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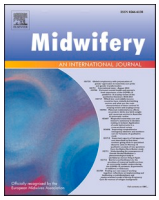

Review Article

Factors associated with breastfeeding knowledge and attitudes among non-pregnant, nulliparous women of reproductive age: A scoping review

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ABSTRACT

Problem and background: Although breastfeeding has well-established benefits for both mothers and infants, global rates remain suboptimal. Knowledge and attitudes are key factors associated with breastfeeding outcomes and identifying the factors that shape these before pregnancy can guide initiatives to improve breastfeeding rates.

Aim: This scoping review aimed to map factors associated with breastfeeding knowledge and attitudes in non-pregnant, nulliparous women of reproductive age.

Method: In line with PRISMA-ScR and the Joanna Briggs Institute methodology, the Population, Concept, and Context framework was applied to identify factors affecting breastfeeding knowledge and attitudes. A comprehensive search across SCOPUS, MEDLINE, Web of Science, Cochrane Library, CINAHL, and Embase was conducted. Data were extracted using a standardised form, and methodological quality was assessed. A narrative synthesis was performed to summarise the findings.

Findings: The review included 37 studies from 22 countries, primarily focusing on university students. Breastfeeding knowledge varied, with some studies reporting moderate to high levels, while others reported lower levels. Most participants had positive attitudes, though a few were neutral or negative. Key associated factors included education, exposure to breastfeeding, age, cultural norms, and socioeconomic status. Higher education and exposure to breastfeeding information were associated with better knowledge and attitudes, while the relationship with socioeconomic status showed mixed results.

Conclusion: This review highlights the multifactorial nature of breastfeeding knowledge and attitudes. Interventions before pregnancy are crucial to improving breastfeeding outcomes. Further research is needed, particularly in regions with low breastfeeding rates.

Introduction

Breastfeeding is widely recognised as the preferred method for infant nutrition, offering well-documented health benefits for infants and mothers (Muro-Valdez et al., 2023; WHO, 2022). It plays a crucial role in reducing infant and childhood mortality and mitigating the risk of developing noncommunicable diseases later in life (Prentice, 2022; WHO and UNICEF, 2023). The Global Breastfeeding Collective targets for 2030 include: 70 % of newborns breastfeeding within an hour after birth, 70 % of infants being exclusively breastfed for the first six months of life, with 80 % continuing to breastfeed at one year (WHO, 2022). These targets emphasise the importance of breastfeeding in promoting long-term maternal and child health (Levin et al., 2017; Muro-Valdez et al., 2023).

Breast milk contains an array of bioactive compounds, immune cells, and other protective molecules that support immune function, organ development, and inflammatory regulation (Gura, 2014). Breastfeeding has been shown to lower the incidence of conditions such as otitis media, lower respiratory tract infections, gastroenteritis, and sudden infant death syndrome (Levin et al., 2017; Muro-Valdez et al., 2023). Breastfeeding is also associated with significant maternal health benefits, including a reduced risk of cardiovascular disease and several cancers. Early maternal benefits include a lower risk of postpartum haemorrhage, decreased risk of postpartum depression, support for postpartum weight loss, and improved fertility regulation (Chowdhury et al., 2015; Muro-Valdez et al., 2023; Papadopoulou et al., 2023; Prentice, 2022; Salone et al., 2013). Increasing global breastfeeding rates and support systems could significantly reduce mortality rates, preventing an estimated 20,

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000 breast cancer deaths and 823,000 child deaths annually (Victora et al., 2016).

Despite these well-documented advantages, global breastfeeding rates remain suboptimal, with estimates as low as 48 % (WHO, 2024). Women often face barriers such as societal stigma and embarrassment (Hackett et al., 2015; McFadden and Toole, 2006), highligthing the need for multifaceted approaches to promote breastfeeding (Rollins et al., 2016). Positive attitudes and adequate knowledge are critical for improving initiation and continuation rates (Aboul-Enein et al., 2023; Ahmed et al., 2021; Ibrahim et al., 2023; Kornides and Kitsantas, 2013; Yang et al., 2018). While knowledge refers to the information and facts an individual understands about breastfeeding, attitudes reflect their personal feelings, emotions, motivations, and inclinations toward that topic (Valbuena et al., 2021).

Importantly, infant feeding decisions are frequently made before pregnancy, with early decision-makers more likely to breastfeed (Jannesari et al., 2020). Limited knowledge about breastfeeding is linked to delayed initiation, whereas greater knowledge and positive attitudes support better breastfeeding outcomes (Mary et al., 2022; Kornides and Kitsantas, 2013; Saparina and Rismah, 2021; Jefferson, 2014). Since women typically lead infant feeding decisions, education introduced prior to pregnancy allows more time for informed choices and may overcome barriers present during pregnancy and postpartum (Radzyminski and Callister, 2016; Earle and Hadley, 2018; Ho and Yu, 2014; Jannesari et al., 2020).

This scoping review aims to systematically map existing evidence on breastfeeding knowledge and attitudes, with a particular focus on identifying associated factors among non-pregnant, nulliparous women of reproductive age.

Methods

This is a scoping review, a method ideal for addressing broad research questions and identifying the nature and extent of the research evidence (Grant and Booth, 2009). Scoping reviews help identify research gaps, clarify key concepts, and provide a comprehensive overview of the research landscape (Munn et al., 2018; Tricco et al., 2018). This approach is particularly suited to this topic, enabling the identification of diverse methodologies and key factors related to breastfeeding knowledge and attitudes. The scoping review followed the PRISMA-ScR guidelines (Chan and Whitfield, 2020) and the Joanna Briggs Institute (JBI) methodology for scoping reviews (Ejie et al., 2021), adhering to their checklists throughout the review process. A review protocol was developed and registered with the Open Science Framework (OSF) prior to the conduct of the study and was used to guide the review process.

Review question

This review was structured around the question: What factors are associated with the knowledge and attitudes of non-pregnant, nulliparous women of reproductive age towards breastfeeding?

The review question was developed using the Population, Concept, and Context (PCC) framework. Scoping reviews commonly use the PCC framework to formulate the search question (Peters et al., 2022). For this review, the PCC is as follows:

P, Population: non-pregnant, nulliparous women of reproductive age
C, Concepts: knowledge & attitudes toward breastfeeding
C, Context: all countries

Identification of relevant studies

Studies were included if they focused on a population of women who are non-pregnant, nulliparous, and of reproductive age (defined by the WHO as 15–49 years old). Studies must have been published in English, as translating non-English papers was not feasible due to limited resources. The review excluded interventional and experimental studies that did not provide pre-intervention data on the level of knowledge and attitudes toward breastfeeding or associated factors. Included studies focused on knowledge and attitudes toward breastfeeding, while studies examining breastfeeding rates, patterns, planning, initiation, practices, and counselling skills were excluded.

The population for this scoping review was non-pregnant, nulliparous women. Studies that did not provide clear data on parity or whether participants had children, were included, as excluding these would significantly limit the scope of the review. In such cases, the studies were considered eligible if it was reasonable to assume the population could include non-pregnant, nulliparous women. The data on whether parity status was mentioned in the study is included in the quality appraisal table. Studies with mixed-gender participants were included only if they separately reported data for males and females, allowing data on female participants to be identified. Studies lacking clear demographic data on sex and age were excluded. Exceptions were made for studies where the population could reasonably be assumed to fall within the reproductive age range.

Search strategy

A comprehensive search strategy was developed by first creating a concept map of the key terms. This established an extensive list of synonyms and search terms. The process involves brainstorming related terms using main concepts and keywords, reviewing relevant papers and noting key terms, utilising thesaurus tools to find synonyms, employing database-specific features such as MeSH for PubMed, and considering different word forms, using truncation symbols to capture variations. The expertise of a research librarian enhanced the quality and effectiveness of the search strategy. The full search terms are detailed in Table 1. These terms were adapted for use in different databases to accommodate database-specific features and optimise results. No time constraints were applied, and the search was conducted in December 2024.

Source of evidence

The search was conducted using multiple electronic databases to ensure broad coverage of relevant research: CINAHL (Cumulative Index to Nursing and Allied Health Literature), MEDLINE (Medical Literature Analysis and Retrieval System Online), SCOPUS, Web of Science, Cochrane Library and Embase. A manual search of the bibliographic references of the selected articles was also carried out.

Selection of evidence

The PRISMA flowchart (Fig. 1) provides a detailed overview of the study selection process. All identified sources were collated in an EndNote bibliography library. The process began with 1580 records from five databases. After duplicates were removed, the sources underwent an initial screening at the title and abstract level, followed by full-text screening. A total of 175 full-text reports were retrieved. Data were selected by the first reviewer (MM) for consistency due to the large volume of studies. Selection accuracy was checked independently for a minimum of 25 % of studies by another reviewer (MI), with any disagreements resolved by consulting a third reviewer (VH). The screening process often led to the identification of new or relevant terms, which led to an expanded search and inclusion of relevant studies. Additionally, manual reference checks identified a further five studies, which were incorporated into the final total. Ultimately, 37 studies were included in the review. Excluded sources and reasons for exclusion are documented in supplementary Table 1.

Table 1
Search terms.

knowledge OR attitude* OR awareness OR Education OR Competence OR Literacy OR Perception* OR understanding* OR comprehension OR belief* OR stance* OR perspective* OR view* OR thought* OR opinion*
AND
Breastfeeding OR "Breast feeding" OR "Breast-feeding" OR "Breast Fed" OR Breastfed OR lactation OR infantfeeding OR "infant feeding" OR "breast milk" OR "human milk" OR "newborn feeding"
AND
Nulliparous OR Nonparous OR "non parous" OR "non-parous"OR Childless OR "Never given birth" OR "Zero-parity" OR nulligravida OR "never-pregnant" OR nonpregnant OR "non pregnant" OR non-pregnant OR student* OR "Non parous" OR "Non-parous" OR "before pregnancy" OR "prepregnancy" OR "pre-pregnancy" OR "Antecedent to pregnancy" OR "prior to pregnancy" OR nulliparity OR "pre gestation" OR "pre-gestation" OR "pregestation" OR pregestational OR "pre gestational" OR pregestational OR "preconceptional" OR pre-conceptional OR pre conceptional OR preconception OR "pre conception" OR "pre-conception"

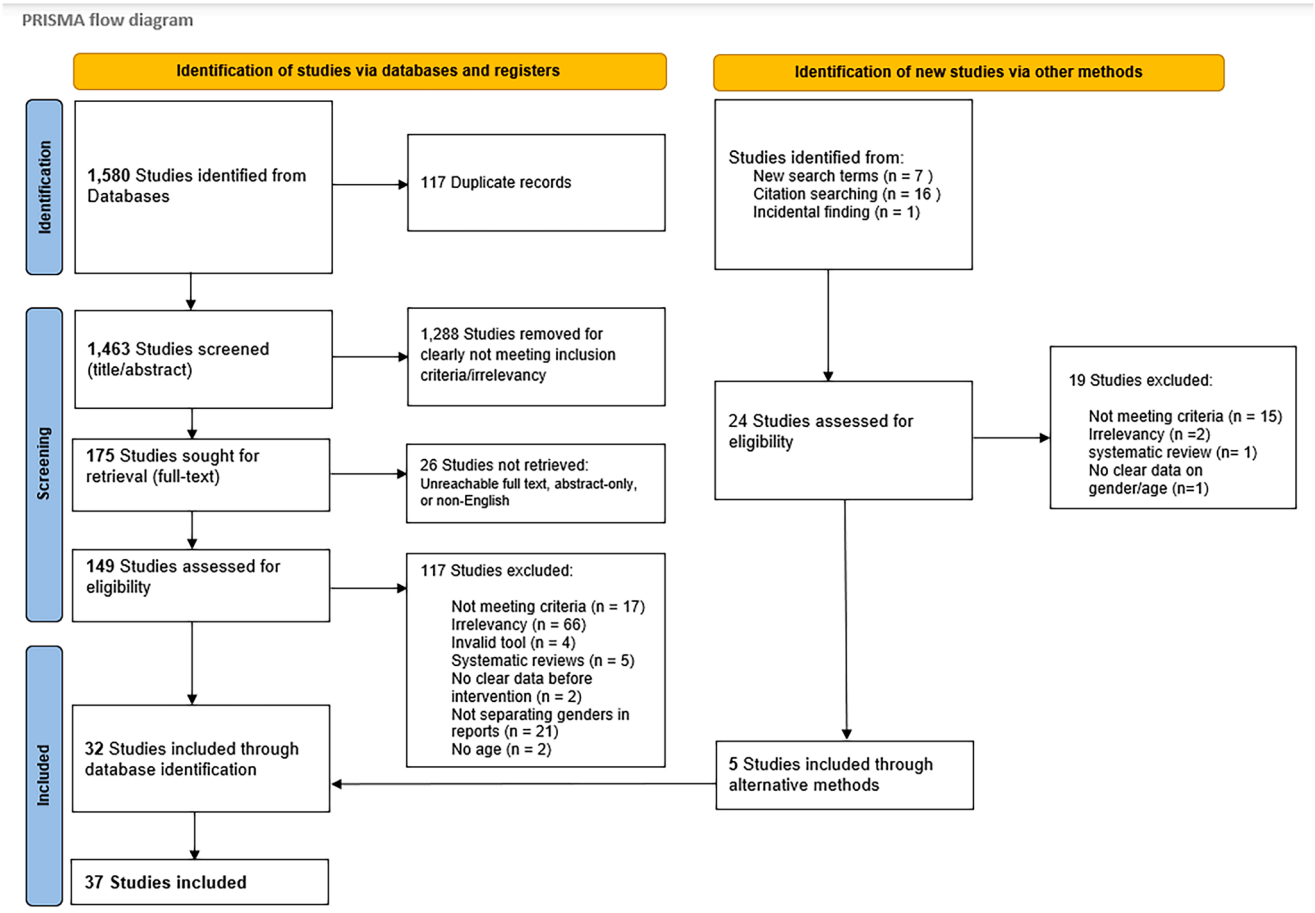

Fig. 1. PRISMA flow diagram.

Data extraction/ charting

A draft data extraction table aligned with the review questions was created in Microsoft Excel to collate and synthesise the data. Information collected included: study details (year, authors, country, and title), study characteristics (aims, design, assessed factors, and tools), participant characteristics (age, sample size, demographics, and other variables), and study results (knowledge/attitude scores, associated factors, and key findings), following the recommendations of Tricco et al. (2018) and Peters et al. (2022). The results were reviewed collaboratively by two reviewers (MM & MI). Disagreements on study selection and extraction were resolved by discussion. Systematic or other reviews found were also screened against the inclusion criteria, but no additional relevant studies were identified.

Data synthesis

The included studies showed heterogeneity in their methodologies and measurement approaches meaning that it was not possible to combine study findings in a meta-analysis. Consequently, the findings are organised and presented through a narrative synthesis to capture the diverse aspects of breastfeeding knowledge and attitudes.

Quality appraisal

Critical appraisal of the included studies was conducted to assess their methodological quality for transparency, using a custom-designed quality assessment tool. An evaluation was also performed to determine whether parity status was mentioned. The results are presented in Table 2, with each aspect rated as "Yes," "No," or "Unclear." To visualise the overall quality, a simple scoring system was used: (+) for low quality (1–2 "Yes" ratings), (++) for moderate quality (3–4 "Yes" ratings),

Table 2
Quality assessment.

Study	Clear Objectives	Appropriate Design	Population & Sampling	Results Quality	Study Transparency	Ethical Considerations	Measurement Validity	Quality Score	Parity Data
Grabowski et al. (2024)	Yes	Yes	Yes	Yes	Yes	Yes	No validation reported	+++	No
Ogundare et al. (2023)	Yes	Yes	Yes	Yes	Yes	Yes	Adequate	+++	No
Pereira et al. (2023)	Yes	Yes	Unclear (Sample size reporting inconsistency)	Yes	Yes	Yes	Strong	+++	No
Sayed and Bugis (2023)	Yes	Yes	Yes	Yes	Yes	Yes	Strong	+++	Yes
Sayed et al. (2023)	Yes	Yes	Yes	Yes	Yes	Yes	Strong	+++	Yes
Liu et al. (2023)	Yes	Yes	representativeness unclear	Yes	Yes	Yes	Strong	+++	Yes
Iñarritu-Pérez et al. (2022)	Yes	Yes	Yes	Yes	Yes	Yes	Adequate	+++	No
Spencer et al. (2022)	Yes	Yes	Yes	Yes	Yes	Yes	Adequate	+++	No
Uğurlu (2022)	Yes	Yes	Sampling process was not conducted	Yes	Yes	Yes	Strong	+++	No
Keleş (2021)	Yes	Yes	Yes	Yes	Yes	Yes	Strong	+++	No
Jannesari et al. (2020)	Yes	Yes	Number of schools and students per school not specified	Yes	Yes	Yes	Adequate	+++	Yes
Khresheh (2020)	Yes	Yes	Yes	Yes	Yes	Yes	Strong	+++	No
Elareed and Senosy (2019)	Yes	Yes	Yes	Yes	Yes	Yes	Strong	+++	No
Mofied et al. (2019)	Yes	Yes	Yes	Yes	Yes	Yes	Strong	+++	No
Yahya and Abdul Hamid (2018)	Yes	Yes	Yes	Yes	Yes	Yes	Strong	+++	No
Jefferson et al. (2017)	Yes	Yes	Yes	Yes	Yes	No information provided on ethics approval or informed consent	Strong	+++	Yes
Khriesat et al. (2017)	Yes	Yes	Yes	Yes	Yes	Yes	Strong	+++	Yes
Aggarwal et al. (2016)	Yes	Yes	Yes	Yes	Yes	Yes	Adequate	+++	No
Bhattacharya et al. (2016)	Yes	Yes	Did not reach target sample size; sampling method not clearly stated	Yes	Yes	Yes	Strong	+++	No
Ho and McGrath (2016)	Yes	Yes	Yes	Yes	Yes	Yes	Strong	+++	No
Padmanabhan et al. (2016)	Yes	Yes	Yes	Yes	Yes	Yes	Adequate	+++	No
Hackett et al. (2015)	Yes	Yes	Yes	Yes	Yes	Yes	Adequate	+++	Yes
Jefferson et al. (2015)	Yes	Yes	Yes	Yes	Yes	No information provided on ethics approval or informed consent	Strong	+++	Yes
Jefferson et al. (2014)	Yes	Yes	Yes	Yes	Yes	Yes	Strong	+++	Yes
Hamade et al. (2014)	Yes	Yes	Yes	Yes	Yes	Yes	Strong	+++	No
Ho and Yu (2014)	Yes	Yes	Yes	Yes	Yes	Yes	Strong	+++	No
Khriesat et al. (2014)	Yes	Yes	Yes	Yes	Yes	Yes	Strong	+++	Yes
Abdel-Hady et al. (2013)	Yes	Yes	Yes	Yes	Yes	Yes	Adequate	+++	No
Al-Ali et al. (2013)	Yes	Yes	Yes	Yes	Yes	Yes	Strong	+++	No
Kavanagh et al. (2012)	Yes	Yes	Yes	Yes	Yes	Yes	Strong	+++	No
Marrone et al. (2008)	Yes	Yes	Yes	Yes	Yes	Yes	Strong	+++	Yes
Juliff et al. (2007)	Yes	Yes	Yes	Yes	Yes	Yes	Strong	+++	No

(*continued on next page*)

Table 2 (*continued*)

Study	Clear Objectives	Appropriate Design	Population & Sampling	Results Quality	Study Transparency	Ethical Considerations	Measurement Validity	Quality Score	Parity Data
Tarrant and Dodgson (2007)	Yes	Yes	Sampling method not described	Yes	Yes	Yes	Strong	+++	No
Kang et al. (2005)	Yes	Yes	Sampling Method Not Clearly Described	Yes	Yes	Yes	Strong	+++	No
Connolly et al. (1998)	Yes	Yes	Yes	Yes	Yes	No information provided on ethics approval or informed consent	Adequate	+++	No
Forrester et al. (1997)	Yes	Yes	Yes	Yes	Yes	No information provided on ethics approval or informed consent	Adequate	+++	No
Yeo et al. (1994)	Yes	Yes	Yes	Yes	Yes	Yes	Adequate	+++	No

(+++) for high quality (5–6 "Yes" ratings), and (-) for very low quality (0 "Yes" ratings). The tools used in the studies were given a summary measurement of validity, which was rated as Strong, Adequate, or Limited. The validity score of the tools influenced the overall quality rating of the study, with studies using tools with minimal validation being downgraded in their overall rating. No studies were excluded based on quality; an assessment was developed to evaluate the methodological rigor of the included studies, ensuring reliability and transparency in the findings (Pollock et al., 2022).

Results

In total, 37 peer-reviewed articles with diverse methodological approaches were included in the review (Table 3). The studies originated from 22 countries, including high-, middle-, and low-income countries, with some countries appearing more than once. The USA is the most frequent contributor, appearing seven times, followed by Saudi Arabia with four contributions.

Study focus and populations

Studies varied in focus, with 11 assessing attitudes alone, 6 examining only knowledge, and 20 evaluating both using separate questionnaires (Table 3). Connolly et al. (1998) used a questionnaire that assessed both knowledge and attitude simultaneously.

The studies examined a range of populations with diverse educational backgrounds, and participants from various racial and ethnic groups (detailed participant information is provided in Table 3). The majority focused on young adults and adolescents in educational settings, primarily targeting college and university students, particularly those in nursing, medicine, and midwifery. These studies concentrated on breastfeeding knowledge and attitudes among future healthcare providers. Additionally, high school students and adolescents were also included in the research. Demographic characteristics, such as gender and ethnicity, were addressed in some studies to capture breastfeeding perceptions across different groups.

Assessment tools

A variety of assessment tools were employed to measure breastfeeding-related knowledge and attitudes, broadly categorised into those focusing on knowledge and those assessing attitudes. These instruments ranged from self-administered questionnaires to interviews and included both researcher-developed tools and adapted or modified versions of validated scales, summarised in Table 3. Breastfeeding knowledge was classified as high, moderate, or low, while attitudes were categorised as positive, neutral, or negative, based on criteria specified in each study. When explicit scoring thresholds were available (e.g., IIFAS scores $\geq$70 indicating positive attitudes), these were applied; otherwise, classifications relied on the authors' original descriptions or interpretive summaries, as summarised in Table 4. Supplementary Table 2 provides detailed information on the assessment tools, including their development sources, item formats, scoring methods, validation metrics, and classification thresholds as reported in the original studies. The Iowa Infant Feeding Attitude Scale (IIFAS) was the most commonly used tool for measuring attitudes, appearing in 12 studies, with one study employing a modified version (Sayed et al., 2023). Similarly, the Infant Feeding Knowledge Test Form A (AFORM) was the most frequently used knowledge assessment tool, featured in three studies.

Attitudes and knowledge levels

Knowledge levels varied across the studies (Table 4). Several studies reported moderate knowledge among participants ($n = 10$), while others found knowledge to be generally poor ($n = 8$), including among nursing students (Elareed and Senosy, 2019; Khriesat and Ismaile, 2017) and midwifery students (Liu et al., 2023). Other studies demonstrated high knowledge levels ($n = 7$), particularly among medical students (Iñarritu-Pérez et al. 2022; Mofied et al. 2019).

Attitudes toward breastfeeding were mostly positive, with the majority indicating favourable views ($n = 18$) (Table 4). However, some studies reported neutral ($n = 6$) or negative attitudes ($n = 6$). Negative attitudes were also observed among nursing students (Elareed and Senosy, 2019; Khriesat and Ismaile, 2017), midwifery students (Spencer et al., 2022), and medical students (Khriesat et al., 2014; Aggarwal et al., 2016). Notably, studies conducted within the same country sometimes revealed significant variations. For example, in Saudi Arabia, one study identified highly positive attitudes and strong community support for breastfeeding (Khresheh, 2020), another described moderate attitudes (Sayed and Bugis, 2023), and a third, focusing on nursing students, revealed negative attitudes (Khriesat and Ismaile, 2017).

Associated factors

Data from the 33 studies highlighted several key factors associated with breastfeeding knowledge and attitudes (Table 4). These included education, exposure and socio-economic status, along with other associated factors such as age, ethnic background, cultural norms, and parental education.

Association of educational factors

A total of 20 studies identified the field of education or related educational factors as significantly associated with breastfeeding knowledge and attitudes (Table 4). The evidence on the relationship between field of study and breastfeeding knowledge and attitudes is mixed. Some studies suggest that students in science-related or health-related fields have greater breastfeeding knowledge and more positive

Table 3
Descriptive summary of included studies.

Author & Year	Country	Participants & Age	Study Design	Assessment Factors & Tools
Grabowski et al. (2024)	USA	Adolescents and young adults: 14–24 yrs (Mean: 18.8)	Cross-sectional	Knowledge, Open-ended questions
Ogundare et al. (2023)	Nigeria	Undergraduate students: 15–29 yrs (Mean: 20.93)	Cross-sectional	Knowledge, Researcher-made questionnaire
Pereira et al. (2023)	Portugal	Medical students: Mean: 22.45 yrs	Cross-sectional	Attitude, IIFAS
Sayed and Bugis (2023)	Saudi Arabia	Higher education students: 23–25 yrs (Mean: 21.80 ± 2.17)	Descriptive exploratory	Attitude, modified IIFAS
Sayed et al. (2023)	Saudi Arabia	Female higher education students: 23–25 yrs (Mean: 21.80 ± 2.17)	Descriptive exploratory	Knowledge, Exclusive breastfeeding knowledge scale
Liu et al. (2023)	China	Nursing undergraduates: 18–25 years	Cross-sectional	Knowledge, Self-administered questionnaire
Iñarritu-Pérez et al. (2022)	Mexico	Undergraduate medical students: Mean: 20±1 yrs	Quasi-experimental	Knowledge and Attitude, Researcher-made questionnaire
Spencer et al. (2022)	England	Final year midwifery students: 21–43 yrs	Qualitative (semi-structured interviews)	Attitude, Semi-structured interview
Uğurlu (2022)	Turkey	Midwifery students: 18–30 yrs (Mean: 20.40 ± 1.25)	Cross-sectional	Attitude, IIFAS
Keleş (2021)	Turkey	Midwifery students (2nd year): 19.82 ± 1.09 years	Semi-experimental	Knowledge and Attitude, Breastfeeding Knowledge Evaluation Form N, IIFAS
Jannesari et al. (2020)	Iran	Female high-school students: 16–19 yrs (Mean: 17.52 ± 0.72)	Cross-sectional	Knowledge and Attitude, Researcher-made questionnaire
Khresheh (2020)	Saudi Arabia	University students: 19–26 (Mean: 20.6 ± 1.38)	Cross-sectional	Knowledge and Attitude, Self-administered questionnaire based on Kavanagh et al. and Tarrant & Dodgson
Elareed and Senosy (2019)	Egypt	Nursing students: 18–25 years	Cross-sectional	Knowledge and Attitude, Infant Feeding Knowledge Test, IIFAS
Mofied et al. (2019)	Egypt	Medical and nursing students: 20–24 yrs	Cross-sectional	Knowledge and Attitude, Modified Australian Breastfeeding Questionnaire (ABQ)
Yahya and Abdul Hamid (2018)	Malaysia	Undergraduate university students: 19–28 years (mean 22.34 ± 1.45)	Cross-sectional	Knowledge and Attitude, AFORM, IIFAS
Jefferson (2017)	USA	African American & Caucasian college students: 18–44 yrs (Mean: 20)	Cross-sectional	Attitude, IIFAS
Khriesat and Ismaile (2017)	Saudi Arabia	Nursing students: 18–25 yrs	Cross-sectional	Knowledge and Attitude, Self-administered questionnaire
Aggarwal et al. (2016)	India	Medical students: Mean: 20.42 ± 1.698 yrs	Cross-sectional	Knowledge, Self-administered questionnaire
Bhattacharya et al. (2016)	India	Teenage college student, First-year around 18 yrs	Cross-sectional	Knowledge and Attitude, Self-administered questionnaire
Ho and McGrath (2016)	Taiwan	High school students: Mean: 16.97 yrs	Quasi-experimental, repeated measure	Knowledge and Attitude, Researcher-made questionnaire, IIFAS
Padmanabhan, et al. (2016)	India	College students: 18–24 yrs	Cross-sectional	Knowledge and Attitude, Researcher-made questionnaire
Hackett (2015)	Bangladesh	Adolescent girls: 15–23 yrs	Cross-sectional	Knowledge and Attitude, Interviews
Jefferson (2015)	USA	College students: 17–44 yrs	Cross-sectional	Attitude, IIFAS
Jefferson (2014)	USA	Black college students: 17–44 yrs (Mean: 22 ± 5.38)	Cross-sectional	Attitude, Iowa Infant Feeding Attitude Scale (IIFAS)
Hamade et al. (2014)	Lebanon and Syria	Undergraduate students: 18–25 yrs	Cross-sectional	Knowledge and Attitude, Infant Feeding Knowledge Test A (AFORM), IIFAS
Ho and Yu (2014)	Taiwan	School students: 15–18 yrs	pre-test/post-test survey	Attitude, IIFAS
Khriesat et al. (2014)	Jordan	Medical students: Sixth-year	Cross-sectional	Knowledge and Attitude, Researcher-made questionnaire
Abdel-Hady et al. (2013)	Eygpt	Female medical students, first to final years	Cross-sectional	Knowledge, Self-administered questionnaire
Al-Ali et al. (2013)	Jordan	Undergraduate students: 17–38 yrs	Cross-sectional	Attitude, IIFAS
Kavanagh et al. (2012)	USA	Undergraduate students: Mean 19 yrs	Cross-sectional	Knowledge and attitude, Breastfeeding knowledge statements by Tarrant et al. and Giles et al.
Marrone et al. (2008)	USA	University undergraduates: Mean 20.0 ± 1.74	Cross-sectional	Knowledge and Attitude, AFORM, IIFAS
Juliff et al. (2007)	Western Australia	Secondary school students: 13–14 yrs / 16–17 yrs	Cross-sectional	Knowledge and attitude, Breastfeeding knowledge scale (BFK) & Attitudes Toward Breastfeeding (ATBF) Scale
Tarrant and Dodgson (2007)	China, Hong Kong	University students: 19- over 30 yrs	Cross-sectional	Knowledge and Attitude, Infant feeding knowledge scale
Kang, et al. (2005)	Korea	Undergraduate students: 20–25 yrs (Mean: 22.6)	Cross-sectional	Knowledge and Attitude, Researcher-made questionnaire
Connolly et al. (1998)	Ireland	Fifth-year students: 16–19 yrs	Cross-sectional	Knowledge and Attitude, Researcher-made questionnaire
Forrester et al. (1997)	USA	High school & college students: 13–19 yrs, 17–43 yrs	Cross-sectional	Attitude, Self-administered questionnaire
Yeo et al. (1994)	Japan & USA	High-School Female Students: 16–17 yrs	Cross-sectional	Attitude, Approved questionnaire

attitudes (Bhattacharya et al., 2016; Kang et al., 2005; Mofied et al., 2019). However, others indicate that students in human sciences score higher than those in mathematics and natural sciences (Jannesari et al., 2020) or that knowledge levels do not significantly differ between health-related and non-health-related majors (Kavanagh et al., 2012). Additionally, some findings highlight specific variations, such as agriculture students demonstrating strong breastfeeding knowledge (Ogundare et al., 2023) or differences in knowledge of specific topics among students from various disciplines (Padmanabhan et al., 2016).

The studies also emphasised the positive impact of both formal and informal breastfeeding education. Students who had been exposed to information about the benefits of breastfeeding were more likely to display positive attitudes toward it (Al-Ali et al., 2013). Factors such as learning about breastfeeding through coursework and participating in

Table 4
Summary of knowledge, attitude, and associated factors.

Author & Year	Knowledge level	Attitude level	Associated Factors
Grabowski et al. (2024)	High	N/A	Exposure to breastfeeding information, societal attitudes
Ogundare et al. (2023)	Moderate	N/A	Age, Faculty of study, Sources of information
Pereira et al. (2023)	N/A	+	Year of education, age
Sayed and Bugis (2023)	N/A	+	Perceived Behavioral Control
Sayed et al. (2023)	High	N/A	Breastfeeding exposure, perceived social support, income, age
Liu et al. (2023)	Low	N/A	Place of Residence (Urban/Rural), Only-Child Status, Breastfeeding Courses, and Relevant Internship Experience
Iñarritu-Pérez et al. (2022)	High	+	Educational intervention (breastfeeding workshop)
Spencer et al. (2022)	N/A	–	Practice supervisor support, work environment (hospital vs. community), time constraints, and theory-practice gap
Uğurlu (2022)	N/A	+	Grade in school, receiving information, attending additional courses
Keleş (2021)	Moderate	+	Previous breastfeeding training
Jannesari et al. (2020)	Moderate	+	Field of study, age, parental education level
Khresheh (2020)	High	+	Level of study, breastfeeding exposure
Elareed and Senosy (2019)	Low	–	Grade level, age
Mofied et al. (2019)	High	Neutral	Education field, exposure to breastfeeding information, breastfeeding support
Yahya and Abdul Hamid (2018)	Low	–	Breastfeeding exposure
Jefferson (2017)	N/A	+	Race, breastfeeding exposure
Khriesat and Ismaile (2017)	Low	_	N/A
Aggarwal et al. (2016)	Moderate	N/A	N/A
Bhattacharya et al. (2016)	Moderate	+	Stream of education
Ho and McGrath (2016)	Moderate	+	Educational intervention
Padmanabhan, et al. (2016)	Moderate	+	Source of information, educational background
Hackett (2015)	Low	Neutral	N/A
Jefferson (2015)	N/A	+	Education, breastfeeding exposure
Hamade et al. (2014)	Moderate	+	Health-related major, breastfeeding exposure
Ho and Yu (2014)	N/A	+	Informal breastfeeding education, Breastfeeding exposures, media exposure
Jefferson (2014)	N/A	+	N/A
Khriesat et al. (2014)	Moderate	–	Breastfeeding information exposure
Abdel-Hady et al. (2013)	Varied by topic	N/A	Educational stage, residence, marital status
Al-Ali et al. (2013)	N/A	+	Breastfeeding information exposure, Self-objectification
Kavanagh et al. (2012)	High	Neutral	Age, breastfeeding exposure, intention to breastfeeding
Marrone et al. (2008)	Low	Neutral	Age, breastfeeding exposure
Juliff et al. (2007)	Low	Neutral	Ethnicity, parental education, school setting, breastfeeding exposure, and breastfeeding info (TV, reading)
Tarrant and Dodgson (2007)	High	+	Breastfeeding exposures
Kang, et al. (2005)	Low	+	Field of study
Connolly et al. (1998)	Moderate	Neutral	Perceived embarrassment in public, Practicality concerns
Forrester et al. (1997)	N/A	–	Social stigma and fear of embarrassment
Yeo et al. (1994)	N/A	+ (Japan > USA)	Family and Culture

educational interventions were found to be significantly associated with students' knowledge and attitudes (Grabowski et al., 2024; Keleş, 2021; Liu et al., 2023; Uğurlu, 2022).

The level of education consistently emerged as a key factor associated with breastfeeding knowledge and attitudes (Table 4). Higher educational levels were generally associated with better knowledge and more positive attitudes toward breastfeeding, with the exception of studies by Ogundare et al. (2023), Khresheh (2020), and Al-Ali et al. (2013), where current educational level was not significantly associated with knowledge or attitudes. A statistically significant difference was found between nursing students' academic year and their breastfeeding knowledge, with fourth-year students scoring higher than first-year students (Elareed and Senosy, 2019). Similarly, Khresheh (2020) observed higher knowledge scores among senior students, and Pereira et al. (2023) found that students with more years of training scored higher on knowledge. Participants with advanced education, such as postgraduate qualifications, demonstrated a more thorough understanding of breastfeeding benefits and practices compared to those with lower levels of education (Hackett et al., 2015; Jefferson, 2014, 2015). Furthermore, higher knowledge scores were associated with longer placements in maternity or neonatology units (Liu et al., 2023).

Breastfeeding exposure and related concepts

Breastfeeding exposure was highlighted across 12 studies as another significant factor positively associated with knowledge and attitudes (Table 4). Key factors included direct exposure to breastfeeding, such as knowing someone who breastfed, being breastfed as an infant, witnessing someone breastfeeding, and prior exposure to breastfeeding through formal or informal education. Individuals with diverse forms of exposure tend to have higher attitude scores (Hamade et al., 2014). Women who had limited exposure to breastfeeding or primarily saw formula feeding as the norm, were less inclined to choose breastfeeding when they had children (Yahya and Abdul Hamid, 2018). Attitudes toward breastfeeding were also associated with exposure to breastfeeding in the media, such as on television (Juliff et al., 2007). Only one study found no significant difference in breastfeeding knowledge and attitude scores based on previous exposure to breastfeeding (Kang et al., 2005).

Socioeconomic status and income as associated factors

The relationship between income, socioeconomic status, and breastfeeding attitudes and knowledge yielded mixed results across studies. Jefferson's (2014) study of African American and Caucasian college students found that lower income was associated with lower breastfeeding rates and knowledge. Similarly, a study from Saudi Arabia by Sayed et al. (2023) suggested that higher income levels were positively linked to attitudes toward exclusive breastfeeding. However, three studies found no statistically significant differences in knowledge and attitudes based on income (Elareed and Senosy, 2019; Jefferson, 2014; Liu et al., 2023).

Other associated factors

Age was another important factor, as highlighted in seven studies (Table 4). Kavanagh et al. (2012) and Marrone et al. (2008) found that students 20 years or older had higher breastfeeding attitude and knowledge scores than younger peers. Similarly, Grabowski et al. (2024) reported that older participants were more likely to identify a breastfeeding-specific benefit. In contrast, Ogundare et al. (2023) found that respondents aged 25 to 29 were less likely to have good breastfeeding knowledge compared to younger participants. However, studies by Khresheh (2020), Elareed and Senosy (2019), and Al-Ali et al. (2013) found no significant differences in breastfeeding knowledge or attitudes based on age.

While demographic variables related to residence were not statistically linked to knowledge of breastfeeding (Elareed and Senosy, 2019), higher breastfeeding knowledge scores were observed among students from urban areas compared to those from rural areas (Liu et al., 2023; Abdel-Hady et al. 2013). The impact of marital status is unclear, with one study suggesting better knowledge (Abdel-Hady et al. 2013) but others finding no association (Al-Ali et al. 2013; Ogundare et al. 2023). The study by Liu et al. also found that being an only child was associated with higher knowledge levels. Other influential factors identified across multiple studies included cultural and subjective norms, social support, and ethnic background (Table 4). Notably, ethnic background emerged as a key factor, with studies reporting higher knowledge levels among Asian participants (Juliff et al., 2007; Yeo et al., 1994) and Middle Eastern participants (Khresheh, 2020; Sayed et al., 2023; Tarrant and Dodgson, 2007). Further examination by Al-Ali et al. (2013) revealed no significant differences between participants' demographic nationality and their attitudes toward breastfeeding. The impact of parental education on attitudes is unclear. A study conducted in Iran by Jannesari et al. (2020) found that participants whose parents had education levels below a diploma had higher mean attitude scores. In contrast, Juliff et al. (2007) highlighted that higher parental education, particularly postgraduate qualifications, was associated with higher breastfeeding knowledge scores among students.

Discussion

This scoping review summarises the existing literature on breastfeeding knowledge and attitudes among non-pregnant, nulliparous women of reproductive age. The findings highlight a complex interplay of associated factors, with education-related variables and prior exposure to breastfeeding emerging as the most frequently identified factors associated with knowledge and attitudes.

Lack of proper education and access to reliable breastfeeding resources can lead to misconceptions or insufficient knowledge, hindering informed decision-making during pregnancy (Demirci et al., 2022; Khriesat and Ismaile, 2017; Vogels-Broeke et al., 2022). This knowledge gap is often made worse by inconsistent healthcare support and messaging. Examples included, qualified midwives preferring formula feeding over breastfeeding due to the perceived ease for managing their workload, despite the critical role that midwives and maternity care professionals play in shaping breastfeeding attitudes and practices (Spencer et al., 2022; Darwent and Kempenaar, 2014), and negative perceptions of breastfeeding as time-consuming, troublesome, and exhausting reinforcing unfavourable attitudes (Connolly et al., 1998).

Introducing breastfeeding education before pregnancy presents an opportunity for more effective promotion. Integrating breastfeeding education into school curricula could help normalise it as a fundamental aspect of human development and nutrition. Such education should involve both males and females, as engaging both genders in fostering supportive environments can normalise breastfeeding and improve public acceptance (Al Namir et al., 2017; Bhairo and Elliott, 2018; Jefferson, 2015; Panahi et al., 2022). Targeting school-aged children is an effective strategy for achieving the goal of improved knowledge and normalisation of breastfeeding (Tarrant and Dodgson, 2007). However, in countries like the UK, where breastfeeding rates remain relatively low (Royal College of Paediatrics and Child Health, 2021), breastfeeding is not explicitly included in the national school curriculum. Current resources, such as Food – a Fact of Life (FFL), focus on general health and nutrition but do not specifically address breastfeeding (Food a Fact of Life, 2022). Similarly, Relationships, Sex, and Health Education (RSHE) guidance emphasises mental health and relationships but does not include breastfeeding education (Department for Education, 2024). This omission represents a missed opportunity to equip young, nulliparous individuals with the knowledge needed to make informed health decisions in the future.

At the university level, incorporating breastfeeding education into the core training of health-related disciplines is essential (Hamade et al., 2014). Inadequate knowledge among healthcare students often stems from insufficient coverage of breastfeeding and nutrition topics in the curriculum, as well as a lack of clinical experience to enhance breastfeeding knowledge and skills (Elareed and Senosy, 2019; Spencer et al., 2022). Since positive, consistent messaging from healthcare providers significantly influences breastfeeding practices, addressing these educational gaps is crucial (McFadden, 2006). Expanding this educational approach to non-health disciplines could further normalise breastfeeding as a public health priority and encourage more informed choices for everyone.

Age, in addition to factors like education and exposure, has been identified as another key factor, with older students often exhibiting higher levels of breastfeeding knowledge, potentially reflecting greater life experience and awareness (Jannesari et al., 2020; Jefferson, 2017). However, the contrast in studies indicates that age alone may not be the sole associated factor. Instead, a combination of different factors is likely to shape knowledge and attitudes toward breastfeeding.

This review found evidence that exposure to breastfeeding—whether within the family, among friends, in public, or through media portrayals—fosters more positive attitudes and enhances knowledge (Alkhaldi et al., 2023; Marrone et al., 2008; Ho and Yu, 2014). Evidence-based online platforms have been shown to enhance knowledge and serve as valuable resources for breastfeeding information, offering useful support and guidance to users (Angell et al., 2015). It has been suggested that breastfeeding promotion programs could be more effective by utilising media, a powerful tool in shaping public perceptions; however, its role in promoting breastfeeding remains underutilised (Jefferson, 2017; Tarrant and Dodgson, 2007; Ferré-Eguiluz et al., 2019). Few studies have explored the impact of media, including social media, on attitudes toward breastfeeding, despite findings that media are the most frequent source of information about breastfeeding, surpassing home and school (Connolly et al., 1998). The underinvestment in media narratives about breastfeeding weakens public health initiatives designed to promote it (Tomori, 2023). The lack of positive breastfeeding imagery in media, combined with the commercial promotion of infant formula, perpetuates formula feeding as the default choice (Karlsson et al., 2019; Kang et al., 2005). Addressing this gap requires greater investment in media campaigns that present breastfeeding positively.

Societal norms and structural influences play a critical role in shaping breastfeeding attitudes. In many cultures, breastfeeding in public is stigmatised, leading to the perception that it is restrictive or inconvenient. A recent systematic review found that women felt unable to breastfeed in public due to a hostile societal culture that arose as a result of the sexualisation of breasts, disgust narratives, and a lack of exposure to breastfeeding (Grant et al., 2022).

This stigma may cause some women to view formula feeding as a more manageable alternative (Bonia et al., 2013). Addressing these barriers requires a multifaceted approach to shift societal attitudes toward breastfeeding in public. Positive portrayals in media and public spaces can help normalise breastfeeding and reduce stigma. Additionally, policies should protect public breastfeeding rights, and awareness

campaigns can promote acceptance by educating the public and increasing exposure to breastfeeding as a natural act (Grant et al., 2022). Midwives and maternity care providers are uniquely positioned to challenge societal stigma around breastfeeding by providing non-judgmental, informed support and normalising breastfeeding in both clinical and community settings (Burns and Schmied, 2017). to maximise the impact of future interventions, it is essential to recognise that attitudes toward breastfeeding are more complex than knowledge alone. Studies generally show a positive correlation between breastfeeding knowledge and attitudes, however, this relationship is not absolute. For example, some individuals may have low knowledge about breastfeeding yet maintain positive attitudes (Kang, 2005), while others demonstrate high knowledge but indifferent attitudes, as observed in some of the included studies (Kavanagh et al., 2012; Mofied et al., 2019). Therefore, interventions aimed at improving breastfeeding behaviors should target both knowledge acquisition and the emotional and cultural factors that shape attitudes to achieve more effective and sustained change.

Limitations

This scoping review has several limitations. Most of the reviewed studies lacked parity-specific data, highlighting a significant research gap. To ensure a comprehensive analysis, studies without clear parity or age data were included if it was reasonable to assume the participants fell within the target group of non-pregnant, nulliparous women of reproductive age. However, this approach may have introduced some misclassification of participants, potentially leading to bias. For instance, if some participants had prior pregnancy or parenting experience, their perspectives on breastfeeding may differ from those of nulliparous women, which could skew the findings. Additionally, inconsistencies in how studies reported demographic data limited the precision of comparisons, making it difficult to draw definitive conclusions about pre-pregnancy breastfeeding knowledge and attitudes. The limited availability of such data further underscores the need for research focused on this underrepresented population.

This review examines baseline knowledge and attitudes across various contexts and populations, but it is not possible to definitively attribute higher or lower scores to any specific group or context. As a result, the findings cannot provide clear explanations for observed differences.

Due to limited resources, the review excludes the role of men (fathers, partners and the wider society), whose influence on breastfeeding attitudes is well-documented (Al Namir et al., 2017; Bhairo and Elliott, 2018), potentially overlooking broader sociocultural dynamics. Future reviews should take a broader approach. Additionally, the exclusion of empirical studies published in languages other than English meant that 10 potentially relevant studies were excluded.

The literature also revealed that many included studies relied on pretested or pilot-tested questionnaires rather than fully validated instruments. The selection of appropriate assessment tools for measuring breastfeeding knowledge and attitudes is crucial, and the reliance on less robust instruments may limit the reliability and comparability of findings across studies.

These limitations suggest areas for improvement in future research to enhance the quality and comprehensiveness of breastfeeding studies.

Conclusion

This scoping review highlights the importance of understanding breastfeeding knowledge and attitudes among women, particularly those who have not yet experienced pregnancy or childbirth. Targeting this population during their reproductive years can help address key factors associated with breastfeeding decisions and improve promotion strategies. The review reveals significant variations in breastfeeding knowledge and generally positive, though sometimes neutral or negative, attitudes, emphasising the complex interplay of factors associated with shaping these perceptions.

To foster a more breastfeeding-supportive society, multifaceted interventions are needed, including integrating breastfeeding education into school and university curricula, implementing media strategies, and enacting policies that protect public breastfeeding, normalise the practice, and increase exposure. These efforts can ultimately enhance breastfeeding outcomes. Further research is essential to develop targeted interventions that effectively improve global breastfeeding rates and support maternal and child health.

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Declaration of competing interest

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.midw.2025.104511.

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