</b>						1
Central Italy	77 (13%)	17 (18%)	4 (9.3%)	44 (14%)	12 (10%)	
Northern Italy	416 (71%)	69 (71%)	31 (72%)	223 (69%)	93 (78%)	
Southern Italy	91 (16%)	11 (11%)	8 (19%)	58 (18%)	14 (12%)	
<sup>1</sup> n (%)						
<sup>2</sup> Pearson's Chi-squared test						

### What do you look for when performing BSE?

Subsequently, the knowledge of the entire sample regarding the signs of breast cancer to be noted during the first phase of BSE, the inspection of the breasts, was investigated. 0.3% (N=3) stated that they would look for only puckering or dimpling of the skin, 0.6% (N=6) indicated they would search solely for nipple discharge or nipple bleeding, 20% (N=204) mentioned any form of lump or swelling, 0.3% (N=3) noted areas of redness or eczema, <0.1% (N=1) reported none of the above, and 79% (N=794) indicated all of the above. Eighty-seven percent of midwives and 67% of students indicated that all of the listed signs are ones to look for during BSE (Fig 8).

Fig 8. What do you look for when performing Breast Self-Examination (BSE)?



It emerged that midwives possess a higher level of knowledge compared to midwifery students, in fact, 87% of midwives would check for all the listed signs of breast cancer during BSE, while among students, this percentage drops to 67%. Therefore, there is a significant correlation ( $p\text{-value}=0$ ) between professional role and adequate knowledge of the technique. Third-year students demonstrated a greater level of knowledge compared to first- and second-year students. 55% of first-year students, 76% of second-year students, and 78% of third-year students possess comprehensive knowledge of the technique. In this case, there is a significant correlation between the year of study in the degree program and

adequate knowledge of the technique (p-value=0). Another correlation was identified with the variable "Macro-region of study for the degree program among students" (p-value=0). Specifically, The 93% of female midwifery students from the South Italy, 68% from the North Italy, and 64% from the Center Italy would check for all the previously listed signs during BSE. No significant correlation was found with the variable of work experience among midwives (p-value=1).and with the Italian Region in which they are currently serving (p-value=1) (Table 4)

Table 4. What do you look for when performing Breast Self-Examination (BSE)?

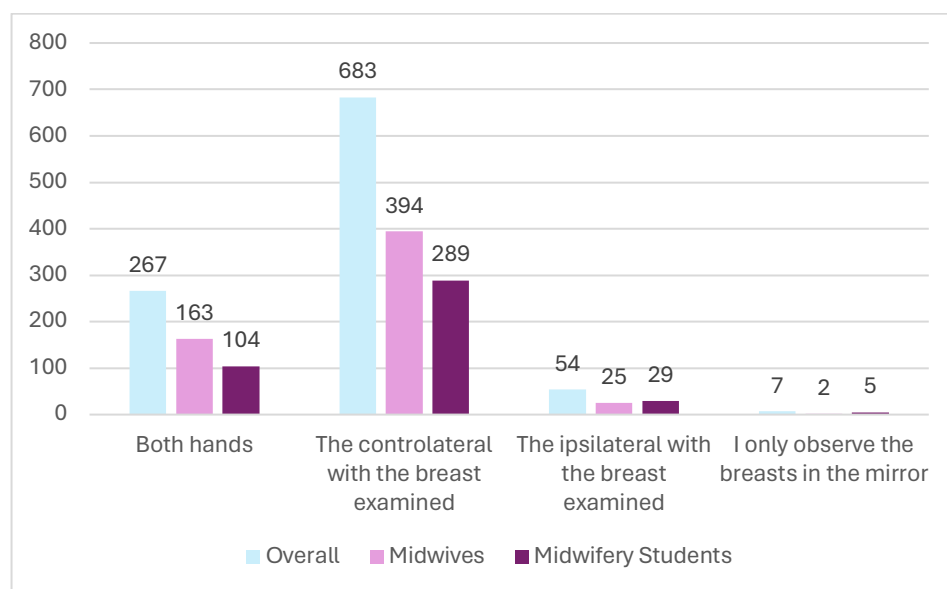
Characteristic	Overall N = 1011 <sup>1</sup>	None of the above N = 1 <sup>1</sup>	Puckering or dimpling of the skin N = 3 <sup>1</sup>	Discharge from the nipple N = 6 <sup>1</sup>	All of the above N = 794 <sup>1</sup>	Any new lump N = 204 <sup>1</sup>	Redness or eczema N = 3 <sup>1</sup>	p-value <sup>2</sup>
<b>Professional role</b>								0
Midwives	584 (58%)	1 (100%)	1 (33%)	3 (50%)	508 (64%)	71 (35%)	0 (NA%)	
Midwifery Students	427 (42%)	0 (NA%)	2 (67%)	3 (50%)	286 (36%)	133 (65%)	3 (100%)	
<b>Academic year</b>								0
First year Midwifery Students	116 (27%)	0 (NA%)	0 (NA%)	1 (33%)	58 (20%)	55 (41%)	2 (67%)	
Second year Midwifery Students	117 (27%)	0 (NA%)	2 (100%)	0 (NA%)	76 (27%)	38 (29%)	1 (33%)	
Third year Midwifery Students	194 (45%)	0 (NA%)	0 (NA%)	2 (67%)	152 (53%)	40 (30%)	0 (NA%)	
<b>Current Macro-region of Study (Midwifery Students)</b>								0
Central Italy	64 (15%)	0 (NA%)	0 (0%)	1 (33%)	41 (13%)	22 (20%)	0 (0%)	
Northern Italy	275 (64%)	0 (NA%)	2 (100%)	1 (33%)	186 (60%)	84 (76%)	2 (100%)	

<b>Characteristic</b>	<b>Over all</b> N = 1011 <sup>1</sup>	<b>None of the above</b> N = 1 <sup>1</sup>	<b>Puckering or dimpling of the skin</b> N = 3 <sup>1</sup>	<b>Discharge from the nipple</b> N = 6 <sup>1</sup>	<b>All of the above</b> N = 794 <sup>1</sup>	<b>Any new lump</b> N = 204 <sup>1</sup>	<b>Redness or eczema</b> N = 3 <sup>1</sup>	<b>p-value<sup>2</sup></b>
Southern Italy	91 (21%)	0 (NA%)	0 (0%)	1 (33%)	85 (27%)	5 (4.5%)	0 (0%)	
<b>Seniority</b>								1
< 5 years	255 (44%)	0 (0%)	1 (100%)	1 (33%)	219 (43%)	34 (48%)	0 (NA%)	
> 20 years	84 (14%)	0 (0%)	0 (0%)	1 (33%)	70 (14%)	13 (18%)	0 (NA%)	
11-20 years	102 (17%)	0 (0%)	0 (0%)	0 (0%)	93 (18%)	9 (13%)	0 (NA%)	
5-10 years	143 (24%)	1 (100%)	0 (0%)	1 (33%)	126 (25%)	15 (21%)	0 (NA%)	

### Which hand do you use when do you perform BSE?

In the examined sample, 26% (N=267) indicated that they would perform BSE using both hands, while 68% (N=683) would use the hand contralateral to the breast being examined. Additionally, 5.3% (N=54) would use the ipsilateral hand, and 0.7% (N=7) would limit themselves to simply observing the breasts. More specifically, 67% of midwives and 68% of students believe that the recommended hand for performing BSE is the one opposite to the breast being examined. (Fig 9).

Fig 9. Which hand do you use when do you perform Breast Self-Examination- BSE?



No significant correlation was found between knowledge of the correct hand to use during BSE and professional role (p-value=1), the year of study among students (p-value=0.14), the age of the students (p-value=0.07), the Macro-region of study for the degree program among students (p-value=0.44), or the years of service of midwives (p-value=1). (Table 5)

Table 5 Which hand do you use when do you perform Breast Self-Examination- BSE?

Characteristic	Overall N=1011	Both hands N=267 <sup>1</sup>	The controlateral with the breast examined N = 683 <sup>1</sup>	The ipsilateral with the breast examined N = 54 <sup>1</sup>	I only observe the breasts in the mirror N = 7 <sup>1</sup>	p- value <sup>2</sup>
<b>Professional role</b>						1
Midwives	584 (58%)	163 (61%)	394 (58%)	25 (46%)	2 (29%)	
Midwifery Students	427 (42%)	104 (39%)	289 (42%)	29 (54%)	5 (71%)	
<b>Academic year</b>						0.14
First year Midwifery Students	116 (27%)	29 (28%)	75 (26%)	7 (24%)	5 (100%)	
Second year Midwifery Students	117 (27%)	32 (31%)	76 (26%)	9 (31%)	0 (NA%)	
Third year Midwifery Students	194 (45%)	43 (41%)	138 (48%)	13 (45%)	0 (NA%)	
<b>Current Macro- region of Study (Midwifery Students)</b>						0.44
Central Italy	64 (15%)	11 (9.6%)	47 (16%)	6 (25%)	0 (0%)	
Northern Italy	275 (64%)	84 (73%)	171 (60%)	15 (63%)	5 (100%)	
Southern Italy	91 (21%)	20 (17%)	68 (24%)	3 (13%)	0 (0%)	
<b>Seniority</b>						1
< 5 years	255 (44%)	66 (40%)	174 (44%)	14 (56%)	1 (50%)	
> 20 years	84 (14%)	21 (13%)	60 (15%)	3 (12%)	0 (0%)	
11-20 years	102 (17%)	32 (20%)	67 (17%)	3 (12%)	0 (0%)	
5-10 years	143 (24%)	44 (27%)	93 (24%)	5 (20%)	1 (50%)	
<sup>1</sup> n (%)						

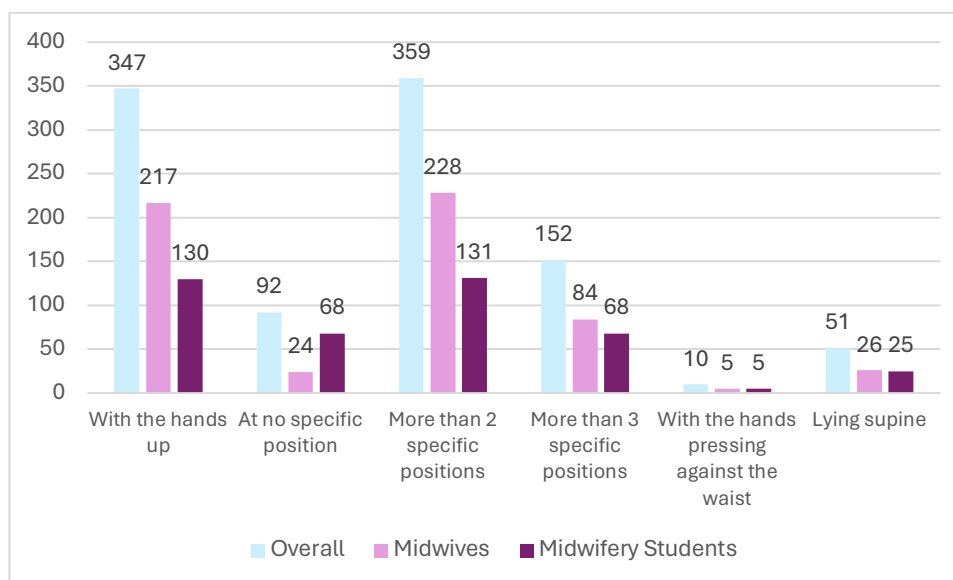
	<b>Overall</b>	<b>Both hands</b>	<b>The controlateral with the breast examined</b>	<b>The ipsilateral with the breast examined</b>	<b>I only observe the breasts in the mirror</b>	<b>p-value<sup>2</sup></b>
<b>Characteristic</b>	N=1011	N=267 <sup>1</sup>	N = 683 <sup>1</sup>	N = 54 <sup>1</sup>	N = 7 <sup>1</sup>	
<sup>2</sup> Pearson's Chi-squared test						



### In which position do you perform BSE?

The questionnaire sought to assess the appropriate positions to adopt during BSE. The responses received are detailed below. Of the sample, 34% (N=347) indicated they would conduct BSE solely with their arms raised, 9.1% (N=92) specified no particular position, 36% (N=359) would use more than two specific positions, 15% (N=152) would use more than three specific positions, 1% (N=10) would do so solely by pressing their hands against their waist, and 5% (N=51) would conduct the examination in a supine position (Fig 10).

Fig 10. *In which position do you perform BSE?*



Specifically, among midwives, 37% (N=217) would conduct BSE with their arms raised, 4.1% (N=24) in no specific position, 39% (N=228) in more than two positions, 14% (N=84) in more than three positions, 0.9% (N=5) by pressing their hands against their waist, and 26% (N=26) in a supine position. For students, respectively, 30% (N=130) would conduct the examination with arms raised, 16% (N=68) in no specific position, 31% (N=131) in more than two positions, 16% (N=68) in more than three specific positions, 1.2% (N=5) by pressing against their waist, and 5.9% (N=25) in a supine position. A significant correlation was identified between professional role and the position adopted during BSE (p-value=0), as well as between the year of enrollment in the Midwifery degree program and the position adopted (p-value=0). In fact, third-year students were found to perform BSE more

frequently using more than three specific positions (22%) compared to first year (10%) and second-year students (11%). However, no significant correlation was found with the Macro-region in which students attended their courses (p-value=0.64), years of service (p-value=0.32), or the region where midwives are currently practicing (p-value=1) (Table 6)

Table 6. In which position do you perform BSE?

Characteristic	Overall N = 1011 <sup>1</sup>	With the hands up N=347 <sup>1</sup>	At no specific position N =92 <sup>1</sup>	More than 2 specific positions N = 359 <sup>1</sup>	More than 3 specific positions N = 152 <sup>1</sup>	With the hands pressing against the waist N = 10 <sup>1</sup>	Lying supine N=51 <sup>1</sup>	p-value <sup>2</sup>
<b>Professional role</b>								0
Midwives	584 (58%)	217 (63%)	24 (26%)	228 (64%)	84 (55%)	5 (50%)	26 (51%)	
Midwifery Students	427 (42%)	130 (37%)	68 (74%)	131 (36%)	68 (45%)	5 (50%)	25 (49%)	
<b>Academic year</b>								0
First year Midwifery Students	116 (27%)	38 (29%)	31 (46%)	22 (17%)	12 (18%)	3 (60%)	10 (40%)	
Second year Midwifery Students	117 (27)	35 (27%)	17 (25%)	39 (30%)	13 (19%)	2 (40%)	11 (44%)	
Third year Midwifery Students	194 (45%)	57 (44%)	20 (29%)	70 (53%)	43 (63%)	0 (NA%)	4 (16%)	
<b>Current Macro-region of Study (Midwifery Students)</b>								0.64
Central Italy	64 (15%)	21 (16%)	6 (10%)	22 (15%)	11 (16%)	1 (25%)	3 (14%)	
Northern Italy	275 (64%)	83 (64%)	49 (83%)	86 (58%)	39 (57%)	2 (50%)	16 (73%)	

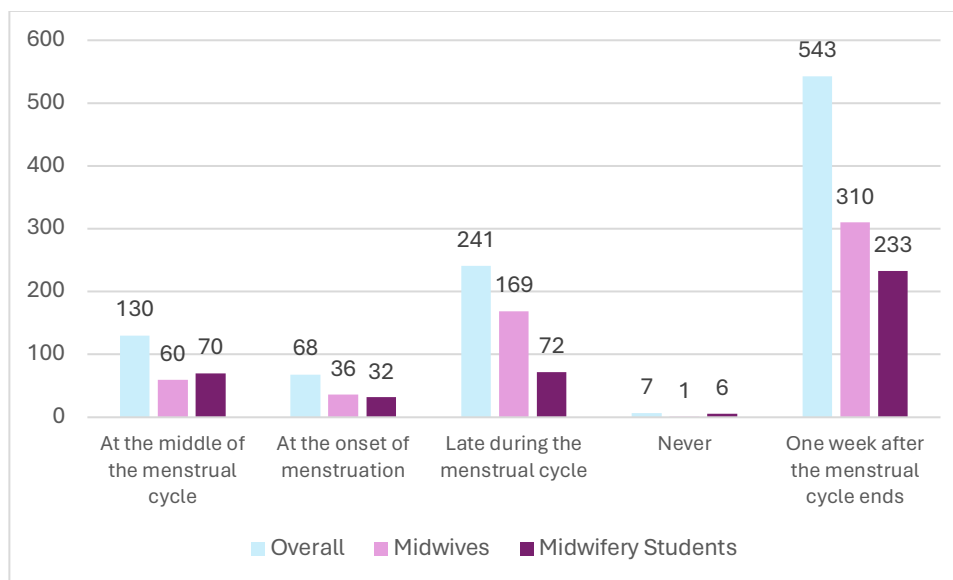
<b>Characteristic</b>	<b>Over all</b> N = 1011 <sup>1</sup>	<b>With the hands up</b> N=347 <sup>1</sup>	<b>At no specific position</b> N =92 <sup>1</sup>	<b>More than 2 specific positions</b> N = 359 <sup>1</sup>	<b>More than 3 specific positions</b> N = 152 <sup>1</sup>	<b>With the hands pressing against the waist</b> N = 10 <sup>1</sup>	<b>Lying supine</b> N=51 <sup>1</sup>	<b>p-value<sup>2</sup></b>
Southern Italy	91 (21%)	25 (19%)	4 (6.8%)	40 (27%)	18 (26%)	1 (25%)	3 (14%)	
<b>Seniority</b>								0.32
< 5 years	255 (44%)	78 (36%)	13 (54%)	118 (52%)	34 (40%)	1 (20%)	11 (42%)	
> 20 years	84 (14%)	34 (16%)	3 (13%)	30 (13%)	13 (15%)	0 (0%)	4 (15%)	
11-20 years	102 (17%)	43 (20%)	4 (17%)	26 (11%)	21 (25%)	1 (20%)	7 (27%)	
5-10 years	143 (24%)	62 (29%)	4 (17%)	54 (24%)	16 (19%)	3 (60%)	4 (15%)	
<sup>2</sup> Pearson's Chi-squared test								

### When is it recommended for a woman of fertile age to perform BSE?

Thirteen percent (N=130) of the sample reported that they would perform breast self-examination midway through their menstrual cycle, 6.9% (N=68) at the onset of menstruation, 24% (N=241) at the end of the menstrual cycle, 0.7% (N=7) indicated they would never perform BSE, and 55% (N=543) would conduct it one week after the end of the menstrual cycle. The AIRC guidelines specifically identify the aforementioned period as the most appropriate time for conducting BSE (Fig 11).

Responses from midwives were as follows: 10% (N=60) would perform BSE midway through the menstrual cycle, 6.3% (N=36) at the onset of menstruation, 29% (N=169) at the end of the menstrual cycle, 0.2% (N=1) would never perform it, and 54% (N=310) would perform it one week after the cycle ends. Responses from Italian midwifery students were, respectively: 17% (N=70), 7.7% (N=32), 17% (N=72), 1.5% (N=6), and 56% (N=233).

Fig 11. When is it recommended for a woman of childbearing age to perform BSE?



A significant correlation was identified between the phase of the menstrual cycle in which BSE is performed and professional role ( $p$ -value=0.01), as well as with the Macro-region where students are currently enrolled in their degree program ( $p$ -value=0.02). In fact, midwifery students currently studying in Southern Italy demonstrated greater awareness of

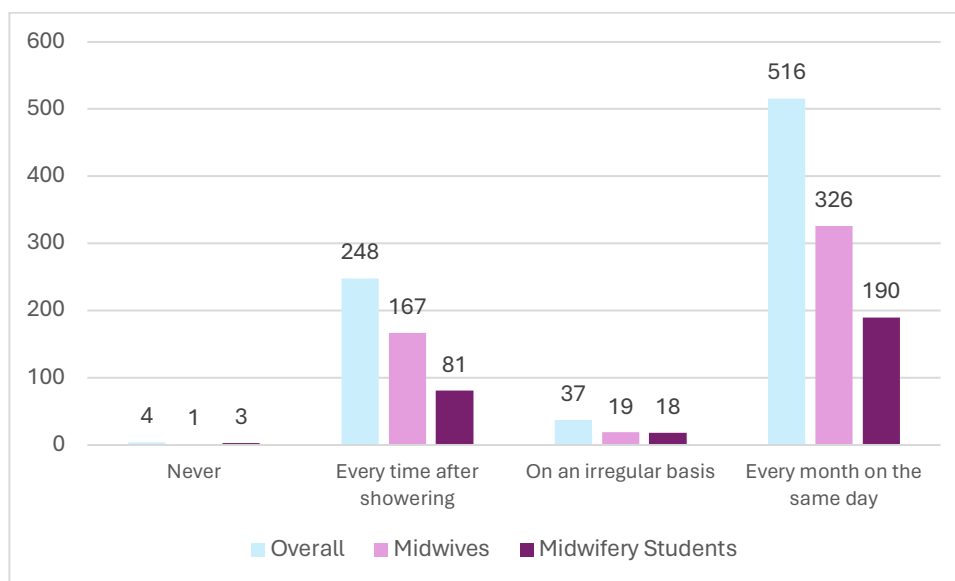


<b>Characteristic</b>	<b>Over all</b> N=989 <sup>1</sup>	<b>At the middle of the menstrual cycle</b> N = 130 <sup>1</sup>	<b>At the onset of menstruation</b> N = 68 <sup>1</sup>	<b>Late during the menstrual cycle</b> N = 241 <sup>1</sup>	<b>Never</b> N = 7 <sup>1</sup>	<b>One week after the menstrual cycle ends</b> N = 543 <sup>1</sup>	<b>p-value</b> <sup>2</sup>
< 5 years	252 (44%)	28 (47%)	10 (28%)	65 (38%)	1 (100%)	148 (48%)	
> 20 years	80 (14%)	6 (10%)	4 (11%)	33 (20%)	0 (0%)	37 (12%)	
11-20 years	102 (18%)	9 (15%)	9 (25%)	37 (22%)	0 (0%)	47 (15%)	
5-10 years	142 (25%)	17 (28%)	13 (36%)	34 (20%)	0 (0%)	78 (25%)	

### When should BSE be performed in menopausal women?

This was an optional question; therefore, responses were provided by 87.8% of midwives and 69.8% of students, not the entire sample. Overall, the sample indicated that during menopause, BSE should be performed: every time after showering (31%, N=248), without a specific frequency (4.6%, N=37), monthly on the same day (64%, N=516) or never (0.5%,N=4). Specifically, midwives reported that they would perform BSE every time after showering 33% (N=167), on an irregular basis 3.7% (N=19), or regularly every month on the same day 64%, (N=326), with 0.2% (N=1) indicating they would never perform it. Midwifery students responded as follows: 28% (N=81) would perform it every time after showering, 6.2%(N=18) irregularly, 65% (N=190) monthly on the same day, and 1% (N=3) would never perform it (Fig 12).

Fig 12 *When should BSE be performed in menopausal women?*



Midwives appear to be more aware of the optimal timing for BSE in postmenopausal women compared to students. A statistically significant correlation was identified between the correct timing of BSE during menopause and professional role (p-value=0.02), as well as with years of professional service (p-value=0.01). In fact, Seventy percent of younger midwives, with less than five years of service, were more often able to identify the correct timing for BSE compared to their colleagues with 5-10 years of experience (68%), 11-20

years (59%), and over 20 years (43%). Conversely, no significant correlation was observed concerning the year of study among students (p-value=0.09) or with the current Macro-region of study for students (p-value=1).

*Tab 15 "When should BSE be performed in menopausal women?"*

<b>Characteristic</b>	<b>Overall</b> N = 805 <sup>1</sup>	<b>Never</b> N = 4 <sup>1</sup>	<b>Every time after showering</b> N = 248 <sup>1</sup>	<b>On an irregular basis</b> N = 37 <sup>1</sup>	<b>Every month on the same day</b> N = 516 <sup>1</sup>	<b>p- value<sup>2</sup></b>
<b>Professional role</b>						0.02
Midwives	513 (87.8%)	1 (25%)	167 (67%)	19 (51%)	326 (63%)	
Midwifery Students	292 (69.8%)	3 (75%)	81 (33%)	18 (49%)	190 (37%)	
<b>Academic year</b>						0.09
First year Midwifery Students	72 (25%)	2 (67%)	27 (33%)	8 (44%)	35 (18%)	
Second year Midwifery Students	81 (28%)	0 (NA%)	21 (26%)	6 (33%)	54 (28%)	
Third year Midwifery Students	139 (48%)	1 (33%)	33 (41%)	4 (22%)	101 (53%)	
<b>Current Macro-region of Study (Midwifery Students)</b>						1
Central Italy	49 (16%)	0 (0%)	11 (12%)	5 (25%)	33 (17%)	
Northern Italy	182 (59%)	3 (100%)	52 (55%)	12 (60%)	115 (59%)	
Southern Italy	80 (26%)	0 (0%)	31 (33%)	3 (15%)	46 (24%)	
<b>Seniority</b>						0.01
< 5 years	205 (40%)	1 (100%)	53 (32%)	6 (32%)	145 (44%)	

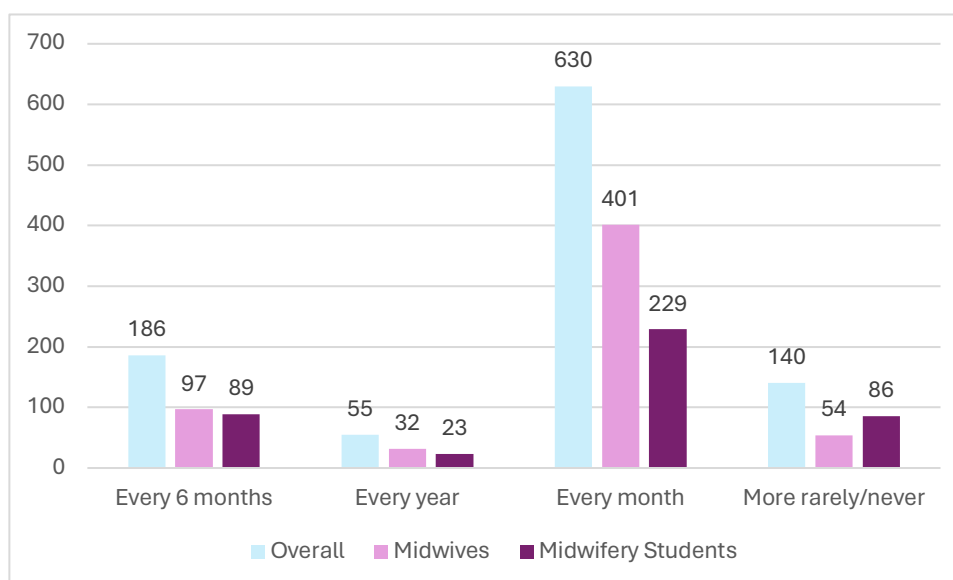


<b>Characteristic</b>	<b>Overall</b> N = 805 <sup>1</sup>	<b>Never</b> N = 4 <sup>1</sup>	<b>Every time after showering</b> N = 248 <sup>1</sup>	<b>On an irregular basis</b> N = 37 <sup>1</sup>	<b>Every month on the same day</b> N = 516 <sup>1</sup>	<b>p- value<sup>2</sup></b>
> 20 years	80 (16%)	0 (0%)	37 (22%)	8 (42%)	35 (11%)	
11-20 years	98 (19%)	0 (0%)	38 (23%)	2 (11%)	58 (18%)	
5-10 years	130 (25%)	0 (0%)	39 (23%)	3 (16%)	88 (27%)	

### How frequently do you examine your axillae?

Eighteen percent (N=186) reported that they would perform axillary self-examination every six months, 5.4% (N=55) annually, 62% (N=630) monthly, and 14% (N=140) rarely or never. Responses from midwives were as follows: 17% (N=97) would perform the examination every six months, 5.5% (N=32) annually, 69% (N=401) monthly, and 9.2% (N=54) rarely or never. Midwifery students reported: 21% (N=89) every six months, 5.4% (N=23) annually, 54% (N=229) monthly, and 20% (N=86) rarely or never (Fig 13).

Fig 13 How frequently do you examine your axillae?



A significant correlation was found between professional role and the frequency of axillary (underarm) lymph node examination (p-value=0). A second significant correlation was also found with the year of study (p-value=0). Third-year students have shown a greater tendency to perform axillary self-examination (64%) more regularly compared to second year (50%) and first-year students (39%). Lastly, a third correlation was identified based on the Macro-region in which students are currently studying. Monthly axillary examination is practiced more by students from Central (71%) and Southern Italy (71%) than by those from Northern Italy (68%) (Tab 9).

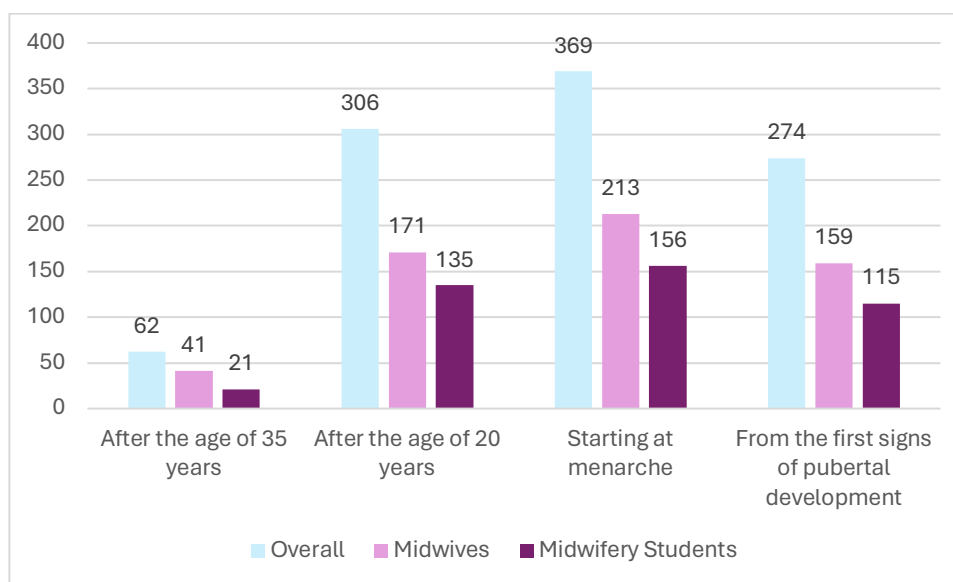
Tab 9. How frequently do you examine your axillae?

Characteristic	Overall N=1,011 <sup>1</sup>	Every 6 months N =186 <sup>1</sup>	Every year N = 55 <sup>1</sup>	Every month N =630 <sup>1</sup>	Rarely/ never N = 140 <sup>1</sup>	p- value <sup>2</sup>
<b>Professional role</b>						0
Midwives	584 (58%)	97 (52%)	32 (58%)	401 (64%)	54 (39%)	
Midwifery Students	427 (42%)	89 (48%)	23 (42%)	229 (36%)	86 (61%)	
<b>Academic year</b>						0
First year Midwifery Students	116 (27%)	26 (29%)	10 (43%)	45 (20%)	35 (41%)	
Second year Midwifery Students	117 (27%)	26 (29%)	7 (30%)	59 (26%)	25 (29%)	
Third year Midwifery Students	194 (45%)	37 (42%)	6 (26%)	125 (55%)	26 (30%)	
<b>Current Macro-region of Study (Midwifery Students)</b>						0.02
Central Italy	64 (15%)	10 (12%)	5 (20%)	36 (15%)	13 (16%)	
Northern Italy	275 (64%)	57 (70%)	13 (52%)	140 (58%)	65 (78%)	
Southern Italy	91 (21%)	14 (17%)	7 (28%)	65 (27%)	5 (6.0%)	
<b>Seniority</b>						1
< 5 years	255 (44%)	34 (35%)	13 (41%)	180 (45%)	28 (52%)	
> 20 years	84 (14%)	15 (15%)	5 (16%)	53 (13%)	11 (20%)	
11-20 years	102 (17%)	17 (18%)	8 (25%)	71 (18%)	6 (11%)	
5-10 years	143 (24%)	31 (32%)	6 (19%)	97 (24%)	9 (17%)	
<sup>1</sup> n (%)						
<sup>2</sup> Pearson's Chi-squared test						

### At what age is it recommended to begin performing BSE?

Data analysis further indicated that 30% (N=306) of the sample believes BSE should begin at age 20, 6.1% (N=62) from age 35, 36% (N=369) starting at menarche, and 27% (N=274) from the first signs of pubertal development. Midwives and midwifery students reported as follows, respectively: 29% (N=171) / 32% (N=135) believe it should begin at age 20; 7% (N=41) / 4.9% (N=21) from age 35; 36% (N=213) / 37% (N=156) from menarche; and 27% (N=159) / 27% (N=115) from the first signs of pubertal development (Fig 14).

Fig 14. At what age is it recommended to begin performing BSE?



A single significant correlation was identified between the response "Starting at age 20" and years of professional experience ( $p$ -value = 0). Midwives with more than 20 years of experience demonstrate a higher level of knowledge regarding the recommended age to begin performing BSE. Specifically, adequate knowledge of this recommendation is possessed by 36% of those with over 20 years of experience, 31% of those with less than 5 years, and 26% of those with both 11-20 years and 5-10 years of experience (Fig 14). No significant correlation was found with professional role ( $p$ -value=1), the year of study among students ( $p$ -value=0.14), the age of the students ( $p$ -value=0.07), the Macroregion of study for the degree program among students ( $p$ -value=0.44), or the years of service of midwives ( $p$ -value=1). (Table 10)

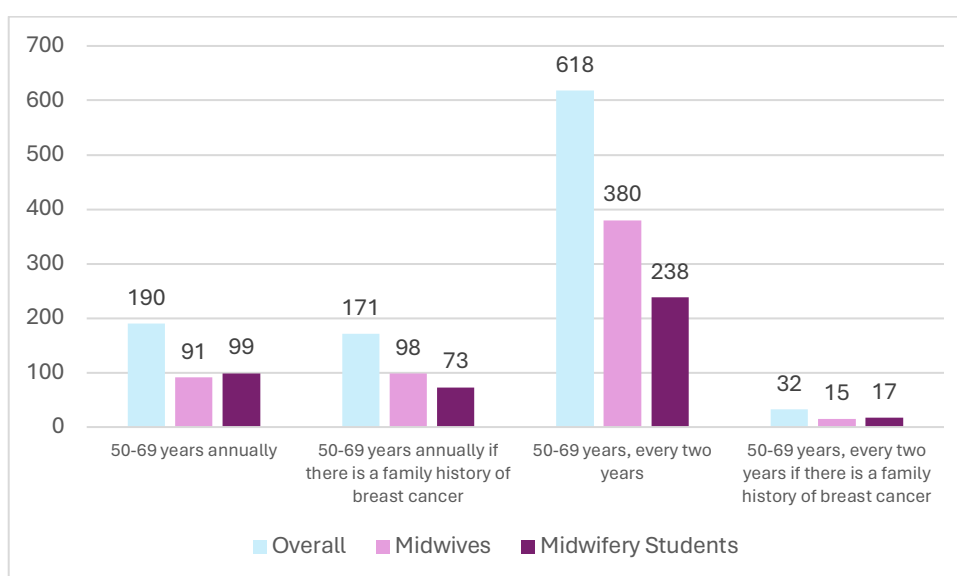
Tab 10 At what age is it recommended to begin performing BSE?

Characteristic	Overall N=1,011 <sup>1</sup>	After the age of 20 years N = 306 <sup>1</sup>	After the age of 35 years N = 62 <sup>1</sup>	Starting at menarche N = 369 <sup>1</sup>	From the first signs of pubertal development N = 274 <sup>1</sup>	p- value <sup>2</sup>
<b>Professional role</b>						1
Midwives	584 (58%)	171 (56%)	41 (66%)	213 (58%)	159 (58%)	
Midwifery Students	427 (42%)	135 (44%)	21 (34%)	156 (42%)	115 (42%)	
<b>Academic year</b>						1
First year Midwifery Students	116 (27%)	35 (26%)	8 (38%)	38 (24%)	35 (30%)	
Second year Midwifery Students	117 (27%)	35 (26%)	8 (38%)	44 (28%)	30 (26%)	
Third year Midwifery Students	194 (45%)	65 (48%)	5 (24%)	74 (47%)	50 (43%)	
<b>Current Macro-region of Study (Midwifery Students)</b>						1
Central Italy	64 (15%)	21 (15%)	5 (23%)	27 (18%)	11 (9.1%)	
Northern Italy	275 (64%)	89 (63%)	11 (50%)	88 (60%)	87 (72%)	
Southern Italy	91 (21%)	31 (22%)	6 (27%)	31 (21%)	23 (19%)	
<b>Seniority</b>						0
< 5 years	255 (44%)	79 (46%)	5 (12%)	91 (43%)	80 (50%)	
> 20 years	84 (14%)	30 (18%)	10 (24%)	31 (15%)	13 (8.2%)	
11-20 years	102 (17%)	25 (15%)	20 (49%)	36 (17%)	21 (13%)	
5-10 years	143 (24%)	37 (22%)	6 (15%)	55 (26%)	45 (28%)	
<sup>1</sup> n (%)						
<sup>2</sup> Pearson's Chi-squared test						

### In which age range does the Ministry of Health recommend and provide mammography screening?

Nineteen percent of the total sample (N=190) reported that the Ministry of Health offers mammography screening for women aged 50-69 annually, while 17% (N=171) believed that it is offered annually for the same age group only if there is a family history of breast cancer. Additionally, 61% (N=618) indicated that screening is offered biannually for ages 50-69, and 3.2% (N=32) believed it is provided for ages 50-69 if a family history is present (Fig 15). A substantial portion of midwives (65%, N=380) affirmed that mammography screening is offered in Italy for ages 50-69 biannually. A smaller proportion reported that it is offered annually for ages 50-69 (16%, N=91), annually with a family history (17%, N=98), and biannually with a family history (2.6%, N=15). Midwifery students responded as follows, in the previously mentioned order: 56% (N=238), 23% (N=99), 17% (N=73), and 4% (N=17)

Fig 15. In which age range does the Ministry of Health recommend and provide mammography screening?



No correlation was found between knowledge of the mammogram screening and professional role (p-value=0.39), the year of study among students (p-value=0.09), the age of the students (p-value=1), the Macro-region of study for the degree program among

students ( $p$ -value=1), or the years of service of midwives ( $p$ -value=1), years of professional experience ( $p$ -value = 1) (Table 10).

*Table 10. In which age range does the Ministry of Health recommend and provide mammography screening?*

	<b>Overall</b>	<b>50-69 years annually</b>	<b>50-69 years annually if there is a family history of breast cancer</b>	<b>50-69 years, every two years</b>	<b>50-69 years, every two years if there is a family history of breast cancer</b>	<b>p-value<sup>2</sup></b>
<b>Characteristic</b>	N=1,011 <sup>1</sup>	N = 190 <sup>1</sup>	N = 171 <sup>1</sup>	N = 618 <sup>1</sup>	N = 32 <sup>1</sup>	
<b>Professional role</b>						0.39
Midwives	584 (58%)	91 (48%)	98 (57%)	380 (61%)	15 (47%)	
Midwifery Students	427 (42%)	99 (52%)	73 (43%)	238 (39%)	17 (53%)	
<b>Academic year</b>						0.09
First year Midwifery Students	116 (27%)	36 (36%)	22 (30%)	50 (21%)	8 (47%)	
Second year Midwifery Students	117 (27%)	30 (30%)	16 (22%)	67 (28%)	4 (24%)	
Third year Midwifery Students	194 (45%)	33 (33%)	35 (48%)	121 (51%)	5 (29%)	
<b>Current Macro-region of Study (Midwifery Students)</b>						1
Central Italy	64 (15%)	19 (19%)	11 (16%)	33 (13%)	1 (6.7%)	
Northern Italy	275 (64%)	59 (59%)	47 (67%)	156 (64%)	13 (87%)	
Southern Italy	91 (21%)	22 (22%)	12 (17%)	56 (23%)	1 (6.7%)	
<b>Seniority</b>						1
< 5 years	255 (44%)	35 (38%)	45 (46%)	166 (44%)	9 (60%)	
> 20 years	84 (14%)	10 (11%)	13 (13%)	59 (16%)	2 (13%)	

<b>Characteristic</b>	<b>Overall</b> N=1,011 <sup>1</sup>	<b>50-69 years</b> <b>annually</b> N = 190 <sup>1</sup>	<b>50-69 years</b> <b>annually if</b> <b>there is a</b> <b>family</b> <b>history of</b> <b>breast</b> <b>cancer</b> N = 171 <sup>1</sup>	<b>50-69</b> <b>years,</b> <b>every two</b> <b>years</b> N = 618 <sup>1</sup>	<b>50-69 years,</b> <b>every two</b> <b>years if</b> <b>there is a</b> <b>family</b> <b>history of</b> <b>breast</b> <b>cancer</b> N = 32 <sup>1</sup>	<b>p-</b> <b>value</b> <sup>2</sup>
11-20 years	102 (17%)	22 (24%)	18 (18%)	60 (16%)	2 (13%)	
5-10 years	143 (24%)	24 (26%)	22 (22%)	95 (25%)	2 (13%)	
<sup>2</sup> Pearson's Chi-squared test						



### Does mammography radiation pose health risks?

The sample was asked whether they believed that the mammography machine, used for performing mammograms, poses a minimal risk to women's health. The overall responses from the sample were as follows: yes (49%, N=498) and no (51%, N=513). More specifically, 43% of midwives and 57% of students answered yes. Conversely, 57% of midwives and 43% of students responded no.

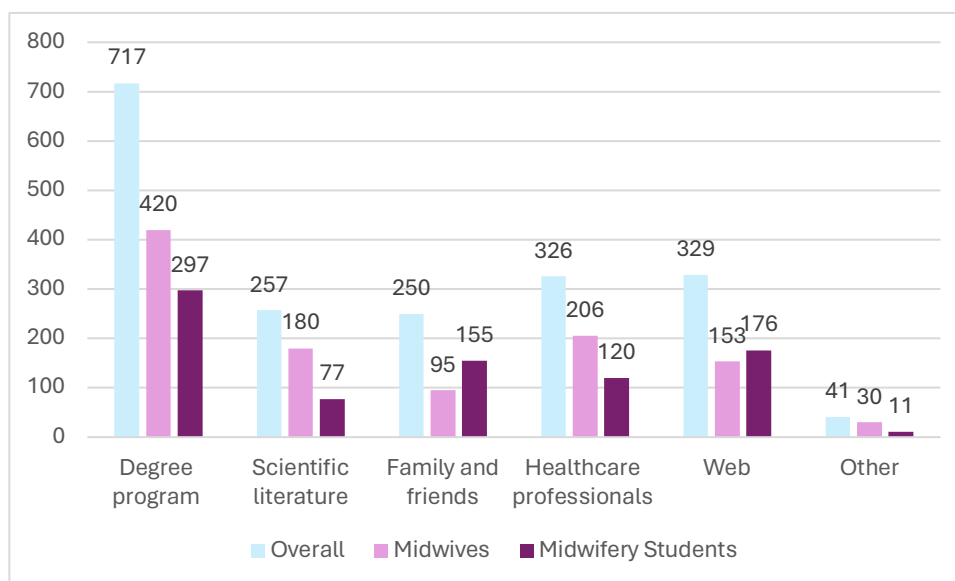
*Table 19 Does mammography radiation pose health risks?*

<b>Characteristic</b>	<b>Overall</b> N = 1,011 <sup>1</sup>	<b>No</b> N = 513 <sup>1</sup>	<b>Yes</b> N = 498 <sup>1</sup>
<b>Professional role</b>			
Midwives	584 (58%)	330 (57%)	254 (43%)
Midwifery Students	427 (42%)	183 (43%)	244 (57%)
<sup>1</sup> n (%)			

### Which are your sources of information regarding Breast Cancer?

The questionnaire aimed to explore the sources of information concerning breast cancer among the surveyed sample. This question was designed in a multiple-choice format, enabling participants to select multiple options simultaneously. Among the respondents, N=717 (71%) of the total sample (N=1011) indicated that their source of information stemmed from the degree program they had either previously attended or were currently enrolled in. Furthermore, N=257 (25%) reported that scientific literature served as a source of information, N=250 (25%) identified family and friends, N=326 (32%) cited healthcare professionals, and N=329 (33%) referenced the internet as a source of information (Fig 16)

Fig 16. Which are your sources of information regarding Breast Cancer?



Notably, differences in response percentages were observed between the midwives and the midwifery students, as detailed in table 13. Both midwives and midwifery students identified their degree program as their primary source of information on breast cancer (72% and 70%, respectively). Midwives expressed a stronger preference for scientific literature and consulting other healthcare professionals compared to students. In contrast, students appeared more inclined to seek information within their family and friends, as well as through online sources (Table 13).

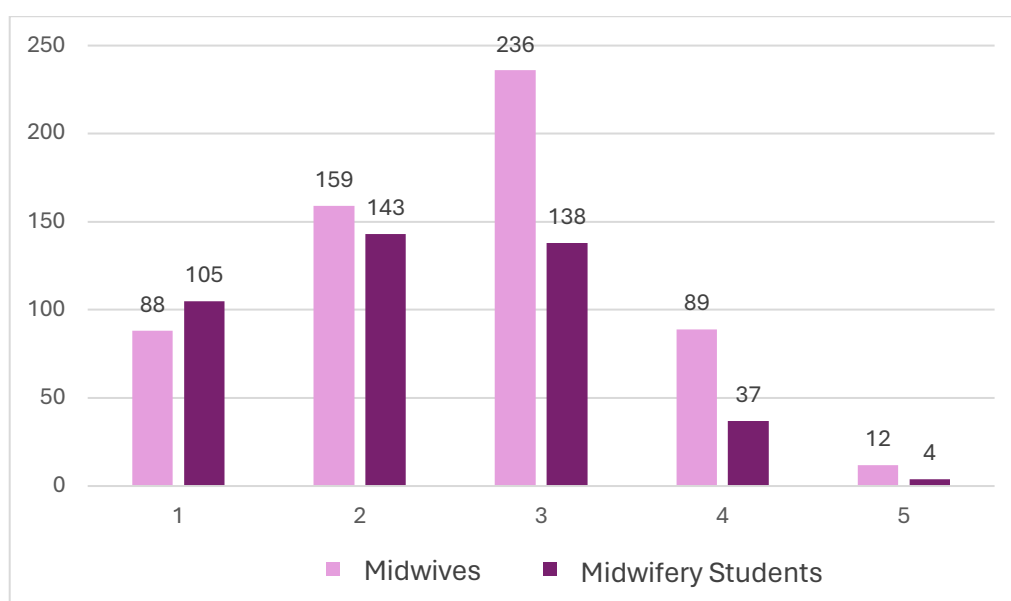
*Table 13. Fig 16. Which are your sources of information regarding Breast Cancer?*

	<b>Overall N=1011</b>	<b>Midwives</b>	<b>Midwifery Students</b>
<b>Degree program</b>	717 (71%)	420 (71.9%)	297 (69.5%)
<b>Scientific literature</b>	257 (25%)	180 (30.8%)	77 (18%)
<b>Family and Friends</b>	250 (25%)	95 (16.3%)	155 (36.3%)
<b>Healthcare professionals</b>	326 (32%)	206 (35.3%)	120 (28%)
<b>Web</b>	329 (33%)	153 (26.2%)	176 (41.2%)

### How do you rate your knowledge of breast cancer screening and prevention?

The respondents were invited to self-assess their theoretical and practical competence regarding breast cancer prevention and screening on a scale from 1 to 5, where a rating of 1 represented very limited knowledge and skills, and a rating of 5 indicated excellent, highly up to date competence.

*Fig 17. How do you rate your knowledge of breast cancer screening and prevention?*



The distribution of responses across the entire sample was as follows: 1 (19%, N=193), 2 (30%, N=302), 3 (37%, N=374), 4 (12%, N=126), and 5 (1.6%, N=16). In general, midwives appear to assess their level of knowledge more favorably than students, who tended to assign themselves lower scores. The distribution of self-assessed knowledge scores is as follows:

- Score of 1: 15% students and 25% midwives
- Score of 2: 27% midwives and 33% students
- Score of 3: 40% midwives and 32% students
- Score of 4: 15% midwives and 8.7% students
- Score of 5: 2.1% midwives and 0.9% students

Overall, 39% of the sample considers their knowledge of breast cancer prevention and screening to be very poor (2) or extremely poor (1). Furthermore, only 13.6% of the sample perceives their knowledge as very good (4) or excellent (5). A more detailed analysis of the self-assessed competence levels among midwives and midwifery students is provided in Table 21. A significant correlation was first identified between professional role ( $p$ -value = 0), with midwives reporting higher scores of 4-5. A second significant correlation exists between the year of enrollment in the midwifery program ( $p$ -value = 0); Specifically, 43% of first-year students consider their knowledge of breast cancer prevention and screening to be extremely poor (1) compared to the 27% of second-year students and to only 12% of third-year students.

*Table 21 How do you rate your knowledge of breast cancer screening and prevention?*

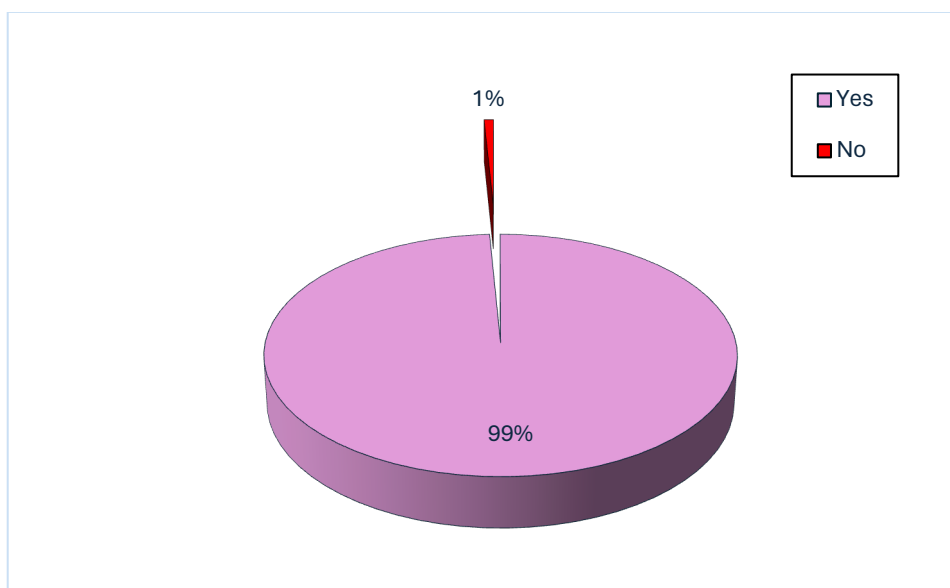
<b>Characteristic</b>	<b>Overall</b> N = 1,011 <sup>1</sup>	<b>1</b> N=193 <sup>1</sup>	<b>2</b> N = 302 <sup>1</sup>	<b>3</b> N=374 <sup>1</sup>	<b>4</b> N=126 <sup>1</sup>	<b>5</b> N =16 <sup>1</sup>	<b>p-value</b> <sup>2</sup>
<b>Professional role</b>							0
Midwives	584 (58%)	88 (46%)	159 (53%)	236 (63%)	89 (71%)	12 (75%)	
Midwifery Students	427 (42%)	105 (54%)	143 (47%)	138 (37%)	37 (29%)	4 (25%)	
<b>Academic year</b>							0
First year Midwifery Students	116 (27%)	50 (48%)	38 (27%)	24 (17%)	3 (8%)	1 (25%)	
Second year Midwifery Students	117 (27%)	31 (30%)	49 (34%)	30 (22%)	5 (14%)	2 (50%)	
Third year Midwifery Students	194 (45%)	24 (23%)	56 (39%)	84 (61%)	29 (78%)	1 (25%)	
<b>Current Macro-region of Study (Midwifery Students)</b>							0
Central Italy	64 (15%)	18 (18%)	13 (10%)	26 (17%)	6 (14%)	1 (25%)	
Northern Italy	275 (64%)	78 (76%)	99 (77%)	77 (51%)	20 (45%)	1 (25%)	

<b>Characteristic</b>	<b>Overall</b> N = 1,011 <sup>1</sup>	<b>1</b> N=193 <sup>1</sup>	<b>2</b> N = 302 <sup>1</sup>	<b>3</b> N=374 <sup>1</sup>	<b>4</b> N=126 <sup>1</sup>	<b>5</b> N =16 <sup>1</sup>	<b>p-value</b> <sup>2</sup>
Southern Italy	91 (21%)	6 (5.9%)	16 (13%)	49 (32%)	18 (41%)	2 (50%)	
<b>Seniority</b>							0.01
< 5 years	255 (44%)	37 (42%)	59 (37%)	113 (48%)	40 (45%)	6 (50%)	
> 20 years	84 (14%)	7 (8.0%)	15 (9.4%)	42 (18%)	15 (17%)	5 (42%)	
11-20 years	102 (17%)	17 (19%)	37 (23%)	30 (13%)	17 (19%)	1 (8.3%)	
5-10 years	143 (24%)	27 (31%)	48 (30%)	51 (22%)	17 (19%)	0 (0%)	
<sup>1</sup> n (%)							
<sup>2</sup> Pearson's Chi-squared test							

**Do you consider it important for obstetric professionals to receive comprehensive theoretical and practical education at the university level concerning breast cancer prevention and screening?**

After the previous question, participants were asked to indicate whether they believed that midwifery personnel receive comprehensive theoretical and practical education at the university level concerning breast cancer prevention and screening. An overwhelming majority, 99% of the sample, affirmed this need (99.1% among midwives, N=579; 99.3% among students, N=424).

*Fig 18 Do you consider it important for obstetric professionals to receive comprehensive theoretical and practical education at the university level concerning breast cancer prevention and screening?*

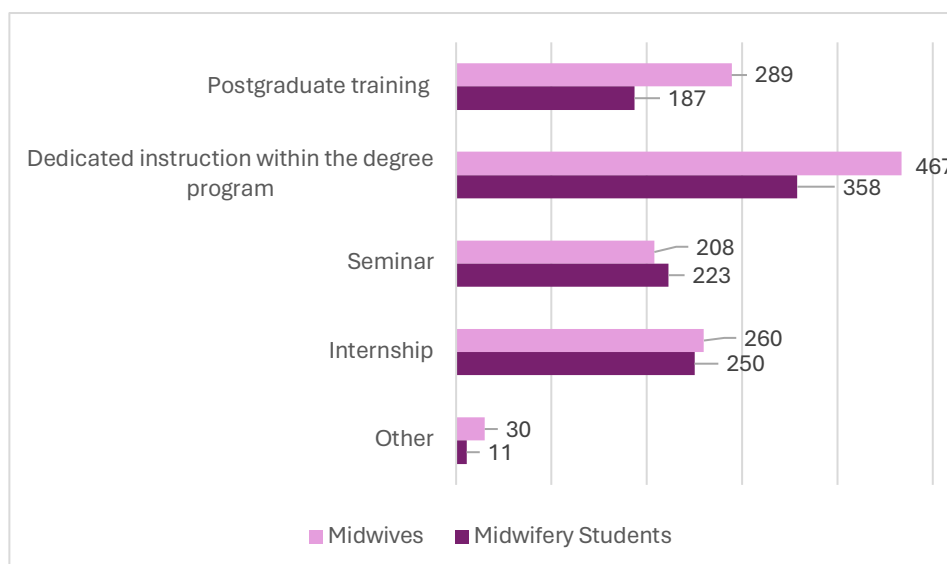


**Through what means could current and future midwifery personnel receive specialized theoretical and practical training in breast cancer prevention and screening?**

Participants were invited to select from a range of multiple-choice options regarding the modalities through which current and future midwifery personnel could receive specialized theoretical and practical training in breast cancer prevention and screening.

The statistical population reported the following preferences: postgraduate training (N=476), dedicated instruction within the degree program 82% (N=825), seminars (N=431), internships (N=510), and other (N=41). Although slight variations were observed between the preferences expressed by midwives and those indicated by students, the most frequently selected modality was dedicated instruction within the degree program, endorsed by 80% (N=467) of midwives and 84% (N=358) of students (Fig 18).

*Fig 18 Through what means could current and future midwifery personnel receive specialized theoretical and practical training in breast cancer prevention and screening?*





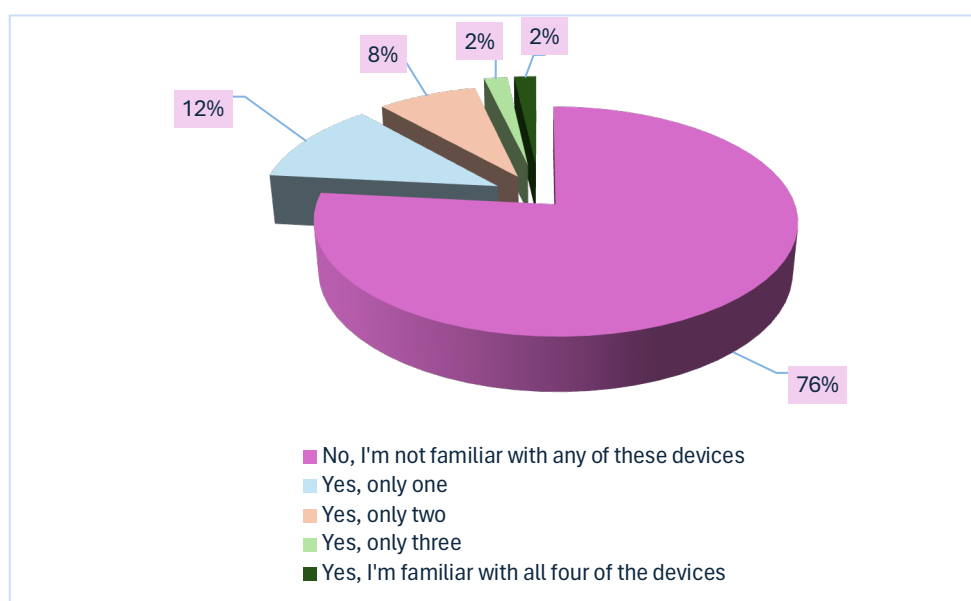
*Tab 15. Through what means could current and future midwifery personnel receive specialized theoretical and practical training in breast cancer prevention and screening?*

	<b>Overall (N=1011)</b>	<b>Midwives</b>	<b>Midwifery Students</b>
<b>Postgraduate training</b>	476	289 (49%)	187 (44%)
<b>Dedicated instruction within the degree program</b>	825	467 (80%)	358 (84%)
<b>Seminar</b>	431	208 (36%)	223 (52%)
<b>Internship</b>	510	260 (45%)	250 (59%)
<b>Altro</b>	41	30 (5.1%)	11 (2.6%)

### Are you familiar with or have you ever used any of these simulation devices?

Finally, the study investigated the respondents' familiarity with specific devices designed to provide tactile experience and simulate a realistic breast. The sample was presented with four photographs, each depicting a different simulation device, and was asked whether they were familiar with or had ever used any of the following simulation devices. The responses were as follows: 77% (N=775) of the sample indicated that they were not familiar with any of the devices, 12% (N=119) were familiar with only one, 7.9% (N=80) were familiar with two, 1.9% (N=19) were familiar with three, and 1.8% (N=18) reported familiarity with all four devices. (Fig 19).

Fig 19. Are you familiar with or have you ever used any of these simulation devices?



Only 18 individuals within the entire sample (N=1011) were able to recognize all the devices depicted in the images.

- No recognized simulation device: 74% of midwives and 81% of midwifery students
- One recognized simulation device: 12% of midwives and 11% of students.
- Two recognized simulation devices: 9.4% of midwives and 5.9% of students
- Three recognized simulation devices: 2.4% of midwives and 1.2% of students
- All devices recognized: 2.4% of midwives and 0.9% of students

A statistically significant correlation was established between professional role and familiarity with the simulation devices (p-value=0.02). A second statistic correlation was established between the variable "Macro-region" and the familiarity with or use of all the devices (p-value=0.02). In fact, 4% of students from Southern Italy were familiar with all four simulation devices, compared to 3% from Central Italy, and only 0.7% of students from Northern Italy (Table 15). In contrast, no significant correlations were identified concerning the year of study among students (p-value=1), years of professional service among midwives (p-value=1), or the macro-region in which midwives are currently practicing (p-value=1) (Table 15).

*Table 15 Are you familiar with or have you ever used any of these simulation devices?*

<b>Characteristic</b>	<b>Overall</b> N = 1011 <sup>l</sup>	<b>No, I'm not familiar with any of these devices</b> N = 775 <sup>l</sup>	<b>Yes, only one</b> N = 119 <sup>l</sup>	<b>Yes, only two</b> N = 80 <sup>l</sup>	<b>Yes, only three</b> N = 19 <sup>l</sup>	<b>Yes, I'm familiar with all four of the devices</b> N = 18 <sup>l</sup>	<b>p-value<sup>2</sup></b>
<b>Professional role</b>							0.02
Midwives	584 (58%)	430 (55%)	71 (60%)	55 (69%)	14 (74%)	14 (78%)	
Midwifery Students	427 (42%)	345 (45%)	48 (40%)	25 (31%)	5 (26%)	4 (22%)	
<b>Academic year</b>							1
First year Midwifery Students	116 (27%)	96 (28%)	9 (19%)	8 (32%)	0 (NA%)	3 (75%)	
Second year Midwifery Students	117 (27%)	94 (27%)	13 (27%)	7 (28%)	3 (60%)	0 (NA%)	
Third year Midwifery Students	194 (45%)	155 (45%)	26 (54%)	10 (40%)	2 (40%)	1 (25%)	
<b>Current Macro-region of Study (Midwifery Students)</b>							0.02
Central Italy	64 (15%)	50 (15%)	4 (7.0%)	6 (18%)	2 (33%)	2 (25%)	

<b>Characteristic</b>	<b>Overall</b> N = 1011 <sup>1</sup>	<b>No, I'm not familiar with any of these devices</b> N = 775 <sup>1</sup>	<b>Yes, only one</b> N = 119 <sup>1</sup>	<b>Yes, only two</b> N = 80 <sup>1</sup>	<b>Yes, only three</b> N = 19 <sup>1</sup>	<b>Yes, I'm familiar with all four of the devices</b> N = 18 <sup>1</sup>	<b>p-value<sup>2</sup></b>
Northern Italy	275 (64%)	218 (67%)	40 (70%)	13 (39%)	2 (33%)	2 (25%)	
Southern Italy	91 (21%)	58 (18%)	13 (23%)	14 (42%)	2 (33%)	4 (50%)	
<b>Seniority</b>							1
< 5 years	255 (44%)	192 (45%)	28 (39%)	24 (44%)	6 (43%)	5 (36%)	
> 20 years	84 (14%)	56 (13%)	15 (21%)	6 (11%)	3 (21%)	4 (29%)	
11-20 years	102 (17%)	71 (17%)	10 (14%)	16 (29%)	3 (21%)	2 (14%)	
5-10 years	143 (24%)	111 (26%)	18 (25%)	9 (16%)	2 (14%)	3 (21%)	
<b>Current Macro-region of service (Midwives)</b>							1
Central Italy	77 (13%)	59 (14%)	10 (14%)	4 (7.3%)	1 (7.1%)	3 (21%)	
Northern Italy	416 (71%)	313 (73%)	48 (68%)	37 (67%)	11 (79%)	7 (50%)	
Southern Italy	91 (16%)	58 (13%)	13 (18%)	14 (25%)	2 (14%)	4 (29%)	
<sup>1</sup> n (%)							
<sup>2</sup> Pearson's Chi-squared test							

## DISCUSSION

AIRC, IARC and WHO recommends regular and monthly BSE. These scientific organizations emphasize the importance of breast screening as a preventive measure in breast health management. In particular, because this enables individuals to become familiar with the normal structure of their breasts. It is therefore crucial to highlight that regular BSE will make it easier for the person to recognize any changes or abnormalities. In other words, it has been identified as a key component of a complete breast cancer prevention strategy. (Associazione Italiana per la Ricerca sul Cancro (AIRC), 2019) (IARC-International Agency for Research on Cancer, 2024) (World Health Organization, 2023). The survey showed that 50% (N=506) of the total sample (N=1011) practice BSE regularly. 56% (N=325) of midwives declared to do it montly, compared with 42% (N=181) of students. The percentage of midwives who routinely perform BSE is higher in this study (56%) than in the Dinas study (52.5%). However, a smaller proportion of midwifery students (42%) reported performing it monthly compared to those in the Dinas study (45.4%) (Dinas K, 2018).

Although there are relevant articles on this subject, the existing scientific literature on the practice of BSE among midwives is extremely limited.

This Survey is comparable to research conducted among midwives in Niger, where 44.9% (Abdou A, 2020) of the respondents performed BSE regularly. These percentages are higher than most of the data reported in the literature.

Only 13.1% of Ethiopian midwifery students surveyed performed BSE practitioners (Abera H, 2017). This agrees with another study published in 2010 (Beydağ KD, 2010) where only 11.6% of Turkish midwifery students reported practice BSE regularly. This rate is consistent with the 14.4% observed among students in Istanbul (Gençtürk N, 2017) but is significantly lower than the 52.7% reported in another study involving Iranian nursing and midwifery students (Soodabeh A, 2006).

On the other hand, (Avci IA, 2008) reported that only 17.5% of Turkish midwives in their sample admitted to practice BSE regularly. A higher percentage was observed among

Iranian healthcare staff, including midwives, where 44% reported regular BSE practice (Sheikhalipour Z., 2024).

All studies agree that midwives are more likely to perform BSE compared to midwifery students. Statistical analysis of the data showed that students in their third year tended to perform BSE more routinely than students in their first or second year. This may be because breast cancer and its prevention is usually part of the curriculum in the third year, so these students have more knowledge and awareness.

Regarding the general population, a survey conducted by Fondazione Veronesi in collaboration with Astra Ricerche revealed that 17.5% of the interviewed Italian women claimed to be unaware of how to perform a BSE (26% of those in their twenties and 12% of women over 55). Additionally, 28.8% believe they perform it correctly or would do so; however, among this group, more than one-third either do not conduct the examination or do so only once or twice a year (Veronesi, 2023). These data highlight the strong need to improve and raise awareness of women's health issues among health professionals, and to provide more specific training on screening for women.

The elevated rates of regular BSE among midwives in comparison to midwifery students may be attributed to their superior knowledge of breast cancer signs.

The IARC 2024 guidelines, in conjunction with those of WHO, encourage women to actively observe for any abnormalities such as: lumps, bumps, or thickening; persistent pain in one breast or armpit; changes in skin colour or texture; *peau d'orange* (orange peel texture); redness or eczema; dimpling; puckering; nipple retraction; nipple discharge; or nipple bleeding (World Health Organization, 2023) (IARC-International Agency for Research on Cancer, 2024).

As suggested by Dinas in his article, not all midwives and students actively look for all the previously signs listed when performing BSE. In fact 79% of the sample said to carry out a thorough BSE and check for all the possible signs. A significant proportion, 20% (n=204), admitted limiting their examination to checking for any form of lump or swelling. A higher

level of awareness of the signs of breast cancer is noted among midwives compared to midwifery students. In fact, 87% of midwives would check for all the listed signs, whereas this percentage dropped to 67% among students. However, within the student population, Southern students (93%) and third-year students (78%) are the most inclined to observe all the signs.

The scientific literature demonstrates that the general population has a lower level of knowledge regarding the signs of breast cancer. For instance, a study conducted by Maitanmi (Maitanmi JO, 2023), which surveyed a sample of Ethiopian women (N=160), found that 35.0% rarely looked for puckering, while 53.8% actively sought signs such as discharge, color changes, and dimpling of the skin when examining their breasts. This finding is further supported by Apatić, who highlighted that only 54.8% of the sample of Croatian women examined actively looked for dimpling or puckering of the skin (Apatić R, 2023).

Of those surveyed, 68% reported that they would use the contralateral hand when performing a BSE. This is in line with WHO and IARC recommendations (World Health Organization, 2023) (IARC-International Agency for Research on Cancer, 2024). In addition, as supported by Dinas' research, midwives showed a higher level of understanding of the correct hand to use. In another study (Apatić R, 2023), 79.8% of interviewed knew that the correct hand to use for BSE is the contralateral hand.

IARC strongly advises that women adopt a series of specific positions when performing a BSE in order to facilitate a sufficiently thorough and a complete assessment. The recommended positions include: standing upright with arms relaxed at the sides, placing both hands firmly on the waist with light pressure, raising the arms above the head and placing them behind the neck while pushing forward, leaning forward slightly with hands on the waist, sitting, and lying down (IARC-International Agency for Research on Cancer, 2024).

The survey revealed that only 15% of the sample use all the recommended positions for performing a BSE. This percentage is higher than that observed among Greek midwives (6.6%) and Greek students (5.7%). The Turkish nursing and midwifery students have an even lower level of proficiency with only a 1.4% indicating the use of the full range of correct techniques and positions for BSE (Balkaya, 2007).

A recent study (Al-Qazaz HK, Knowledge, awareness, and practice of breast self-examination among females in Mosul city, Iraq, 2020), on a sample of Iranian women found that only 16.4% of women were aware of the steps to follow when performing BSE. A little more than half of the Nigerian women surveyed said that they do not ever examine their breasts in a standing position. Meanwhile, about half of the respondents claimed that they sometimes examine each breast while lying down with a pillow under the shoulder of the breast being examined (Maitanmi JO, 2023).

Only 55% of the sample were performing BSE at the recommended time in relation to the menstrual cycle. AIRC recommends BSE during the follicular phase of the menstrual cycle and at the end of menstruation, specifically between days 7 and 14 of the cycle. This is because during the ovulatory and luteal phases, breast tissue changes due to hormonal fluctuations. (Associazione Italiana per la Ricerca sul Cancro (AIRC), 2019). Through his questionnaire, Dinas highlighted that 32.1% of Greek midwives and 28.1% of Greek midwifery students performed BSE at the appropriate time within the menstrual cycle. In the Survey, Midwives demonstrate a higher level of knowledge regarding the optimal timeframe for performing BSE (54%). The percentage of awareness among Italian students (56%) is higher than that observed in a sample of Turkish midwifery and nursing students, where only 5.4% were aware of the recommended timing within the menstrual cycle for performing BSE (Balkaya, 2007). The percentage obtained from the survey is significantly lower (Erdem Ö, 2016) that found among female primary healthcare workers in Turkey, where 81% of the sample indicated that they would perform BSE after menstruation. A study (Jobran AWM, 2023) of a cohort of Palestinian women showed that 47% perform BSE at the recommended phase of the menstrual cycle.



According to WHO BSE should be performed monthly on the same day each month in postmenopausal women (World Health Organization, 2023). BSE is extremely important and is recommended not only for women of reproductive age but especially for postmenopausal women. This because, according to the American Cancer Society, the average age of onset for breast cancer is 62 years.

Sixty-four percent of the total sample recognize that the specific day of the month chosen for BSE in menopausal women is not critical. Nevertheless, it is extremely important to perform it on the same day every month. Midwives exhibit a higher level of awareness concerning the appropriate timing for BSE in postmenopausal women when compared to students. Specifically, midwives with less than five years' experience demonstrated the most accurate and current and up-to-date knowledge on the subject.

IARC recommends the palpation of the axillary region in conjunction with BSE. Sixty-two percent of the respondents (69% midwives, 54% midwifery students) claimed that they perform a monthly axillary examination. This percentage is slightly higher than that reported among Greek midwives and students, where 57.1% of midwives and 43.2% of midwifery students affirmed to do it monthly. Midwifery students appeared to be less inclined to examine the axillary region, with 20% indicating that they do so either rarely or not at all.

In a recent study (Albeshan S, Assessment of Knowledge and Awareness About Breast Self-Examination Among University Female Students in Saudi Arabia., 2023) 668 respondents were interviewed: 65.5% were aged between 20 and 24, and 47.8% enrolled in health-related courses. The study showed that participants recognized the importance of examining the axillary area during BSE.

A limited percentage of the sample demonstrates awareness that BSE should commence at the age of 20, as recommended by both the American Cancer Society and AIRC. In particular, just 30% (N=306) of a total cohort of 1,011 individuals were found to have

awareness of this. This percentage represents a notable increase compared to the findings of (Erdem Ö, 2016) which indicated that merely 13.6% of Turkish primary healthcare workers were cognizant of the appropriate age to initiate BSE. In contrast, (Jobran AWM, 2023) 45.4% of the total sample was aware of the recommended initiation age for BSE.

The Ministry of Health offers free mammography to women aged 50 to 69 years, every two years (Ministero della Salute, 2022). However, certain Italian regions, such as Basilicata, Emilia Romagna, Friuli Venezia Giulia, Lombardy, Tuscany, and Valle d'Aosta, are experimenting to extend screening to women aged 45 and over. AIOM guidelines from 2021 on breast cancer confirm that mammography is the most effective screening test and reaffirm the recommended age range of 50 to 69 years.

Sixty-one percent of the sample is aware of the age range in which mammographic screening is recommended. Additionally, there are no significant differences in responses between midwives and students. Seventy-one percent of community midwives identified the right age for screening, which is an important statistic as they are the practitioners who most often engage with women in a community context.

The PASSI 2022-2023 data indicate that in Italy, 73% of women aged between 50 and 69 have undergone mammographic screening for preventive purposes, either as part of organized programmes or on their own initiative. This represents an increase compared to the 2021-2022 biennium, when the percentage was 70%. A higher percentage of informed obstetric personnel, including both midwives and students, could potentially improve adherence to mammographic screening (PASSI, s.d.). The AIOM guidelines on breast neoplasms state that digital mammography is preferable to analog techniques (AIOM- Associazione italiana Oncologia Medica, Associazione Italiana Registri Tumori, Aiom Fondazione, Osservatorio Nazionale Screening,, 2023). In 2019, new European Commission Initiative on Breast Cancer (ECIBC), published new European guidelines for mammographic screening, which confirmed the preference for digital mammography (Commission, s.d.).

According to the American College of Radiology (ACR), digital mammography screening uses an average effective dose of radiation of 0.21 mSv. This is higher than the radiation exposure from two projections chest X-ray (posteroanterior and lateral), which is 0.1 mSv, but significantly lower than that from a lumbar spine X-ray, which is 1.5 mSv ((ACR), American College of Radiology, 2008). The WHO has determined that the risk of ionizing radiation exposure to the breast during a mammography is minimal and that the benefits outweigh the potential risks from radiation exposure (World Health Organization, 2016).

Most of the sample (71%), with similar percentages for midwives (71.9%) and midwifery students (69.5%), reported that their main source of information regarding breast cancer screening and prevention is their academic program. Midwives tended to rely more on scientific literature and consultations with other healthcare professionals, while students demonstrated to be more inclined to search information through internet and peer networks. In most survey categories, midwives showed higher levels of knowledge, probably influenced by the scientific literature, which provides more comprehensive, up-to-date, and rigorously validated information.

Peers, family, and friends are also common sources of information among the general population. In fact, in a study involving 1,021 women from Saudi Arabia, it was revealed that 16.99% (N=163) of participants listed family and friends as their primary source of information on breast cancer (Akhtari-Zavare M, 2013), while 21.58% (N=207) cited a physician. Only 6.37% (N=65) claimed to perform BSE monthly. In line with these findings, involving a sample of 392 Ethiopian women revealed that 11.26% (N=42) reported friends as their primary source of information on breast cancer, while a significantly proportion, 28.69% (N=107), indicated that healthcare professionals served as their main source of knowledge on the topic. (K., 2022) Another common source of information in a sample of women in Addis Ababa (Tewelde B, 2022) was television and radio; in fact, 70.10% of the women added that these were their main sources of information regarding breast cancer and its prevention.

Thirty-nine percent of current and future midwives involved in this National Survey rated their knowledge of breast cancer prevention and screening as extremely poor (1) or poor (2). Students considered their knowledge to be lower than that of practicing midwives; but the overall level of knowledge remains inadequate. A similar scenario could be observed in a sample of postgraduate nursing students in Nigeria, where only 11% demonstrated a good knowledge of BSE and 34% were aware of breast cancer risk factors (Aluko JO, 2014). 58.3% of Turkish midwifery students surveyed lacked knowledge about the practice of BSE, and of these, 53.4% did not perform it specifically because they lacked the theoretical background necessary to implement it (Beydağ KD, 2010). Another study among Turkish midwives and nurses, revealed that only 30.2% possessed comprehensive knowledge regarding BSE (Bulut A, 2017). In contrast, a higher overall level of knowledge (63.3%) is observed among female health professionals working in public health settings in Ethiopia (Dechasa DB, 2022). Similar results have been observed among Iranian midwives and nursing students, who report an average level of knowledge regarding BSE, with respective rates of 71.8% and 62.1% (Soodabeh A, 2006).

In general, scientific literature indicates a low level of knowledge among healthcare professionals regarding preventive techniques such as BSE. This hinders the effective exchange of up-to-date and comprehensive information with women.

After assessment of their knowledge of breast cancer prevention and screening, almost all midwives and midwifery students (99%) expressed a need for more comprehensive theoretical and practical education on the subject. This need is supported by a study of Turkish nursing and midwifery students, in which 94.6% expressed interest in additional theoretical information about BSE (Balkaya, 2007). In a later survey on Slovak midwifery students, a similar result was observed, with 92.8% of first-year students and 88% of third-year students sought specific instruction on BSE. In addition, 78.56% of first-year students

and 64% of third-year students wished to receive a practical demonstration of the procedure (Plesnicar A, 2010).

In this regard, there are scientific articles that demonstrate that educational training for healthcare workers, such as midwives, can significantly increase the level of knowledge regarding BSE. It was found that some Ethiopian midwifery students (Abera H, 2017) who received educational training involving readings, videos, discussions and practical demonstrations increased their adequate BSE theoretical knowledge from 37.7% to 54.4% and their practical skills from 16.4% to 70.5%, further emphasizing the importance of Breast cancer prevention. A study conducted by Shahbazi in 2017 among midwives and nurses, not only emphasized the importance of education, but also compared the different teaching methods through which this can be done. The sample was provided with educational materials and indirect training through lectures conducted by a nurse with a master's degree and teaching experience. After the lectures, the level of knowledge increased significantly in the group that received direct training (Shahbazi S, 2017). Training sessions have been shown to increase knowledge about breast cancer, its risk factors, and preventive techniques such as BSE, and have proven to be useful for the female population. In fact, a study conducted by Yilmaz found that, after one week of training, knowledge about breast cancer increased from 70.5% to 99.2%, awareness of risk factors from 34.4% to 98% and knowledge of BSE progressed from 53.7% to 85.2% (Yilmaz M, 2017). This underscores the importance of women being aware, only when they are properly informed they can they take proactive steps to care for their breast health through informed preventive measures.

Both midwives and midwifery students recognized that the specialized training offered by the programme could be the most effective approach to increasing theoretical and practical competence regarding breast cancer prevention and screening. This preference is an indication of the importance that midwives give to breast cancer.

Knowledge of simulation devices is extremely limited, with 77% of the sample having never used or known about them; 74% of midwives and 81% of students being completely unfamiliar. To improve both group's knowledge, it would be highly beneficial to provide a strong theoretical foundation through specific university courses, postgraduate training, or seminars would be beneficial. This theoretical education should be complemented by practical training through internships, allowing participants to gain hands-on experience in prevention and engage in simulations using specialized devices.

In conclusion the survey revealed that midwives and students have a good understanding of the signs of breast cancer, a reasonable knowledge of the frequency of BSE, the recommended hand to use during the examination, the appropriate time in the menstrual cycle for performing BSE in fertile women, and the recommended timing for BSE in menopausal women. There is also a satisfactory understanding of the axillary examination and the age range for which mammography screening is recommended. However, knowledge is considerably lacking regarding the positions to adopt during the BSE and the age at which it is recommended. Therefore, midwives and midwifery students are informed about breast cancer prevention and screening, but in most cases, this information is lacking and incomplete and indicates a need for more training, especially at the university level.

In general, midwives have a higher level of theoretical and practical knowledge about breast cancer prevention and screening compared to midwifery students, as indicated by their responses in the survey. However, there are notable differences within the student category. In particular, those currently studying in Southern Italy and third-year students exhibited a greater level of theoretical and practical knowledge concerning BSE and the use of devices. After examining the midwifery courses offered by universities in the different regions of Italy during the academic years 202-2022 and 2022-2023, it was found that the differences in responses were due to the different university educational pathways. It was not possible to consult the various courses of the midwifery programmes in all regions: some programs were in the process of being updated or did not provide sufficient

detail to determine whether the topic of interest, breast cancer, its prevention and screening techniques was covered during the degree program. Therefore, the discussion of these data is based solely on the confirmed teachings identified. The topic of breast cancer and its prevention and screening is addressed in 67% of midwifery programs in Southern Italy, in 50% of programs in Central Italy, and in 50% of those in Northern Italy. In the third year of university education, the topic is covered in its entirety. The differences in university education are the main factors that explain the differences in students' knowledge regarding preventing and screening breast cancer.

## CONCLUSION

### **Future Implications for Women through Midwifery Breast Cancer Screening and Prevention Education**

This survey has highlighted the importance of improving midwives' and midwifery students' knowledge of breast cancer prevention and BSE. Adequate awareness and understanding of these issues would not only promote higher adherence to mammography screening but are also essential for the promotion of women's overall health and well-being. Midwives play a fundamental role in women's health as professionals who have direct and potentially continuous contact with women.

Ministerial Decree No. 740 of 14 September 1994 has outlined the important privileges granted to midwives. This decree has defined midwives as health professionals responsible for supporting and guiding women throughout their life cycle, beyond the phases of pregnancy and childbirth. It has also added that midwives are involved in prevention initiatives and the detection of tumours in the female genital tract.

The importance of mammography screening as a key preventive measure against breast cancer should be emphasized in Italy. In fact, in some regions the coverage is significantly lower than the national average: in Calabria 44.8%, in Abruzzo 55.8%, in Basilicata 58.1%, in Campania 60.1%, in Puglia 64%, in Sardegna 62.9% and in Sicilia 64.1% (PASSI, s.d.). These differences highlight the need for targeted interventions and enhanced public health initiatives to increase awareness in areas where screening rates are lower than the national average.

Within this framework of preventive healthcare, midwives play a central role in providing women with the essential tools and knowledge to promote a complete understanding of their bodies and support them in making informed decisions about their health.

The Breast Cancer 2021 guidance has stated that there are many modifiable risk factors that can be reduced or even eliminated with appropriate education. These include high



alcohol consumption, animal fat intake and low fibre intake. In addition, obesity has been identified as a risk factor in postmenopausal women. This is probably related to excess adipose tissue, which is a major source of circulating estrogens during this phase, leading to excessive hormonal stimulation of the mammary gland.

It is therefore essential that health professionals use their expertise to promote regular physical activity combined with a balanced Mediterranean diet. These practices contribute to a better metabolic and hormonal balance (AIOM- Associazione Italiana di Oncologia Medica, 2021).

Breastfeeding is a protective factor against breast cancer. According to AIRC, "Breastfeeding infants is a preventive strategy that benefits the health of both the mother and her child. This applies even in the case of cancer and when cancer has already occurred. The literature clearly shows that the risk of breast cancer is reduced by 4.3% for each year of breastfeeding among women who choose to do so, compared to those who do not. However, the greatest benefit is seen in women who are genetically predisposed to the disease, particularly those with mutations in the BRCA1 gene. The risk is halved in these women and reduced by 45% in those who breastfeed. In addition, the risk can be reduced by up to 59% in women with a family history of breast cancer - those with other cases in close relatives but no proven mutation. (Associazione Italiana per la Ricerca sul Cancro (AIRC), 2019). Why does breastfeeding reduce the risk of breast cancer? Firstly, during breastfeeding there is a decrease in the levels of oestradiol, prolactin and growth hormone, which contributes to a reduced risk of malignant breast disease. Secondly, the process of apoptosis that occurs physiologically during breastfeeding helps to eliminate cells with early DNA mutations from the ducts of breast tissue. Thirdly, breastfeeding promotes greater differentiation of epithelial cells in the mammary gland. This makes them less proliferative and therefore less susceptible to malignant mutations (Bothou A, 2022).

Teaching BSE by midwives plays a fundamental role in promoting the early detection of breast cancer. This enables women to develop a greater awareness of their bodies and helps to identify any abnormalities earlier. The role of the midwife involves a deep understanding of the emotional and psychological implications of breast health, as well as the technical aspect of BSE. The early detection of breast cancer can affect many aspects of a woman's life, from her plans for the future to her sense of identity and femininity. This is crucial for all women, but it is particularly important for younger women, especially considering that 20% of breast cancer cases in Veneto between 2015 and 2017 involved women under the age of 50 (Rete Oncologica Veneta, Edizione 2022).

The midwife can play a crucial role in helping women to overcome the barriers that may prevent them from practising BSE such as lack of knowledge of the technique, insufficient awareness of its importance, embarrassment in performing the examination and inadequate training by health professionals.

In a multidisciplinary team, each professional brings specific expertise that, when combined, can increase the effectiveness of prevention strategies. In conclusion, working together with midwives and other health professionals to prevent and screen not only optimizes health outcomes but also helps to create a supportive and trusting environment for women. Consequently, this might encourage them to take an active interest in their health.

Investing in the training of midwives is essential to ensure high-quality healthcare that provides women with up-to-date information and support to manage their health. Furthermore, educating midwifery students about the importance of prevention and BSE helps to create a generation of professionals who are more aware of and prepared to address women's health. Improving knowledge in this area can help to reduce the incidence and mortality cause by breast cancer. The implementation of specific and continuous training, practical seminars and awareness-raising campaigns is therefore essential to give midwives

and students the necessary instrument to become active in the prevention of breast cancer. By working together and across disciplines, we can build a future where every woman has access to high quality information and support to help prevent breast cancer; this for contributing to a healthier and more informed society.

It is therefore essential to improve the training of current and future midwives in the prevention and early detection of breast cancer for:

- Increase Information and awareness about breast cancer.
- Educating women about the risk factors associated with breast cancer.
- Promote breastfeeding as a protective factor.
- Encourage women to participate in prevention and screening.
- Promoting adherence to screening programmes.
- Helping women to overcome the barriers to BSE and screening.
- Public Health Interventions aimed at improving awareness and prevention.
- Promoting a multidisciplinary approach to breast cancer screening and prevention.

Training midwives in the prevention and screening of breast cancer is crucial not only because of their professional role, but also because of the personal relevance it has for them as women. Increased training in this area would have a dual benefit: it would improve the quality of the care midwives can provide and encourage them to prioritize their own health. It would also create a network of mutual support and common consciousness, which would have a positive impact on both professionals and women. Thus, training in breast cancer prevention is not just a professional requirement, but an investment in women's overall health, creating a beneficial cycle of awareness and proactive care.

To conclude, supporting midwives to become educated in breast cancer prevention improves the quality of care they provide and cultivates a model of shared support and awareness that benefits them personally and professionally. This approach contributes to a more durable culture of prevention.

## **ACRONYMS**

**MBC:** Metastatic Breast Cancer

**CBE:** Clinical Breast Examination

**BSE:** Breast Self-Examination

**WHO:** World Health Organization

**IARC:** International Agency for Research on Cancer

**AIRC:** Italian Association for Cancer Research

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