

Educational Resources and Curriculum on Lactation for Health Undergraduate Students: A Scoping Review

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Abstract

Background: Breastfeeding is a fundamental component of health care, and health professionals need to be adequately prepared. As part of the system, health care professionals have the ability to influence the establishment and maintenance of breastfeeding. The global literature regarding the curricular approach or established best practices for health professional education in lactation is inconclusive and lacking in rigor.

Research aim: To explore the literature for the educational resources, methods, and curriculum used in the education of undergraduate health students related to lactation.

Methods: A scoping review examining the curricular programs of health professional students in lactation was undertaken exploring and summarizing evidence from peer reviewed and grey literature. A scoping review with a five-stage review process was followed. The database search between 1982–2018 generated 625 results, 79 full-text articles were reviewed, and 29 articles published in English met the inclusion criteria.

Results: In general, educational resources, methods, curricular approaches, and foundational topics were based on best practice standards. Some authors incorporated a variety of learning methods and provided experiential learning, with evidence of translation of knowledge into clinical practice. In the studies examined, researchers reported that students had improved their: knowledge and attitudes (59%); breastfeeding support skills (45%); and confidence (10%). However, even in programs that focused on developing students' breastfeeding support skills, authors reported a lack of change in students' confidence.

Conclusions: Although only English articles met the inclusion criteria, this review was unique in its search of multidisciplinary, multilingual, and international studies. Consistency in teaching across disciplines is key and not evident in the studies reviewed.

Keywords

breastfeeding, breastfeeding assessment, breastfeeding knowledge, breastfeeding practices, lactation education

Background

Breastfeeding (BF) exclusively for the first 6 months of life is acknowledged to be the gold standard for infant feeding (World Health Organization, 2014). Health care professionals' role in supporting new parents is vitally important to breastfeeding outcomes (Cohen et al., 2018; Kim et al., 2018; McFadden et al., 2017). Health professionals (HP) need to be adequately prepared with the technical and scientific knowledge they need to support breastfeeding families at the undergraduate level, because it is a fundamental component of preventive health care (Campbell, 2020). However, the literature lacks identification of the curricular approach or established best practices for health professional education in lactation (Dodgson et al., 2014; Yang et al., 2018).

As part of the system, health care professionals have the ability to influence the establishment and maintenance of

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breastfeeding. Researchers conducted systematic reviews, which have shown that appropriate professional interventions and support, provided from the prenatal to the postnatal period, are among the factors associated with breastfeeding initiation and continuation, and are required for breastfeeding success (Cohen et al., 2018; Kim et al., 2018; McFadden et al., 2017). Strategies that rely mainly on face-to-face support are more likely to succeed with women practicing exclusive breastfeeding (McFadden et al., 2017).

An important reason for weaning and early cessation of breastfeeding is a lack of knowledge on the part of healthcare providers (McFadden et al., 2017). While exploring women's attitudes, experiences, and thoughts specific to influences on their breastfeeding, researchers found that participants in their studies perceived that there was often a lack of support and sometimes outright discouragement from healthcare providers related to breastfeeding, and that they lacked breastfeeding information and skills to support families (Johnson et al., 2016; Keevash et al., 2018).

An analysis based on a subset of 66 countries demonstrated that, despite the fact that the majority of births are attended by skilled birth attendants, in most countries studied, early initiation of breastfeeding "was not facilitated by the presence of a doctor, nurse or midwife" (UNICEF, 2016, p. 8). Researchers have reported that undergraduate students (UGS) are not adequately prepared to support mothers in breastfeeding (Dodgson et al., 2014; Gary et al., 2017), which is reflected in their future performance as practitioners. This reinforces the vital need for consistent undergraduate health care professionals' education about breastfeeding to enhance their knowledge, skills, and attitude to support parents.

For this reason, a scoping review examining the curricular programs of health professional students in lactation and breastfeeding education was undertaken. The authors examined best practices, those that facilitate learning, and the existing gaps in evidence related to lactation and support for breastfeeding. In this review, we explored and summarized evidence from peer reviewed and grey literature about undergraduate health professional student educational resources, methods, and the curriculum for lactation. The aim of this study was to explore the literature for the use of educational methods, resources, and curriculum in the education of undergraduate health students related to lactation.

Methods

Design

We conducted a scoping review using Arksey and O'Malley's framework (2005) and followed PRISMA Extension for Scoping Reviews–PRISMA-ScR (Moher et al., 2009; Tricco et al., 2018). Given the complex nature of the topic in an area previously not comprehensively reviewed, Arksey and O'Malley (2005) framework has been recommended as a

Key Messages

- We have highlighted the lack of consensus in the global literature regarding the curricular approach or the established best practices for health professional education in lactation.
- All researchers who have evaluated student learning have had favorable results with the curricular approaches described.
- There is a need for a broad breastfeeding-related curriculum for undergraduate health professionals.

scoping review methodology (Joanna Briggs Institute [JBI], 2015). This approach allowed for a full examination of the literature encompassing health professional student education and the curriculum for lactation.

Sample

In constructing the research question, the PCC mnemonic was used as suggested by the Joanna Briggs Institute (JBI, 2015). For this mnemonic, P: represents Population, C: Concept, and C: Context, thus our research question: What educational resources, methods, and curriculum are used to educate undergraduate health students related to lactation? (P: undergraduate health student, any age, any sex; C: curriculum in lactation; C: educational resources, methods, and curriculum in lactation for undergraduate health professional students).

The following inclusion criteria were considered for identifying articles: available in English, Portuguese, Spanish, or French; published and unpublished (grey literature); all sources of evidence (primary studies, opinion articles, or editorial letters). Inclusion criteria addressed structures and processes that support lactation education for health professional undergraduate students, this included health undergraduate student education, breastfeeding education tools, or lactation curriculum. Articles were excluded if they addressed the lactation education for breastfeeding parents, did not mention the target population, or were book chapters (Figure 1).

Two researchers (NB, FV) fluent in English, Spanish, French, and Portuguese, independently screened all articles and abstracts. During this first phase, titles and abstracts were screened to identify pertinent studies. If the relevance of an article was uncertain from reading the abstract, then the full paper was required for review. The full articles were retrieved for those studies that seemed to best answer the research question. Our search generated 625 results. Duplicate citations were removed. The titles and abstracts were screened and resulted in 79 full-text articles. During the second phase of screening, all four reviewers read the 79 articles to decide whether or not they would be included. In some articles, reports failed to include complete information,

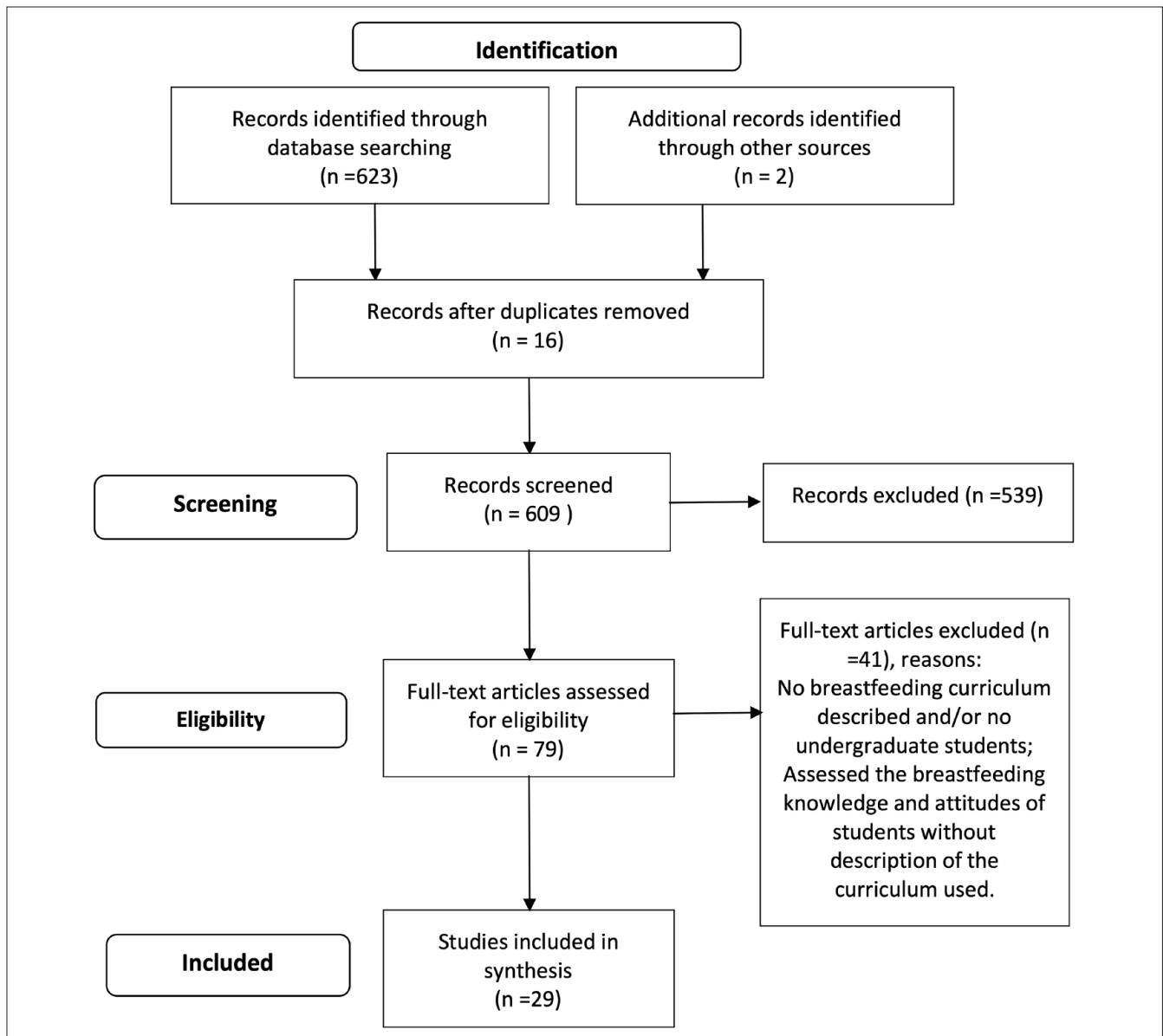


Figure 1. PRISMA Flow Diagram.

so it was not available for our review and resulted in the article being excluded (Figure 1). Although articles in Portuguese, Spanish, and French were considered in the initial search, they did not meet the inclusion criteria to be included in the final review articles. Thus, the articles ($N = 29$) that met the inclusion criteria were all in English.

Measurement

The variables defined for study comparison were demographic characteristics of the sample; outcome measures of student learning (student's knowledge, attitudes, confidence, and skills); educational methods; educational resources; and curricular content.

The researchers applied an analytical framework for all the studies selected and collated the following information from each article: Author(s), year of publication, country, type of study, purpose, and methodological approach (type and duration of curriculum or strategy developed for breastfeeding education, sample size, undergraduate discipline), outcome measures and conclusions. Any discrepancies were resolved through discussion among the research team.

Educational methods included any description that authors provided of how and when lactation education was provided. These methods included examining the variety of approaches (e.g., didactic, hands-on, online, in class or lab, workshop, and clinical exposure), and opportunities for

self-directed learning (e.g., reading, watching videos, online modules, and case studies). Educational resources were defined as specific guidelines, legislation, and standard of best practice approaches from global and professional organizations (toolkits and OSCE's) used to develop the material and learning experiences for lactation education.

Curriculum content was defined as the amount of time spent educating students about lactation; where in the program lactation education fit and how well it was integrated into the overall curriculum; whether it was an elective or incorporated into a required class; and whether it was a distinct component offered outside program class time. Components of the curriculum examined were specific to breastfeeding and the management of lactating dyads.

Data Collection

There was no time restriction for the dates of the studies on the initial search so as to have a broad view on the subject. However, as it occurred, results between 1982–2018 were included in this review. A five-stage review process (Arksey & O'Malley, 2005) was employed: identification of the research question; identification of relevant studies; selection of studies; charting the data; and collating, summarizing, and reporting the results (pp. 8–9). Online databases searched were: MEDLINE (Ovid); Lilacs - *Literatura Latino-Americana e do Caribe em Ciências da Saúde* (Latin American and Caribbean Literature on Health Issues)]; Embase; CINAHL; Elsevier Science Direct and Cochrane Database of Systematic Reviews. A general internet search using key terms to capture grey literature in government, association, and research networks was conducted and key documents and information were identified. We also hand searched the reference lists of all included reports and studies for additional results and to confirm the sensitivity and reliability of the original search strategy.

The standardized terms were identified using the Medical Subject Heading Section (MeSH) and the Health Sciences Descriptors (DeCS). The descriptors used were standardized and unstandardized to ensure that any articles that did not use standard descriptors were captured during the search. The subsequent search approach was used:

lactation (OR "breast feeding" OR breastfeeding OR "infant feeding") AND curriculum (OR education OR "curriculum development" OR "health education") AND undergraduate (OR "student" OR "health student" OR "nursing student" OR "midwife student" OR "medical student" OR "pharmacy student" OR "nutrition student" OR university OR faculty)

The health science librarians at the University of British Columbia supported the development of these descriptors and the scoping review in the initial stages.

Data Analysis

A uniform approach to extracting information was done for all reviewed articles. A narrative synthesis of the findings from the included studies was created. Themes emerged in all three focus areas (i.e., educational methods, resources, and content). Reviewed studies were grouped according to these specific categories. For example, specific educational methods were described and further analyzed for common themes. Next, educational resources were grouped into common themes and specific studies were identified if they included these resources. Finally, the lactation curriculum was analyzed across studies and grouped into common themes. In all areas, specific studies were identified in categories that will allow the reader to see priorities of educational methods, education resources, and curriculum for lactation across programs.

Results

Characteristics of the Sample

The reviewed studies were distributed geographically, predominately in the United States (69%, $n = 20$), with nine other countries represented (Table 1). The highest concentration of publications occurred between 2013 and 2015 (27%, $n = 8$). Curriculum evaluation included a variety of methods, but the majority of studies used quasi-experimental pre-and post-test methods ($n = 7$; 24%) and descriptive methods ($n = 7$; 24%). Five (17%) of the articles reported anecdotally. The publications referred to nursing (48%, $n = 14$), medicine (27%, $n = 8$), midwifery (7%, $n = 2$), pharmacy (3.5%, $n = 1$), and dietetic undergraduate students (10%, $n = 3$), with sample sizes ranging from nine to 7,570.

Educational Methods

Overall, the proposed duration of breastfeeding education varied from 3 min to 300 hr or was unspecified. The breastfeeding education was delivered in the curriculum over 1–4 years of undergraduate education (see Supplemental Table S1 for details). Breastfeeding education for undergraduate health students had a variety of approaches and incorporated many teaching/learning methods, from the simplest method of reading to the most complex online course.

In addition, other experiential learning approaches were simulated role-play scenarios using standardized patients or scenarios of a case, computer-based learning, clinical rounds, and hands-on sessions. Fifteen (52%) studies referenced the inclusion of clinical practice with lactation support providers, perinatal clinicals, or didactic and laboratory instruction (Table 2). Of the four studies reporting clinical laboratory experiences, these ranged from role-playing with faculty and students to hands on experience with standardized patients wearing high-fidelity lactation simulation models. The range

Table 1. Characteristics of Reviewed Studies (N = 29).

First Author (year)	Location	Article Type	Sample (N)
Bac et al. (2015)	South Africa	R: Qualitative	UG medical students (N = 171)
Bozzette and Posner (2013)	US	R: Pre/Post Test	Baccalaureate 4 th year nursing students (N = 24)
Bunik et al. (2011)	US	Guidelines Paper	N/A
Davis and Sherrod (2015)	US	R: RCT t	UG nursing students (N = 113)
Deloian et al. (2015)	US	R: Pre/Post Test	Nurses, midwives, NPs, & nursing students (N = 7570)
Dodgson and Tarrant (2007)	China	R: Quasi-experimental	UG nursing students (N = 273)
Du Plessis et al. (2009)	South Africa	R: Descriptive	Variety of HCP (n = 36) & dietetic 3 rd year students (n = 23)
Edwards (2013)	US	R: Cross-Sectional Pilot	PharmD 3 rd year students (N = 264)
Folker-Maglaya et al. (2018)	US	R: Pre/Post Test	Associate Degree nursing students (N = 114)
Froehlich et al. (2013)	US	R: Descriptive	University students (N = 221)
Gary et al. (2017)	US	R: Descriptive	UG medical students (N = 608)
Healer (2014)	UK	Experience Report	UG midwifery students (N = N/A)
Howett et al. (2006)	US	Experience Report	UG and graduate nursing & midwifery students (N = 9)
Kakrani et al. (2015)	India	R: Descriptive	UG 4 th year nursing & 3 rd year medical students (N = 198)
McIntyre and Fraser (2018)	UK	R: Case Study (Mix Methods)	UG midwifery students (N = 53)
Meusch et al. (2013)	US	R: Pre/Post Test	Physician Assistant students (N = 37)
Miller et al. (2007)	US	R: Descriptive	Nursing & medical students (N = N/A)
Montgomery (1999)	US	Experience Report	Nursing students (N = N/A)
Ogburn et al. (2005)	US	R: Post-Test	Medical students (N = 24)
Psiaki and Olson (1982)	US	R: Quasi-Experimental	3 rd year medical students (N = 55)
Radcliffe and Payne (2011)	Australia	R: Cohort	UG students (N = 27)
Rhodes and Burgess (2018)	US	R: Descriptive	Senior level obstetrical nursing students (N = 69)
Ricciotti et al. (2010)	US	R: RCT	UG medical clerkship (N = 23; n=12 Exp/ n=11 control)
Riordan (2000)	US	Experience Report	Variety of HCP students (N = N/A)
Spatz (2005)	US	Experience Report	Junior & senior UG students (N = 162)
Spear (2006)	US	R: Descriptive	Junior & senior UG nursing students (N = 80)
Terzioğlu et al. (2016)	Turkey	R: Prospective	Nursing students (N = 60)
Theurich and McCool (2016)	US	Policies & Recommendations	UG & graduate nutrition & dietetics students (N=N/A)
Villegas et al. (2016)	US, Chile, Mexico	R: Quantitative Descriptive	UG nursing students (N = 23)

Note. HCP = Healthcare professional; N/A = Not Applicable; NPs = Nurse Practitioners; R = research; RCT = Randomized Controlled Trial; UK = United Kingdom; US = United States; UG = Undergraduate.

in time spent in clinical labs varied from 25 min to 1000 hr. Those authors that described the clinical labs included examples of both university and clinically based labs.

Educational Resources

The authors based their curricular approaches for breastfeeding education on international guidelines, guidelines from professional organizations, and curricular learning approaches (Table 3). The international guidelines were published by the

World Health Organization (WHO) guidelines and recommendations (WHO, 2014, 2017, 2018); World Health Organization, & United Nations Children's Fund (2009); the United Nations Children's Fund-United Kingdom-Baby Friendly Initiative (UNICEF-UK-BFI, 2019); and the *Ten Steps to Successful Breastfeeding* (WHO-UNICEF, 2009). Guidelines from professional organizations were incorporated into all the curriculums: International Board of Lactation Consultant Examiners (IBLCE) Academic Projects; La Leche League International

Table 2. Reviewed Studies that had Clinical Practice as Part of the Educational Process (N = 15).

Author (yr.)	Simulation/Role-play Lab n=4 (27%)	Clinical Experiences/ Internships n = 7 (46%)	Both n = 5 (33%)
Bac et al. (2015)		X	
Davis and Sherrod (2015)	X		
Dodgson and Tarrant (2007)			X
Folker-Maglaya et al. (2018)			X
Healer (2014)	X		
Howett et al. (2006)			X
Kakrani et al. (2015)		X	
Odom et al. (2013)		X	
Ricciotti et al. (2010)			X
Rhodes and Burgess (2018)		X	
Spatz (2005)		X	
Spear (2006)		X	
Terzioğlu et al. (2016)			X
Theurich and McCool (2016)		X	
Villegas et al. (2016)	X		

(2019); and 12 knowledge-based and 12 skill-based competencies (Gary et al., 2017) suggested by the United States Breastfeeding Committee (2009) and the Academy of Breastfeeding Medicine (Bunik et al., 2011). Other curricular approaches to learning ($n = 8$, 28%) were Problem-Based Learning (PBL), *Wellstart Lactation Guide*, Objective Structured Clinical Examination (OSCE) for summative evaluation, breastfeeding Toolkit contents, and scientific evidence.

Curricular Content

From this foundation of guidelines, the authors reported on the topics that were included in their lactation education programs. We categorized these as non-mutually exclusive topical categories (Table 4). These topical categories were: psycho-social-cultural characteristics; biological characteristics; policies; interventions; health assessment/developmental; and medical issues. In this scoping review we reported what authors stated. However, in many cases, there was insufficient specific information to judge.

Reported Student Outcomes: Knowledge, Attitudes, Confidence, and Skills

When examining the reviewed studies, author-reported findings suggested an improvement in students' outcomes in a variety of areas (see Supplemental Table S1). Related to lactation education, researchers reported that students had improved their knowledge and attitudes in 59%, breastfeeding support skills in 45%, and confidence in 10% of reviewed articles.

Discussion

In the last decade, the research on breastfeeding curriculum and educational resources has become more frequent and publications in this area have almost doubled. Even so, there is little agreement on best practice standards or a consistent multidisciplinary approach. Many authors supported the use of experiential learning to enhance health professional students' skills (Bac et al., 2015; Rhodes & Burgess, 2018; Ricciotti et al., 2010; Theurich & McCool, 2016).

We found a heavy focus on improving students' breastfeeding knowledge, attitudes, and developing breastfeeding support skills. The authors of studies that provided examples of curriculum aimed at developing students' breastfeeding support skills, also found areas of insufficiency and little increase in students' confidence (Edwards, 2013; Froehlich et al., 2013; Gary et al., 2017; Healer, 2014; Meusch et al., 2013; Miller et al., 2007; Rhodes & Burgess, 2018; Villegas et al., 2016). Many health care professional (HCP) programs lack evidence-based breastfeeding curriculums, which provided consistent information and up-to-date best practices. Most HCP students, therefore, are likely to lack the knowledge and skills necessary and the ability to support parents during clinical practice. This can have a longstanding influence on HCPs self-confidence in their ability to adequately support breastfeeding families. In studies about structured breastfeeding curriculums, researchers demonstrated increased knowledge and/or attitude of the students in all cases where it was measured (Bozzette & Posner, 2013; Davis & Sherrod, 2015; Dodgson & Tarrant, 2007; Du Plessis et al., 2009; Folker-Maglaya et al., 2018; Froehlich

Table 3. Educational Resources Grouped by Sources.

First Author (Yr)	International Guidelines	Professional Organization
	WHO/UNICEF, BFHI-10-steps n = 21 (73%)	ABM, LLLI, USBC, IBLCE, AAP n = 8 (28%)
Bac et al. (2015)	X	-
Bozzette and Posner (2013)	-	-
Bunik et al. (2011)	X	X
Davis and Sherrod (2015)	X	-
Deloian et al. (2015)	-	-
Dodgson and Tarrant (2007)	X	-
Du Plessis et al. (2009)	X	-
Edwards (2013)	X	-
Folker-Maglaya et al. (2018)	X	-
Froehlich et al. (2013)	X	X
Gary et al. (2017)	X	X
Healer (2014)	X	-
Howett et al. (2006)	X	X
Kakrani et al. (2015)	X	-
McIntyre and Fraser (2018)	X	-
Meusch et al. (2013)	-	X
Miller et al. (2007)	X	-
Montgomery (1999)	X	-
Ogburn et al. (2005)	X	X
Psiaki and Olson (1982)	-	-
Radcliffe and Payne (2011)	X	-
Rhodes and Burgess (2018)	X	X
Ricciotti et al. (2010)	-	-
Riordan (2000)	X	-
Spatz (2005)	-	-
Spear (2006)	X	-
Terzioğlu et al. (2016)	-	-
Theurich and McCool (2016)	X	X
Villegas et al. (2016)	-	-

Note. AAP = American Academy of Pediatrics; ABM = Academy of Breastfeeding Medicine; BF = breastfeeding; IBLCE = International Board of Lactation Consultant Examiners; LLLI = La Leche League International; USBC = United States Breastfeeding Committee.

et al., 2013; Meusch et al., 2013). With increased knowledge and experience, health professional students reported feeling more capable to provide breastfeeding support to women (Bunik et al., 2011; Deloian et al., 2015; Edwards, 2013; Healer, 2014; Psiaki & Olson, 1982).

Authors of one study compared three instructional environments (skills laboratory, standardized patient laboratory, and clinical practice environment); they concluded that students who had the opportunity for hands-on practice in instructional environments enhanced their communication skills and reduced their anxiety levels in providing competent and safe health care (Terzioğlu et al., 2016).

Considering the multidisciplinary lens for lactation practice, all health care professionals require a foundational working

knowledge of breastfeeding and how to support parents using evidence-based standards of best practice. The World Health Organization (2018) and the UNICEF promote breastfeeding education with the *Ten Steps to Successful Breastfeeding* through the Baby-friendly Hospital Initiative (BFHI). These were used as theoretical and practical references for both undergraduate students and for health professionals, as an effective pedagogical resource for student learning (Bac et al., 2015; Du Plessis et al., 2009; Kakrani et al., 2015; McIntyre & Fraser, 2018; Rhodes & Burgess, 2018). However, most of the reported research used traditional lactation curriculum information, for example, anatomy and physiology of lactation, human milk production, and latch (Bozzette & Posner, 2013; Miller et al., 2007; Spear, 2006; Terzioğlu et al., 2016; Villegas

Table 4. Characteristics of Educational Resources Employed in Reviewed Studies.

	Characteristics					
	Psycho-social-cultural <i>n</i> = 27 (93%)	Biological <i>n</i> = 24 (83%)	Policies <i>n</i> = 21 (73%)	Interventions <i>n</i> = 20 (70%)	Health assessment/Developmental <i>n</i> = 17 (59%)	Medical issues <i>n</i> = 10 (35%)
Historical BF perspectives		Anatomy and physiology of lactation	Global BF initiatives	Positions and latch on techniques	Maternal assessment	Lactation inducing medications [galactagogues]
Psychological, social and cultural factors			Skin-to-skin contact	Clinical interventions	Infant oral assessment	
Challenges of lactation		Biological specificity of human milk	BF in the first hour of life	during L & D on early BF	Preterm infant	Jaundice
Questions from BF mothers			International Code of Marketing of Breast-milk Substitutes	Milk expression & storage	Standard growth patterns for BF babies	Infant complications
The economics of BF		Maternal nutrition	Research	Human milk banking	Older child	Potential problems associated with the use of human milk substitutes
BF support education for health professionals and parents		Medications	Legislation	Community interventions & resources	Weaning	
Employment issues		Viruses	Parental leave	Technologies		
				Practices to support BF		

Note. Categories are not mutually exclusive. BF = breastfeeding; L & D = labor and delivery.

et al., 2016). Nevertheless, authors pointed out that both didactic and clinical components of breastfeeding education needed to be strengthened for both nursing and undergraduate medical students, who are not adequately prepared to advise their breastfeeding families about breastfeeding due to the absence of academic and curricular content (Gary et al., 2017; Spear, 2006). A multidisciplinary approach has been suggested as important for improving breastfeeding education for health professional undergraduate students and may benefit and serve as a model for the development of new lactation curriculums (Du Plessis et al., 2009; Howett et al., 2006; Ogburn et al., 2005).

Given that parents benefited most, and the duration of exclusive breastfeeding increased when lactation support was offered, it is important for all HCPs to be able to provide support in a variety of locations during pregnancy, childbirth, and postpartum. This support can be provided by both trained consultants and laypersons in the community, or ideally by both. Also, face-to-face support seemed to be more efficient for families who were exclusively breastfeeding (McFadden et al., 2017). Authors of reviewed studies found that hands-on clinical experience in breastfeeding enhanced the learning and contributed to the education for undergraduate health professional students (Bac et al., 2015; Kakrani et al., 2015; Ogburn et al., 2005; Psiaki & Olson, 1982; Rhodes & Burgess, 2018; Ricciotti et al., 2010). On the other hand, authors showed that the sole use of online and web-based tools may hold potential for teaching lactation and breastfeeding to UGS (DeIoian et al., 2015; Edwards, 2013; Miller et al., 2007; Riordan, 2000). A short online tutorial was a feasible tool to increase the breastfeeding information for pharmacy students (Edwards, 2013), and the internet has high educational capability related to lactation education for undergraduate health students (Riordan, 2000). The effectiveness of experiential learning and hands-on support for breastfeeding education was evident in this review. More

research is needed using innovative technological approaches, including serious games, the use of online open-educational resources, mobile applications (apps), and simulations (live and virtual) with evaluation of student outcomes.

In general, we found a lack of (1) reported consistent approaches to education; (2) methodological rigor in measuring student outcomes (e.g., knowledge, attitude, clinical skills); and (3) hands on experiences to develop student support skills. Our results in this scoping review demonstrated many examples of how breastfeeding education has been integrated into health care professional education. However, little solid evidence exists about the translation of knowledge into practice or the exact amount of time, type, and resources necessary to develop baseline knowledge, positive attitudes, and skills in supporting parents to meet their infant feeding goals. Future researchers should focus on the implementation of high-quality breastfeeding education curriculum throughout the undergraduate health courses with incorporation of opportunities for hands-on interprofessional experiences, both in the lab and clinical. Curriculum should also take into consideration cultural diversity and social determinants of health while making use of innovative teaching methodologies and online educational resources. Measurement and comparison of the transfer of learning to clinical practice, given various teaching strategies and the resultant parental experiences and breastfeeding outcomes, is needed. Future research with methodological rigor is warranted and can be designed to evaluate outcomes of targeted curricular approaches to breastfeeding education.

Limitations

Despite a careful search of the current scientific databases, some papers may have been missed. This review is limited by the fact that academic research like theses and dissertations were not identified. Although we searched in multiple

languages, the studies that met the criteria for inclusion were all in English.

Conclusion

The importance of using standards, best practices, and a combination of didactic and hands-on experiential learning as well as the possibility of use of on-line, eLearning, and other innovative methods was evident in the reviewed body of work. The more hours of lactation education, the more student knowledge, attitudes, and confidence was increased. Consistency in teaching across disciplines is key and not evident in the studies reviewed, and the lack of rigor and/or longitudinal studies makes it difficult to demonstrate the transfer of knowledge to skills and clinical practice.

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Supplemental Material

Supplemental material for this article is available online.

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