

Healthcare providers' role regarding the safe and appropriate use of herbal products by breastfeeding mothers: A systematic literature review

Tingyun Zheng^a, Dongning Yao^a, Weijie Chen^a, Hao Hu^a, Carolina Oi Lam Ung^{a,*},
Joanna E. Harnett^{b,**}

^a State Key Laboratory of Quality Research in Chinese Medicine, Institute of Chinese Medical Sciences, Room 2058, N22 Building, University of Macau, Taipa, Macao

^b The University of Sydney School of Pharmacy, Faculty of Medicine and Health, A15 - Pharmacy and Bank Building, The University of Sydney, Australia



ARTICLE INFO

Keywords:

Breastfeeding
Herbal products
Healthcare professional
Pharmacist
Midwife

ABSTRACT

Background: Breastfeeding women often use herbal products to increase their milk supply. The aim of this study was to summarize the literature about the role of healthcare providers in advising breastfeeding women about herbal product use.

Methods: Pubmed, ScienceDirect, Web of Science, and CINAHL databases were searched for articles written in English using the Keywords: “breastfeeding” or “lactation” and “herbal medicine”, “botanical”, “dietary supplement”, “natural product”, “traditional medicine” or “complementary medicine”.

Results: Twenty-two articles were included in this review. A lack of inter-professional communication and guidelines, a lack of provider confidence and knowledge about the evidence for the efficacy and safety of herbal products were identified as causing a ‘gap’ between current practice and expectations of breastfeeding women seeking advice about their use herbal products.

Conclusions: Strategic and collaborative efforts between key stakeholders are required to ensure the needs of women who are considering herbal product use while breastfeeding are met.

1. Background

The use of herbal products is common among breastfeeding women around the world [1]. Recent surveys showed that an estimated 16% US [2], 20%–45% Chinese women [3,4], 59.9% Australian women [5] and 97% of Italian women [6] used at least one herbal product during the breastfeeding period. According to the definition by the World Health Organization, herbal products, together with herbs, herbal materials and herbal preparations, are considered as herbal medicines that contain active ingredients that are derived from the parts of plants, or other plant materials, or combinations [7]. Depending on the traditional beliefs and practices, and the trend in different regions, the term herbal product may refer to different herbal ingredients and refer to a range of dosage forms and preparations.

The most common reason breastfeeding women use herbal products is to increase milk supply [2,5,8–10] or as a traditional prophylactic for insufficient milk production [8,9]. This is likely to be driven by a finding of an American study, that reported 76% of mothers were concerned that they were not producing an adequate amount of breast milk to meet their

child's nutritional needs [10]. Women also report that the use of herbal products during lactation is an act of self-empowerment, offering them reassurance and other psychological benefits such as increasing their confidence about the breastfeeding process [8,9]. Women also use herbal products to treat lactation-related ailments such as engorgement, mastitis, and sore or cracked nipples [11]. In addition, more general ailments may be managed with herbal products during breastfeeding, including headaches, constipation, coughs and colds and depressive symptoms [11] or simply as a general health supplement [8]. Considering the adverse reactions reported about the use of pharmacotherapy in breastfeeding [12], it is not surprising that breastfeeding mothers opted to use herbal products to alleviate their depressive symptoms as perceived a safer option [11]. The most common herbal products used during breastfeeding include fenugreek [2,5,6,8–10,13–15], blessed thistle [5,6,8,9,13], fennel [5,6,9,10,13], dong quai [3,5], garlic [2,5,10,11] and St. John's wort [11]. In addition, herbal products with undisclosed ingredients are also used by breastfeeding women [6,8,15].

Despite documentation outlining a long history of traditional medicines use during breastfeeding, scientific evaluation for the efficacy

* Corresponding author.

** Corresponding author.

E-mail addresses: mb75821@connect.um.edu.mo (T. Zheng), ydn22000@vip.163.com (D. Yao), yb77514@connect.um.edu.mo (W. Chen), haohu@um.edu.mo (H. Hu), carolinaung@um.edu.mo (C.O.L. Ung), joanna.harnett@sydney.edu.au (J.E. Harnett).

<https://doi.org/10.1016/j.ctcp.2019.01.011>

Received 2 December 2018; Received in revised form 8 January 2019; Accepted 22 January 2019

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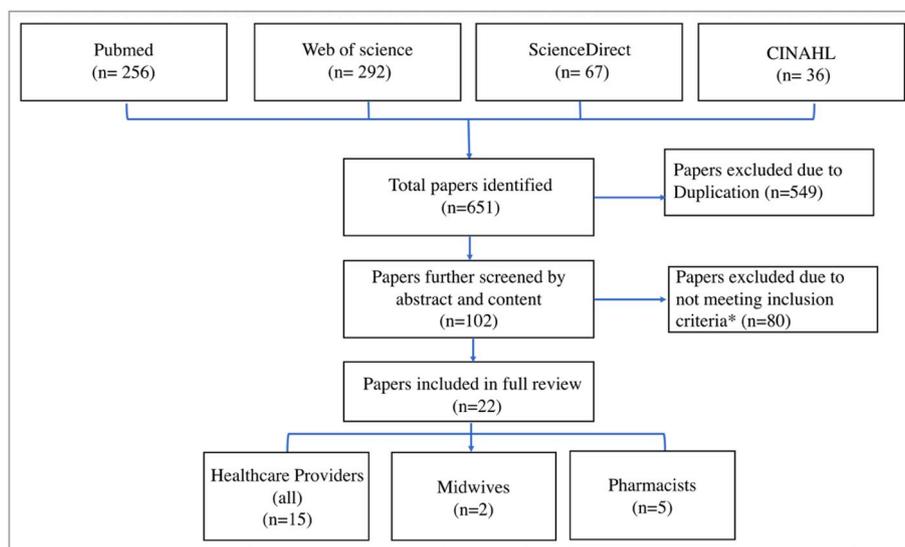


Fig. 1. Literature search method.

and safety of many herbal products used by this population is lacking [6,16]. Nevertheless, women prefer to take herbal products for less serious conditions due to their perception that such products are natural, safer and with less side effects than conventional treatments [9–11,17]. Interestingly, the main reason provided by women for not recommending a herbal galactagogue to a friend, relates to their own experience of ineffective treatments. Whereas, the reason for not recommending a pharmaceutical treatment during breastfeeding is related to experiencing side effects [10]. In terms of effectiveness, it has been shown that breastfeeding women largely perceive plant-derived supplements as useful [9], and seldom consider the possibility of an adverse outcome for either themselves or their breastfed infants [6,11].

Due to the heterogeneity of regulatory standards and lack of standardization for herbal products between, and even within countries and regions, it is difficult to generalize about the quality, safety and efficacy of herbal products [18]. Adding to this complexity, is the variation in formulations and doses between products. This is highlighted by the case of the popular herbal galactagogue, fenugreek, that was available to the consumer as the crude seeds, capsules, tincture and tea [9]. Whether the purity, strength or potency, and other quality attributes of the commercialized products were subject to stringent regulatory control was questionable [19,20]. According to a network meta-analysis, there are specific doses of fenugreek that are required to achieve a galactagogue effect [21]. However, it is not uncommon for fenugreek products to lack instructions regarding the dose and duration of therapy required to achieve a milk promoting effect or to reduce the risk of adverse effects [9,22]. In fact, it has been reported that breastfeeding women were using relatively low doses of fenugreek (less than the 6g of dried seed) as recommended by the German Commission [9]. In other studies, along with potential benefits, at least 21 potential side effects and adverse effects related to the use of fenugreek have been reported including nausea, vomiting, decreased glucose levels, ‘maple-like odour’ of urine and sweat for the mothers, and diarrhea in the breastfed child [10,14]. However, knowledge about the transfer of herbal medicine constituents and/or their metabolites via breast milk to the infant remain a poorly understood area of herbal medicine safety [6]. Adding to the complexity of evaluating the safety of constituent transfer to the infant, is the fact that many commercially available herbal products are not single ingredient products and contain multiple herbs and constituents many of which have not been fully characterized [15]. In addition, there are potential drug-herb interactions for mothers who may choose to take herbal products and conventional medicines concurrently [5,6].

Inarguably, breastfeeding women should be provided with access to professional services, evidence based information and the highest quality herbal products available to ensure a safe and successful breastfeeding experience for both the mother and infant [8,15]. During the course of breastfeeding, mothers come across a range of healthcare providers who have an opportunity to provide breastfeeding education [23], support and information about herbal products [1]. However, to date, a summary of the literature examining this important topic has not been conducted. Therefore, the aim of this review was to summarize the available literature reporting the current practice and approaches that healthcare providers take to caring for breastfeeding women and their use of herbal products.

2. Methods

2.1. Search methods

A search of the literature published since 2013 to present was conducted using the following databases: Pubmed, ScienceDirect, Web of Science, and CINAHL (Cumulative Index to Nursing, Allied Health Literature) databases. Articles were identified using the Keywords: “breastfeeding” or “lactation” and “herbal medicine*”, “botanical*”, “dietary supplement*”, “natural product*”, “traditional medicine*” or “complementary medicine*”. Selection of articles was limited to those published in English and that focused on the practice of healthcare providers in supporting breastfeeding mothers who use herbal products.

2.2. Data collection

As illustrated in Fig. 1, the initial search identified 651 articles. Pubmed, ScienceDirect, Web of Science, and CINAHL yielded 256, 67, 292 and 36 respectively. After screening titles and the removal of duplicates, 102 papers were further screened by abstract and content. Of these, 80 papers were excluded from this study based on lack of specificity to the topic of healthcare providers’ practice in relation to herbal products. A total of 22 papers were included for a final in-depth review (Table 1).

3. Results

Among the 22 studies selected in the review, 15 focused on healthcare providers in general, 5 specifically on pharmacists and 2 specifically on midwives. This possibly indicates that among all

Table 1
Publications included in this review (from 2013 till August 2018).

Authors	Publication year	Study title	Country of study	Method	Implications for specific or all healthcare providers
1 Diezel, H., Steel, A., Wardle, J., & Johnstone, K.	2013	Patterns and influences of interprofessional communication between midwives and CAM practitioners: a preliminary examination of the perceptions of midwives	Australia	Pilot survey of midwives (n = 53)	Midwives
2 Jones, C., Jomeen, J., & Ogbuehi, O.	2013	A preliminary survey of the use of complementary and alternative medicines in childbearing women	UK	Questionnaire completed by women who experienced a live birth across a period of 3 months (n = 40)	Midwives
3 Sim, T. F., Sherriff, J., Hattingh, H. L., Parsons, R., & Tee, L. B. G.	2013	The use of herbal medicines during breastfeeding: A population-based survey in Western Australia	Australia	Self-administered questionnaire completed by breastfeeding mothers (n = 304)	Healthcare providers
4 Whitten, D.	2013	A precious opportunity: Supporting women with concerns about their breastmilk supply	–	Review	Healthcare providers
5 Aleandri, V., Bertazzoni, G., Romanzi, D., Vetrano, G., Durazzi, F., Mazzanti, G., & Vitalone, A.	2014	The use of herbal products during Breastfeeding: A Study from a Public Italian Hospital	Italy	Questionnaire completed by breastfeeding mothers (n = 244)	Healthcare providers
6 Sim, T. F., Hattingh, H. L., Sherriff, J., & Tee, L. B. G.	2014	Perspectives and attitudes of breastfeeding women using herbal galactagogues during breastfeeding: a qualitative study	Australia	In-depth semi-structured interviews with breastfeeding mothers (n = 20)	Healthcare providers
7 Amer, M. R., Cipriano, G. C., Venci, J. V., & Gandhi, M. A.	2015	Safety of popular herbal supplements in lactating women	–	Review	Healthcare providers
8 Sim, T. F., Hattingh, H. L., Sherriff, J., & Tee, L. B. G.	2015	The use, perceived effectiveness and safety of herbal galactagogues during breastfeeding: A qualitative study.	Australia	In-depth semi-structured interviews with breastfeeding mothers (n = 20)	Healthcare providers
9 Sim, T. F., Hattingh, H. L., Sherriff, J., & Tee, L. B. G.	2015	What Do Breastfeeding Women Taking Herbal Galactagogues Perceive of Community Pharmacists' Role in Breastfeeding Support? A Qualitative Study.	Australia	In-depth semi-structured interviews with breastfeeding mothers (n = 20)	Community Pharmacists
10 de Ponti, M., Stewart, K., Amir, L. H., & Hussainy, S. Y.	2015	Medicine use and safety while breastfeeding: Investigating the perspectives of community pharmacists in Australia	Australia	Postal survey completed by pharmacists (n = 176)	Pharmacists
11 Bazzano, A. N., Littrell, L., Brandt, A., Thibeau, S., Thriemer, K., & Theall, K. P.	2016	Health provider experiences with galactagogues to support breastfeeding: A cross-sectional survey.	USA	A cross-sectional survey completed by healthcare providers	Healthcare providers
12 Budzynska, K., Filippelli, A. C., Sadikova, E., Dog, T. L., & Gardiner, P.	2016	Use and factors associated with herbal/botanical and nonvitamin/nonmineral dietary supplements among women of reproductive age: An analysis of the infant feeding practices study II	USA	A secondary analysis of the Infant Feeding Practices II study	Healthcare providers
13 Colavecchi, S., Giusti, A., De Angelis, A., Della Barba, M. L., De Vincenti, A. Y., Vellone, E., & Alvaro, R.	2016	Medications, "Natural" Products, and Pharmacovigilance during breastfeeding: A mixed-methods study on women's opinions.	Italy	A mixed-methods study of qualitative study (focus groups and in-depth interviews with 25 mothers) and quantitative study (questionnaire completed by 258 pregnant women and new mothers)	Healthcare providers
14 Tang, L., Lee, A. H., Binns, C. W., Hui, Y. V., & Yau, K. K. W.	2016	Consumption of Chinese herbal medicines during pregnancy and postpartum: A prospective cohort study in China	China	Interviews with new mothers (n = 695)	Healthcare providers
15 Bazzano, A. N., Cenac, L., Brandt, A. J., Barnett, J., Thibeau, S., & Theall, K. P.	2017	Maternal experiences with and sources of information on galactagogues to support lactation: A cross-sectional study.	USA	Online survey completed by breastfeeding mothers (n = 188)	Healthcare providers
16 Alwhaibi, M., Goyat, R., & Kelly, K. M.	2017	The use of herbal remedies among mothers of young children Living in the central Appalachian Region.	USA	Survey completed by mothers (n = 178)	Healthcare providers
17 Khan, T. M., Wu, D. B. C., & Dolzhenko, A. V.	2017	Effectiveness of fenugreek as a galactagogue: A network meta-analysis.	–	A network meta-analysis	Healthcare providers
18 Sim, T. F., Hattingh, H. L., Sherriff, J., & Tee, L. B.	2017	Towards the implementation of breastfeeding-related health services in community pharmacies: Pharmacists perspectives.	Australia	Semi-structured interviews with community pharmacists (n = 30)	Community pharmacists
19 Albassam, A., & Awad, A.	2018	Community pharmacists' services for women during pregnancy and breast feeding in Kuwait: A cross-sectional study.	Kuwait	Questionnaire-based survey completed by community pharmacists (n = 192)	Community pharmacists
20 Shawahna, R., Qiblawi, S., & Ghanayem, H.	2018	Which benefits and harms of using fenugreek as a galactagogue need to be discussed during clinical consultations? A Delphi study among breastfeeding women, gynecologists, pediatricians, family physicians, lactation consultants, and pharmacists.	Palestine	Delphi technique used in 2 separate panels of breastfeeding women (n = 65) and healthcare providers (n = 56)	Healthcare providers

(continued on next page)

Table 1 (continued)

Authors	Publication year	Study title	Country of study	Method	Implications for specific or all healthcare providers
21 Sim, T. F., Hattingh, H. L., Sherriff, J., & Tee, L. B. G.	2018	The use of non-prescription medicines during lactation: A qualitative study of community pharmacists' attitudes and perspectives.	Australia	Semi-structured interviews with community pharmacists (n = 30)	Community pharmacists
22 Barnes, L. A. J., Barclay, L., McCaffery, K., & Aslami, P.	2018	Complementary medicine products used in pregnancy and lactation and an examination of the information sources accessed pertaining to maternal health literacy: a systematic review of qualitative studies	-	Systematic literature review (n = 28)	Healthcare providers

healthcare providers involved (including specialists, general practitioners, nurses, lactation consultants, naturopaths and herbalists), the role of midwives and pharmacists has attracted the research attention due to their more specific expert knowledge as breastfeeding and medication experts respectively. Based on further analysis, three major themes arose from the literature: (1) breastfeeding women's expectations of healthcare providers, (2) current practice by healthcare providers and breastfeeding women, and (3) enabling factors that would help improve healthcare providers' care of breastfeeding women regarding the use of herbal products (Table 2).

3.1. Breastfeeding women's expectations of healthcare providers

As presented in Table 3, the literature that focused on women's expectations of healthcare providers covered 3 areas: attitudes, knowledge and current practice approaches. Breastfeeding women expected healthcare providers to be proactive in initiating a discussion about herbal products, to be knowledgeable and to provide accurate information about the pros and cons of herbal product use [2,5,8,11,14,15,24]. In addition to herbal product knowledge, one study highlighted that women expected healthcare providers to be knowledgeable about breastfeeding itself [25]. Conversely, healthcare providers reported that actually having a better understanding of the lactation physiology and the importance of the breastfeeding were drivers of both recommending herbal products and making appropriate referrals [2,8,13,15]. However, breastfeeding women expected healthcare providers to have at least a basic knowledge of alternative treatments for common ailments encountered during breastfeeding and to have up to date information regarding the safety and efficacy of the herbal products commonly used by breastfeeding [5,8,11,25–27].

Breastfeeding women considered that healthcare providers could play a role in contributing to the safe and appropriate use of herbal products [5,8,14,15,24]. Generally, healthcare providers accepted that they should routinely check the history of medication use (including herbal products) before and during breastfeeding, to be more vigilant about the emotional status of the mothers especially during the early days postpartum, and to provide breastfeeding education and support whenever possible [5,8,11,19]. Women expected healthcare providers to provide alternative treatment options (including herbal products) for their breastfeeding ailments including their psychological health [8,9]. Healthcare providers' access to unbiased and reliable information sources was considered important to many breastfeeding women [6]. Both breastfeeding women and healthcare providers suggested that the providers' ability to convey evidence-based information about herbal products effectively to breastfeeding women should be a priority [3,5,8,9,14,15,17,26–28]. Different culture background influences women's health literacy and their herbal products use, thus healthcare providers were expected to be culture [25]. Breastfeeding women also relied on healthcare providers to evaluate and manage adverse drug events related to herbal products [11,17,27]. During the course of breastfeeding, mothers might receive care from a range of healthcare providers [8]. Consistency and standardization in the management of herbal product use across healthcare providers was reported as an important strategy to minimize confusion. This is further supported by the proposition that interprofessional communication and collaborative efforts by healthcare providers would ensure the optimal care of breastfeeding women [5,13,19,25,29].

3.2. Current practice

As presented in Table 4, the interface between the use of herbal products by breastfeeding women have been reported from 2 main perspectives: the perspective of the healthcare provider and that of the breastfeeding women. For the healthcare providers, 10 attributes in relation to their current practice were mentioned in the literature. Pharmacists, for instance, may take a cautious approach to the use of

Table 2
Major themes and subthemes identified.

Theme 1: Breastfeeding women's expectations of healthcare providers	
1.1 Attitudes	1.1.1 To be proactive in initiating discussion about the use of herbal products with breastfeeding women
	1.1.2 To more open-minded and supportive when discussing herbal products with breastfeeding women
1.2 Knowledge	1.2.1 To be more knowledgeable about breastfeeding in general
	1.2.2 To be more knowledgeable about herbal products
1.3 Practice	1.3.1 Non-herbal product specific
	1.3.1.1 To be vigilant about the breastfeeding status of the patients/clients
	1.3.1.2 To be sensitive to the stress breastfeeding women may be experiencing
	1.3.1.3 To be able to convey evidence-based information on lactation management
	1.3.1.4 To be sensitive about the mothers' cultural background
	1.3.2 Herbal product specific
	1.3.2.1 To be more aware of the sociodemographic characteristics associated with the use of herbal products
	1.3.2.2 To be able to access reliable information resources about herbal products
	1.3.2.3 To be prepared to provide alternative options and help women make an informed decision
	1.3.2.4 To be able convey evidence-based information on herbal product safety and use effectively
	1.3.2.5 To evaluate and manage adverse drug events related to herbal products
	1.3.2.6 To adopt a consistent approach regarding herbal products
	1.3.2.7 To employ an interdisciplinary approach regarding herbal products
Theme 2: Current Practice	
2.1 Healthcare providers	2.1.1 Varied attitude towards discussing about herbal products with breastfeeding women
	2.1.1.1 Not proactive
	2.1.1.2 Positive
	2.1.2 Lack of confidence in discussing about herbal products with breastfeeding women
	2.1.3 Lack of knowledge about breastfeeding
	2.1.4 Lack of knowledge about herbal products
	2.1.5 Lack of awareness about the availability of evidence-based information about herbal products
	2.1.6 Inappropriate recommendation regarding herbal products
	2.1.7 Poor inter-professional communication
	2.1.8 Lack of a clear understanding of the implications of recommending or using herbal products within their practice
	2.1.9 Lack of consistency in the approach to herbal products
	2.1.10 Lack of privacy at the premises they attend
2.2 Breastfeeding women	2.2.1 Poor knowledge about the available treatment options
	2.2.2 Lack of information about herbal products
	2.2.3 A variety of information sources about herbal products
	2.2.3.1 Healthcare providers
	2.2.3.2 Peer support
	2.2.3.3 Mixed information sources
	2.2.4 Non-disclosure
	2.2.5 Lack of awareness about reporting side effects of herbal products
Theme 3: Enablers	
3.1 Healthcare provider level	3.1.1 Education/special training
	3.1.1.1 Undergraduate course
	3.1.1.2 Continuing professional education
	3.1.1.3 General
	3.1.2 Clarify scope of practice
	3.1.3. Standardize information
3.2 Government level	3.2.1 Develop/revise regulation and policies
	3.2.2 Fund research
	3.2.3 Provide incentives for professional services
	3.2.4 Provide legislative support
	3.2.5 Set up a state-based lactation resource center
3.3 Consumer level	3.3.1 Access to reliable information
	3.3.2 Education about the safety of herbal products
	3.3.3 Education about professional services offered by healthcare providers regarding herbal products
	3.3.4 Education about reporting adverse effects with the use of herbal products
3.4 Research level	3.4.1 Herbal products
	3.4.2 The needs of breastfeeding women
	3.4.3 Practice of healthcare providers
	3.4.4 Development of lactation safety category

herbal products which could be interpreted by breastfeeding women as the pharmacist lacking knowledge or being unwilling to supply such products [15]. Alternatively, they might adopt a conservative attitude and recommend only the products they were familiar with [27], whereas in a separate study, midwives were found to be a main source of recommendation for the use of complementary and alternative medicine including herbal products [24]. A panel of gynecologists, pediatricians, family physicians, lactation consultants, and pharmacists involved in one study reported that they often recommended herbal remedies for breastfeeding women [14]. The relationship between insufficient confidence and knowledge about breastfeeding and herbal products was raised repeatedly by healthcare providers

[8,15,26,27,30]. Furthermore, a lack of awareness about the availability of any evidence-based information about herbal products was raised [19].

An issue related to healthcare providers making inappropriate recommendations regarding herbal products were reported in several studies [26,30,31]. Some pharmacists and general practitioners, for instance, reportedly based their recommendation on the use of medicines in breastfeeding women on the categorization system for prescribing medicines in pregnancy [30]. In another study, it was shown that specialists and lactation counselors did not follow any evidence-based guideline when making recommendations about the dosage of herbal products [31]. Inter-professional communication about

Table 3
Major expectations for health care providers and the corresponding publications.

Major theme	Subtheme	Reference	Major findings
1.1 Attitudes	1.1.1 To be proactive in initiating discussion about the use of herbal products with breastfeeding mothers	[5]	<i>“All health care professionals, including doctors and pharmacists should take the initiative to ask and provide evidence-based advice regarding the appropriateness of using herbal medicines during breastfeeding.”</i>
		[24]	<i>“It is without doubt that CAM and its associated therapies are considered firmly situated within midwifery care provision, as many of the healing systems are based on concepts of promoting empowerment and normal birth ... Midwives could use the booking interview and antenatal consultations to encourage women who are engaging with CAM to seek advice from the appropriate CAM practitioner in relation to safety and efficacy.”</i>
		[8]	<i>“Women expect health professionals to have adequate knowledge and to be willing to offer advice and discussion over alternative therapies to promote breastfeeding performance.”</i>
		[11]	<i>“Accordingly, health care providers must take initiative in creating opportunities to discuss herbal medicines with nursing mothers ... It is crucial for practitioners to review any supplement use prior to use in nursing mothers beginning breastfeeding.”</i>
		[8]	<i>“Some of the participants indicated a need for health care providers to be more open minded, supportive and prepared to provide alternative options should women wish to be able to choose.”</i>
	1.1.2 To more open-minded and supportive when discussing about the use of herbal products with breastfeeding mothers	[15]	<i>“Some participants expressed a desire for pharmacists to be more “open” to discuss various issues related to breastfeeding and to offer more information on CMs during breastfeeding.”</i>
		[2]	<i>“It is important for health care providers...to have open, honest conversations with women as they transition from the preconception, prenatal, and postpartum periods.”</i>
		[14]	<i>“healthcare providers like gynecologists/obstetricians, pediatricians, lactation consultants, family physicians, and pharmacists who are often consulted by breastfeeding women seeking recommendations to enhance their human milk supply should discuss herbal galactagogues balancing their potential benefits against potential harms in case they wanted to opt for herbal remedies considering the preferences of the women concerned.”</i>
		[12]	<i>“Health professionals' knowledge of lactation physiology, the risks associated with premature breastfeeding cessation and their ability to refer women to specialised practitioners and breastfeeding peer support groups are all key determinants in the successful promotion of breastfeeding.”</i>
		[8]	<i>“Gaining an understanding of breastfeeding women's perspectives, why and how they have chosen to use herbal galactagogues over conventional options to increase breast milk supply, their experiences and the factors or indicators that influenced their breastfeeding performance, will provide insight into the potential value of herbal galactagogues.”</i>
1.2 Knowledge	1.2.1 To be more knowledgeable about breastfeeding in general	[15]	<i>“These women expected pharmacists to have a basic knowledge of breastfeeding and the various issues related to breastfeeding.”</i>
		[2]	<i>“It is important for health care providers to recognize that there are many factors that motivate women to use herbs or botanicals as they transition from the preconception, prenatal, and postpartum periods.”</i>
		[25]	<i>“Regarding breastfeeding specifically, policy implications need to ensure Healthcare providers receive sufficient education in lactation and in helping women to breastfeed successfully in order to be able identify and provide help with breastfeeding difficulties and improve services for breastfeeding women.”</i>
		[5]	<i>“Health professionals and health care providers should be aware of the latest information regarding safety and efficacy of the commonly used herbal medicines in lactation and provide appropriate advice to breastfeeding women.”</i>
		[8]	<i>“Participants expected all health care providers to have an adequate level of awareness and knowledge on the availability of all different treatment options.”</i>
	1.2.2 To be more knowledgeable about herbal products	[11]	<i>“An awareness of evidence surrounding agent properties, interactions, and adverse effects is essential to adequately discuss risks and benefits with patients.”</i>
		[15]	<i>“Many participants still believed that it would be favourable if community pharmacists were better educated in the area of herbal medicines and breastfeeding.”</i>
		[26]	<i>“The pharmacist must have adequate information to reach a conclusion about the risk: benefit ratio of treatment for the women to be able to counsel them effectively.”</i>
		[27]	<i>“It was acknowledged that pharmacists had a legal and ethical obligation to acquire adequate knowledge of all products available in the pharmacy, regardless of whether they were conventional or CMs. Participants also felt that it was part of their professional role to ensure the safe and effective use of these products in lactation and be able to make appropriate recommendations to women who may require treatment while breastfeeding.”</i>
		[5]	<i>“Considering the high prevalence of herbal medicines used during breastfeeding and the risk of potential interactions and adverse outcomes, all health care providers, including community pharmacists and pharmacy staff, should routinely ask female customers if they are breastfeeding and if they are using any medicines including CAMs.”</i>
1.3 Practice	1.3.1 Non-herbal product specific	[11]	<i>“It is crucial for practitioners to review any supplement use prior to use in nursing mothers beginning breastfeeding.”</i>
		[8]	<i>“Some participants further commented on the potential value of awareness in reducing distress and anxiety during early days postpartum.”</i>
	1.3.1.2 To take into account the stress factor among breastfeeding mothers	[19]	<i>“The majority of the participants also considered the distribution of breastfeeding-related educational materials practicable within the context of pharmacy practice.”</i>
		[25]	<i>“For women in wealthier economies where culturally competent care was also discussed, the focus</i>
			<i>(continued on next page)</i>

Table 3 (continued)

Major theme	Subtheme	Reference	Major findings
	information on lactation management		<i>was more on what biomedical Healthcare providers could do to improve provider-patient communication and understand the culturally based needs of pregnant and breastfeeding women”</i>
1.3.2 Herbal product specific	1.3.1.4 To be sensitive about the mothers' cultural background	[9]	<i>“This study has highlighted the importance of considering the potential psychological benefits of using herbal galactagogues, and how this translates into breastfeeding adequacy.”</i>
	1.3.2.1 To be more aware of the psychological attributes related to the use of herbal products	[6]	<i>“In order to give them a qualified advice, the health care staff (e.g., general practitioners, gynecologists, pharmacists, nurses, pediatricians, and herbalists) should know how to access unbiased and reliable information sources, and should always update their knowledge on herbal products.”</i>
	1.3.2.2 To be able to access reliable information source about herbal products	[8]	<i>“Health care providers included doctors and specialists, midwives, child health nurses, lactation consultants, naturopaths, as well as community pharmacists. Regular users of herbal medicines believed that alternative options should be made available to all breastfeeding women by their health care providers Participants preferred to receive suggestions or options with information about the available evidence in order to make an informed decision.”</i>
	1.3.2.3 To be prepared to provide alternative options and help women make an informed decision	[5]	<i>“Research-based information should be available to breastfeeding women who wish to consider use of all medicines, including herbal or alternative medicines. This could avoid interruption or cessation of breastfeeding due to unnecessary safety concerns, while allowing mothers to receive appropriate pharmacotherapy without compromising breastfeeding performance and the infant's health.”</i>
	1.3.2.4 To be able convey evidence-based information on herbal products safety and use effectively	[8]	<i>“They expected health care providers to be up-to-date with the latest research data and be able to translate the information into their daily practice.”</i>
		[9]	<i>“Immediate postpartum and early parenthood were viewed as challenging and may be associated with anxiety, stress and confusion in some women, which may impact on their ability to take in any information ... Hence, participants suggested that breastfeeding and related information be part of the focus during pre-natal classes or information sessions to avoid confusion during the lactation stage ... Many participants believed that information regarding herbal medicines to support breastfeeding should be provided in the information pack supplied at pre-natal clinics.”</i>
		[9]	<i>“Besides voicing their need for additional research studies, participants also demonstrated a desire for written and verbal information from their health care professionals with regards to the use, safety and efficacy of herbal medicines during breastfeeding.”</i>
		[9]	<i>“Pharmacists could play in educating breastfeeding women to fully comprehend the available (or the lack of) information and the fact that other conventional medicines, such as domperidone, may have higher efficacy and known safety data to support their use in breastfeeding.”</i>
		[15]	<i>“As one of the major suppliers of herbal medicines, the women expected pharmacists to play a substantial role in providing advice and recommendations regarding their use”</i>
		[17]	<i>“Women have a poor knowledge on the available options, including seeking an alternative treatment, temporarily withholding breastfeeding while maintaining lactation by expressing breast milk, or re-lactating after days, weeks, or months. It is precisely in this circumstance that health care providers should play a crucial role, to convey evidence-based information on drug safety, drug use, and breastfeeding management.”</i>
		[3]	<i>“It is important that health professionals working with mothers do not recommend or prescribe herbal medicines to their clients where there is a lack of evidence supporting their use.”</i>
	[28]	<i>“Healthcare providers can play an important role in providing information about the use of herbal remedies and also in providing feedback about channels (including the Internet) of good quality information to learn more about herbal remedies.”</i>	
	[27]	<i>“From the participants' perspectives, it was their duty of care as pharmacists to ensure the safe and effective use of all products and medicines sold in their pharmacies. Participants felt that they had the responsibility to ensure the safety of breastfeeding women and their breastfed infants”</i>	
	[14]	<i>“Herbal remedies should be recommended considering the 5 rights (right person, time, dose, frequency, and route of administration).”</i>	
	[25]	<i>“An important practice implication for biomedical Healthcare providers across all economic strata centers on balancing the provision of evidence-based biomedical care that aims to ensure the safety and health of both mother and baby, and the need to accommodate culturally different health care practices and women's choices regarding maternal health care.”</i>	
	1.3.2.5 To evaluate and manage adverse drug events related to herbal products	[11]	<i>“It is crucial for practitioners to review any supplement use prior to use in nursing mothers beginning breastfeeding.”</i>
		[17]	<i>“The risks for the baby being the main concern form women, the pediatrician has an important role in offering information.”</i>
		[27]	<i>“Based on the limited available information and resources, pharmacists based their recommendations on professional judgement and personal experience, weighing benefits of using a medicine for the breastfeeding mother and the potential risks to the infant's safety.”</i>
		[14]	

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Table 3 (continued)

Major theme	Subtheme	Reference	Major findings
		[21]	<i>“Potential harms and benefits of recommending the use of fenugreek as herbal galactagogue for breastfeeding women seeking recommendations to increase their human milk supply need to be discussed during the clinical consultations.”</i>
	1.3.2.6 To adopt a consistent approach regarding herbal products	[8]	<i>“It is therefore critically important for the lactation consultants/midwives to educate lactating mothers about the safe use of fenugreek and observes their child and themselves for any undesired event noticed after consumption of this galactagogue.”</i>
	1.3.2.7 To employ an interdisciplinary approach regarding herbal products	[12]	<i>“The importance of referring women who are having breastfeeding difficulties to experienced certified lactation consultants and breastfeeding support services cannot be emphasised enough. When challenges are addressed and resolved quickly, breastfeeding is most likely to continue. In some cases a team approach, including the involvement of a pediatrician, paediatric speech therapist, lactation consultant, and naturopath/herbalist may be indicated. The team approach works well when practitioners are aware of their area of expertise and their limitations.”</i>
		[5]	<i>“Besides the community pharmacists, this study has also identified a greater need for both conventional healthcare providers and CAM practitioners to develop an interdisciplinary network, working collaboratively to ensure optimum health outcomes for their clients.”</i>
		[29]	<i>“The majority of participants agreed that formal communication should exist between CAM practitioners and midwives (83%), and CAM practitioners and medical practitioners (86%) who are providing maternity care to the same woman.”</i>
		[19]	<i>“Referral to other health professionals such as GPs, child health nurses and lactation consultants were at times considered necessary when pharmacists deemed the need for advice as beyond their scope of practice or expertise”</i>
		[25]	<i>“Policies that encourage collaboration between biomedical Healthcare providers and TBAs, traditional herbalists and other traditional healers may help improve maternal and child health outcomes”</i>

breastfeeding women' use of herbal products was found to be sub-optimal which was partly due to healthcare providers' lack of understanding about the workplace policies and the legal implications when including herbal products in their scope of practice [29]. Multi-disciplinary communication between healthcare providers was found to be poor [29]. Discrepancies in the information provided between and within professions, were raised as a cause of confusion for breastfeeding women [15,17,26,30]. A lack of private consulting space in retail pharmacy was identified as a hindrance to discussions about breastfeeding-related issues in the pharmacy [15].

As presented in Tables 4 and 5 major issues that women faced (relating to herbal product use) was associated with the current practice of healthcare providers. Women reported a lack of knowledge about the treatment options available and a lack of information resources to access when dealing with a breastfeeding related ailment [5,8]. Even when there was a drug information service to access, women were not necessarily aware of the service [17].

Despite the complaints about a lack of reliable information, breastfeeding women managed to obtain information about herbal products from a wide range of sources. In some studies, doctors, specialists, pharmacists, midwives, lactation counselors, and herbalists were perceived as reliable information sources by many breastfeeding women [5,6,8,9,15,17,26]. Importantly, peer support was reported to be equally, if not more, accessible and reliable than healthcare providers. Family and friends as well as internet resources were commonly reported sources of information about herbal products [5,8,15,28]. In Asian populations, the woman's mother and mothers-in-law were often cited as a source of advice [3]. Several studies collected information from multiple sources during the decision making process about the use of herbal products [6,10,17,25] and was associated with women receiving conflicting information about the use of herbal products and not disclosing their herbal product use to healthcare providers [5,24] with only 28.6% of 182 consumers informing their doctors about their use of herbal products 3 and of reporting side effects associated with herbal product use [5,24].

3.3. Enablers

The findings of this review suggest a collaborative effort between healthcare providers, governing authorities, consumers and research institutes would enable better care of breastfeeding women related to herbal product use. As presented in Table 5, specific sub categories were identified for each stakeholder.

At the healthcare providers' level, numerous studies indicated that tailored education and ongoing-training for healthcare providers was necessary [8,17,26,27,29,30], with one suggesting a special focus on the safety and efficacy aspects of herbal products, as well as some general aspects of lactation [26]. It was proposed that such training would equip healthcare providers with the knowledge required to meet the expectations of breastfeeding women related to herbal product use [8] and also direct them to reliable information sources that could be used to assist them in facilitating informed decisions [19]. It was proposed that healthcare providers need to be more proactive in healthcare policy related to herbal product use [19]. In addition, professional groups were identified as having responsibilities in the development of procedures, guidelines and protocols for healthcare providers caring for breastfeeding women [29] and a role in endorsing reliable information for their members [8].

At the regulatory level, due to the heterogenous regulatory frameworks for herbal products around the world, product quality varies. The stringent regulation of pre and post market products have been identified as critical for safety [19], and adequate regulation was considered to be lacking [31]. In addition, the need for well-designed trials is needed [31]. The results of such studies could contribute to informing clinical guidelines about herbal product use during lactation [29]. Such initiatives would require government funding and incentives in some areas [19]. In one Australian study, it was proposed that the government should consider setting up a state-based lactation resource center to serve women and healthcare providers with a view to ensuring continuity of care for women during the entire breastfeeding period [19].

Table 4
The current practice of healthcare providers and the breastfeeding mothers, and the corresponding publications.

Major theme	Subtheme	Reference	Major findings
2.1 Health care providers	2.1.1 Varied attitude towards discussing about herbal products with breastfeeding mothers	2.1.1.1 Not proactive	[5] “Prescribers and specialists, including general practitioners, gynecologists and obstetricians were least likely to recommend use of herbal medicines during breastfeeding, as results have shown that only 2.2% of users were recommended to use herbal medicines by this group of health professionals.”
		[8] “Despite the criticism about the lack of information about herbal remedies from most health care providers, some of the participants did report receiving information and recommendations relating to the use of herbal medicines from these providers.”	
		[15] “Participants who believed that there was a limited role for pharmacists to be involved in herbal remedies perceived pharmacists as “over-cautious” and fearful to recommend herbal medicines with little or no scientific evidence to support their efficacy and safety during breastfeeding, which was seen by regular users of herbal remedies as a lack of willingness to supply and inadequate knowledge in the area of CMs.”	
		[27] “As the concern over breastfed infants’ safety was one of the factors guiding participants’ decision-making process, many participants tended to err on the side of caution and were conservative over their recommendations in the absence of evidence-based information.”	
		[24] “In order to minimize the level of uncertainty, participants mostly adopted a conservative attitude and recommended a product that they were familiar with.”	
		[24] “It would appear that midwives were the main source of initiation of CAM use ... The significance of this is that midwives were leading the consumption trend for the use of CAM in this specific group of women”	
		[14] “About 70% of the healthcare provider panelists stated that they recommended quite often herbal remedies for breastfeeding women.”	
		[27] “Many participants expressed frustration and uncertainty when required to provide recommendations to breastfeeding women presenting to pharmacies, in situations where there was a clear therapeutic need for treatment but clear guidelines or evidence to suggest safety of the medicines or treatment were absent”	
	2.1.2 Lack of confidence in discussing about herbal products with breastfeeding mothers	[26] “Some community pharmacists still lack confidence and knowledge to provide advice and resolve health and medication problems of pregnant and lactating women.”	
		[15] “Lack of personal breastfeeding-related experiences, knowledge and awareness deterred breastfeeding women from seeking and accepting advice from health care providers”	
	2.1.3 Lack of knowledge about breastfeeding	[8] “There was also a perception that many health care providers were not supportive of the use of herbal medicines during breastfeeding, and were not knowledgeable of the range of herbal products available and their evidence in terms of safety and efficacy.”	
		[30] “The use of St John’s wort (relatively compatible) was, for most pharmacists (92%, 159/172), a medication about which they had concerns or lacked knowledge”	
	2.1.4 Lack of knowledge about herbal products	[26] “Some community pharmacists still lack confidence and knowledge to provide advice and resolve health and medication problems of pregnant and lactating women.”	
		[8] “It appeared that some participants perceived that there was a lack of health professionals’ awareness about the availability of evidence-based information regarding use of herbal medicines during breastfeeding.”	
	2.1.5 Lack of awareness about the availability of evidence-based information about herbal products	[19] “The overwhelming concern raised by all participants was the lack of evidence-based clinical studies advising the efficacy and safety of medicines in breastfeeding, specifically complementary medicines, despite their popularity amongst this population group.”	
		[30] “There was evidence of confusion among some pharmacists and GPs who interpreted the Therapeutic Goods Administration classification system for prescribing medicines in pregnancy as being appropriate for deciding on use of medications in breastfeeding women. This approach would often result in withholding preferred medication unnecessarily.”	
	2.1.6 Inappropriate recommendation regarding herbal products	[31] “In this study, about half of the respondents answered that their recommended dosage is ‘as needed’ without further specifying the duration of treatment or the daily doses. This is again in line with findings of the Swiss-Canadian study reporting that providers did not follow any evidence-based guideline or protocol.”	
		[26] “Most medicines that were recommended are not detrimental to the mother, fetus and infant. However, the respondents’ recommendations on medicine use were sometimes inappropriate in terms of unneeded drug therapy, off-label use and safety.”	
2.1.7 Poor inter-professional communication	[29] “Just over one fifth (22%) of respondents initiated formal communications with any CAM practitioners, the most common of these being naturopaths (19%) and chiropractors (19%). Likewise, only 16% received formal communication from any CAM practitioners regarding women in their care.”		
	[29] “Nearly half of the respondents (43%) did not have a clear understanding of the legal implications of recommending or using CAM within their practice and 67% felt they understood their workplace policies regarding the referral and use of CAM as part of their scope of practice.”		

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Table 4 (continued)

Major theme	Subtheme	Reference	Major findings
2.2 Breastfeeding mothers	2.1.9 Lack of consistency in the approach to herbal products	[15]	"The lack of a consistent approach along with some enquiries handled by pharmacy assistants was seen as a hindrance to building a trusting relationship with the pharmacist."
		[17]	"Indeed, women complain that they receive conflicting opinions when they consult more health care providers about the use of a drug during breastfeeding."
		[30]	"... problems during counselling existed, such as inconsistency of information among resources and lack of knowledge, demonstrating that confidence is not a good measure of knowledge adequacy."
		[26]	"These findings illustrate the large differences in community pharmacists' practices between countries regarding the services recommended for treatment of pregnancy-related and lactation-related ailments. This could be partly explained by the differences in regulatory environments, types of undergraduate programme and the availability of products at the local pharmacies."
	2.1.10 Lack of privacy at the premises they attend	[15]	"Some further expressed their concerns with regards to privacy when discussing breastfeeding-related issues in the pharmacy. The layout of some pharmacies was perceived as not facilitating privacy."
		[17]	"Women have a poor knowledge on the available options, including seeking an alternative treatment, temporarily withholding breastfeeding while maintaining lactation by expressing breast milk, or relactating after days, weeks, or months."
	2.2.1 Poor knowledge about the available treatment options	[5]	"Approximately seventy-percent (70.1%) of the respondents indicated that they either strongly agree or agree that there was a lack of resources available to them regarding the use of herbal medicines during breastfeeding."
		[8]	"Despite their decision to use herbal galactagogues during breastfeeding, the majority of the participants (17 of 20) commented that there was a lack of resources available regarding the use of herbal medicines during breastfeeding."
	2.2.2 Lack of reliable information about herbal products	[17]	"In cases of doubt, health providers and women themselves could contact a drug information service, a free telephone line that provides toxicologic, pharmacokinetics, and pharmacodynamics information on the use of medications during pregnancy and breastfeeding. However, qualitative and quantitative results show that women do not know about these services."
		[5]	"When given a choice, breastfeeding women were most likely to seek information and advice regarding the use of herbal medicines from pharmacists and doctors."
2.2.3 Various information sources about herbal products	2.2.3.1 Health care providers	[6]	"Compared to what happens in other countries, where family and friends are the most cited source of information about botanicals, in our study, participant's primary source of advice was gynecologists."
		[8]	"In general, health professionals were viewed as reliable sources of information ... In the context of reliable information resources, community pharmacy was perceived as an easily accessible health destination and pharmacists were recognised by participants as overall medicine experts."
		[9]	"Only a minority of the participants sought advice from a lactation consultant or a child health nurse regarding milk supply issues."
		[15]	"... regarded pharmacists as trusted health professionals, experts in medicines, and the first port of call for questions relating to the use of medicines during breastfeeding. They also confirmed that community pharmacies were used as a source of herbal medicines information and advice on their use."
		[17]	"The main sources of information are health professionals, particularly pediatricians, obstetricians, and general practitioners (GPs). Different professionals, including specialists, midwives, and pharmacists, are consulted according to the health problem and the setting. For natural alternatives, herbalist shop personnel are among the sources of information."
		[26]	"These findings indicate that women with pregnancy-related and lactation-related ailments were more tending to visit a pharmacist than a physician. This could be partly explained by the easy access to the community pharmacies ..."
	2.2.3.2 Peer support	[5]	"Family and friends as well as internet resources were also common reported sources of information, followed by lactation consultants, naturopaths or homeopathic practitioners, child health nurses, health food stores, and books, literature or journal articles."
		[8]	"It was evident that some participants were more likely to believe and follow certain recommendations if these were made by parents or peers whom they could relate their experience to or women who had breastfeeding experience.... From the perspectives of some participants, reliance on parents or close family members and friends for breastfeeding-related information was considered sufficient."
		[3]	"Recommendations to consume Chinese herbal medicines were primarily made by family members and relatives, particularly maternal mothers and mothers-in-law (pregnancy 42.9%; postpartum 55.1%), while hospital staff was seldom cited as a source of advice (pregnancy 10.5%; postpartum 2.0%)."
		[9]	"Many of the participants had chosen to use herbal galactagogues based on a recommendation from an individual, and in most cases more than one source prompted the decision. Sources of recommendation included advice obtained from friends, family members or other mothers with breastfeeding experience."

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Table 4 (continued)

Major theme	Subtheme	Reference	Major findings
2.2.3.3 Mixed information sources		[28]	“Women may seek information to complement information received from physicians; however, in our study, it appeared that the Internet and family and friends were more common channels.”
		[6]	“The interviewed women (responders = 235) learned about herbal products from the advices of variety of sources that included the following: gynecologist (44%; n = 103), herbalist (40%; n = 94), pharmacist (29%; n = 68), general practitioner (23%; n = 55), friends (15%; n = 34), pediatrician (13%; n = 30), personal experience (10%; n = 24), and Internet websites (9%; n = 21).”
		[17]	“The information on the use of medications during breastfeeding, including safe and alternative treatments, is not actively offered to all breastfeeding women but sought or given case by case.... Other sources of information, especially when receiving discordant advice, are the Internet, social relationships, and associations in the field of breastfeeding.”
		[10]	“The most common way for mothers to learn about herbal galactagogues was the Internet. Other reported sources of information included lactation consultants (54%), friends (34%), family members (21%), pediatricians (20%), and obstetricians (16%).”
	2.2.4 Non-disclosure	[5]	“Despite doctors being identified as one of the common sources of information, only 52 (28.6%) of the users in this study had made their doctors aware of their decision to use herbal medicines whilst breastfeeding.”
		[24]	“In terms of disclosure, in 11 cases (27.5%), a midwife was aware of the use of CAM (complementary and alternative medicine) ... four women stated that they had not disclosed their engagement with CAM to a health professional.”
	2.2.5 Lack of awareness about reporting side products	[17]	“Despite the fact that the pharmacovigilance and phytosurveillance reporting systems are crucial for postmarketing research in this field, they are mainly unknown by women.”

At the consumer level, women required reliable information to make informed decisions about herbal product use [8–10]. The need to improve women's health literacy and thereby increase their skills to make appropriate and safe decisions about herbal product use has been identified [3,9,11,15,19]. Women who had experienced or suspected adverse effects associated with the use of any products during breastfeeding were encouraged to report such events to post marketing surveillance systems [17].

At the research level, the importance of quality research to build the evidence base about herbal products use during lactation to ensure the well-being of the breastfeeding women and their breastfed infants was repeatedly raised [2,5,8,9,11,15,19,27]. It was also clear from some of the studies that there was a need for further research to examine the needs of breastfeeding women, results of which could greatly help to inform the development of healthcare providers' practice [9,15,28]. On the other hand, continuous research about the practice of healthcare providers was needed to effectively engage the issue of consumers' needs and expectations into their clinical practice and inform the development of clinical guidelines [14,15,24,31]. It was proposed by one study that there is a need to develop a Lactation Safety Category for non-prescription medicines including complementary medicines which would help breastfeeding women make informed decisions and guide healthcare providers make clinical recommendations [19].

4. Discussion

This study provides a comprehensive summary of the literature and has identified the current gaps in health care providers care of breastfeeding women who use herbal products. Three major themes were identified related to herbal product use including, what breastfeeding women expect of healthcare providers, how healthcare providers are currently practicing, and the areas that would enable the current gap between women's expectations and healthcare providers' practice to be filled.

When comparing the expectations breastfeeding women have of healthcare providers and what is actually being practiced, it became evident that there were significant gaps in the support breastfeeding women received from healthcare providers about their use of herbal products. Fig. 2 presents the ‘ideal’ steps required for a women to make an informed decision about herbal product use that is safe and appropriate. The ‘black space’ represents the current deficits in this process associated with healthcare providers' lack of confidence in their knowledge and lack of knowledge about the quality, efficacy and safety of herbal products. These concerns are inextricably related to not knowing where to find reliable and reputable information [8,19]. These aforementioned factors are likely to place women in a difficult position where they reach out to healthcare providers for advice only to receive a reluctant response that does not result in the women receiving any appropriate information or recommendations [26,30,31]. Furthermore, based on the findings of this review, women who consult a range of healthcare providers about the benefits and risks associated with herbal products are likely to receive unclear and conflicting messages [15,26,30,31]. Not surprisingly, the entire process leaves a ‘black space’ with only a portion of breastfeeding women being able to make informed and appropriate decisions about herbal products with the adequate support from healthcare providers.

A recurrent message throughout the literature is a need for healthcare providers including at the interface between breastfeeding and herbal product use. During the course of breastfeeding and even during the postnatal stage, breastfeeding women received care from a range of healthcare providers who could all play a coordinated role in ensuring the safe and appropriate use of services and medicines including herbal products: general practitioners, specialists, midwives, pharmacists, lactation counselors, herbalists, naturopaths, etc [5,8,13,19,29]. Given the diverse focus and expertise of these healthcare providers, a model of care that takes into account a share of

Table 5
Enablers and the corresponding publications.

Major theme	Subtheme	Reference	Major findings
3.1 Health care provider level	3.1.1 Education/special training		“More focus is needed on education for safe CAM use in maternity care to develop procedures, guidelines and protocols for clinicians from discrete professional groups providing concurrent care to pregnant women.”
		[29]	
		[17]	“Adequate training on the use of drugs, natural products, pharmacovigilance, and, more broad, breastfeeding and human lactation should be compulsory in the university curricula ...”
		[19]	“... universities should include more content and provide greater exposure to pharmacy students, covering basic breastfeeding knowledge, the safety and use of medicines during breastfeeding, and reliable references or resources. A few participants also raised their opinion on the need for communication and motivational counselling skills to be able to provide advice to breastfeeding women.”
		[26]	“These results demonstrate that respondents have different knowledge levels in the subject of maternal–fetal medicine and underscore the need for ... the revision of the undergraduate pharmacy curriculum to fill the knowledge gaps of pharmacy students and practitioners in maternal–fetal medicine and to support pharmacists to deliver the proper care for pregnant and lactating women.”
		[27]	“Training at the university level ... for pharmacists should include information, where available, regarding the use of both conventional and CMs throughout lactation ... There seems to be an opportunity and urgent need for ... universities to provide CPD on medicines, including CMs, and various aspects of breastfeeding to ... pharmacy students.”
		[8]	“... ongoing education about CAMs will enable health professionals to be equipped with the knowledge to meet the expectations of the public.”
		[17]	“Adequate training on the use of drugs, natural products, pharmacovigilance, and, more broad, breastfeeding and human lactation should be compulsory in ... Continuing Medical Education.”
		[19]	“Many participants highlighted the importance of further training and education for pharmacists in order to provide services in the community pharmacy setting ... Focus should be placed on the safety aspects of medicines used during breastfeeding, as well as general aspects of breastfeeding.”
		[26]	“These results demonstrate that respondents have different knowledge levels in the subject of maternal–fetal medicine and underscore the need for continuing professional development ... to fill the knowledge gaps of pharmacy students and practitioners in maternal–fetal medicine and to support pharmacists to deliver the proper care for pregnant and lactating women.”
		[27]	“... continuing education for pharmacists should include information, where available, regarding the use of both conventional and CMs throughout lactation ... There seems to be an opportunity and urgent need for professional organisations ... to provide CPD on medicines, including CMs, and various aspects of breastfeeding to pharmacists ...”
		[30]	“This suggests a need for raising awareness of the safety of such commonly used medicines to prevent unnecessarily conservative advice being given to breastfeeding women.”
		[17]	“In fact, all health care providers working with mothers and infants, especially prescribers, should be aware of how the care they provide can affect nursing mothers.”
		[19]	“This finding highlights the importance of educating pharmacists about the available resources, specifically not just where to find them, but also how to interpret the available information.”
		[27]	“It was suggested that raising the awareness and knowledge of pharmacists in regard to the commonly used medicines and their safety in breastfeeding would decrease the tendency to give conservative recommendations unnecessarily and improve quality use of medicines during breastfeeding.”
		[15]	“Pharmacists need to be clear about their scope of practice and skills and be able to identify the need to refer breastfeeding women to other health professionals ... This would also help foster inter-professional collaboration and relationships.”
		[19]	“Participants commented on the need for pharmacists to be informed of national health strategies in order to enhance community pharmacists’ involvement, and ultimately improving client health outcomes.”
		[8]	“Participants further cited the need for reliable information to be endorsed by organisations such as the Australian Breastfeeding Association (ABA).”
		3.2 Government levels	3.2.1 Develop/revise regulation and policies
	“Despite the lack of efficacy data for many complementary medicines, the advertising of these medicines (continued on next page)		

Table 5 (continued)

Major theme	Subtheme	Reference	Major findings
	3.2.2 Fund research	[31]	through mainstream media may positively but inaccurately affect the public's perception of the safety and efficacy of these products." "In order to assure both providers and users about safety and efficacy, more robust studies as well as better pharmacovigilance systems are needed."
	3.2.3 Provide incentives for professional services	[19]	"Funding and support for more robust studies, protocols, and better post-marketing pharmacovigilance systems are urgently needed to assure providers and users about the efficacy and safety of the most commonly used galactagogues."
	3.2.4 Provide legislative support	[29]	"It was recognised that government funding and incentives were necessary to assist with the implementation of the above mentioned strategies and services." "More focus is needed on the education, policy, guidelines and legislative support regarding safe CAM use in maternity care and the generation of clearer professional boundaries for clinicians providing concurrent care to pregnant women. The formation of explicit policies and guidelines promoting woman-centered care and assisting with the navigation of collaboration and communication pathways across the conventional-CAM divide are necessary to enable organisations, bodies and healthcare facilities to respond to consumer needs"
	3.2.5 Set up a state-based lactation resource center	[19]	"A lactation resource center in Western Australia, which would be a potential source of information for women and health professionals ... and that it would serve as a strategy for continuation of care and support in the community during the immediate postnatal period and throughout breastfeeding"
3.3 Consumer level	3.3.1 Access to reliable information	[8]	"The majority of participants expressed a need for accessible evidence-based information and more research to be conducted to facilitate safe and effective use of medicines during breastfeeding to promote successful breastfeeding and avoid unnecessary early cessation of breastfeeding"
		[9]	"Increasing their awareness of the potential issues and the availability of these resources prior to delivery or during the perinatal period may serve to better prepare breastfeeding women for the challenges ahead."
		[10]	"Our findings emphasize that mothers, along with health professionals, such as pediatricians, nutritionists, obstetricians, nurses, and lactation consultants, need evidence-based information regarding herbal and pharmaceutical galactagogues, in order to make informed choices to improve lactation and successful breastfeeding."
	3.3.2 Education about the safety of herbal products	[9]	"Some breastfeeding women may have limited knowledge on the risk and benefit profiles of herbal medicines, and the misconceptions surrounding the safety of herbal medicines are of concern. This finding highlights a need to raise the level of public awareness and to provide available information on safety aspects of using herbal medicines, at least amongst breastfeeding women."
		[11]	"It is important for nursing mothers and practitioners to acknowledge that supplements have not been evaluated in high-quality clinical trials, and limited evidence supports the safety of use. It is also important to note that many herbal preparations are sold as tinctures and fluid extract, which contain a mixture of alcohol (20%-90%), and caution should be emphasised ... Thorough patient education may promote increased awareness and minimize potential adverse effects."
		[3]	"Family especially the older generation such as maternal mother and mother-in-law, was the main source of referral on herbal consumption. Therefore, it is important to educate both mothers and grandmothers about the potential harm of taking Chinese herbal medicines."
		[19]	"Educating and raising public awareness was seen as key to promoting the safe and effective use of non-prescription medicines while breastfeeding ... Some participants suggested the awareness of the public could be increased through promotion and during prenatal classes."
	3.3.3 Education about professional services offered by healthcare providers regarding herbal products	[15]	"As the conventional scope of a community pharmacy was predominantly dispensing of prescription medicines and the supply of medicinal products, in the absence of adequate publicity, breastfeeding women were not aware of and utilising these other services"
		[19]	"Promotion of services should take place to advise the public of any new service"
	3.3.4 Education about reporting adverse effects with the use of herbal products	[17]	"Despite the fact that the pharmacovigilance and phytosurveillance reporting systems are crucial for postmarketing research in this field, they are mainly unknown by women"
3.4 Research level	3.4.1 Herbal medicines	[5]	"Limited clinical trials or large-scale studies are available to ascertain their efficacy as galactagogues. Nevertheless, this study identified the common herbal galactagogues used by women living in Australia and highlighted the need to conduct clinical research to confirm their efficacy and safety."
		[8]	"The need for research and evidence-based information on the use of herbal medicines during breastfeeding was identified by several participants ... Further research into the safety and efficacy of

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Table 5 (continued)

Major theme	Subtheme	Reference	Major findings
		[9]	herbal galactagogues and ongoing education about CAMs will enable health professionals to be equipped with the knowledge to meet the expectations of the public.” “A double-blinded randomised controlled trial (RCT) is required to determine the clinical efficacy of these herbal medicines as galactagogues and to determine to what extent, if any, their use could have a placebo effect.”
		[15]	“High quality studies are needed to ascertain the efficacy and safety of herbal galactagogues.”
		[11]	“It is critical that randomised clinical trials are conducted in this area to guide the recommendations and expand our current knowledge of these products.”
		[2]	“More research is needed to examine the safety of herbs or botanicals for women who are pregnant or in the postpartum period.”
		[19]	“There was also an overwhelming concern raised by all participants regarding the lack of evidence-based reliable clinical studies about the use of medicines, specifically CMs, and their safety in breastfeeding”
		[27]	“The lack of evidence-based, conclusive information on the use of medicines, in particular complementary medicines, and their safety profiles in breastfeeding was seen as a major dilemma when having to make clinical decisions and recommendations”
		[24]	“Researchers and practitioners should gain more insight into how women engage with, and want to engage with complementary and alternative medicine (CAM).”
		[15]	“A need was therefore identified to address the information needs and that the available (or the lack of) information about the effectiveness and safety of these medicines needs to be disseminated to breastfeeding women in an effective manner.”
		[9]	“It was clear from this study that breastfeeding women showed high levels of confidence in the safety of herbal galactagogues. This important presumption requires in-depth investigation to elicit the reasons that are informing the confidence and behaviour of breastfeeding women towards the use of herbal medicines.”
		[28]	“Our findings suggest the need for further research to examine what type of health information women seek, and qualitative methods may help to learn more about specific information practices of women of young children.”
		[24]	“Midwifery research needs to effectively engage with the issue of consumer demand, and distinguish this from consumer interest. Further research is required in relation to midwives and their pseudo consumer role of CAM use”
		[15]	“Further studies are warranted to explore pharmacists’ knowledge of and perspectives regarding the lack of high quality evidence in this area.”
		[31]	“The findings suggest that health providers need higher quality data from rigorous studies of galactagogues, and better clinical guidance, to provide evidence-based recommendations to breastfeeding clients.”
		[14]	“Guidelines on what healthcare providers should communicate and discuss in terms of potential harms and benefits are currently lacking...”
		[19]	“The development of a Lactation Safety Category and the availability of clear and practical guidelines with evidence-based recommendations would better inform and guide health professionals in making clinical recommendations.”
	3.4.2 The needs of breastfeeding mothers		
	3.4.3 Practice of health care providers		
	3.4.4 Development of lactation safety category		

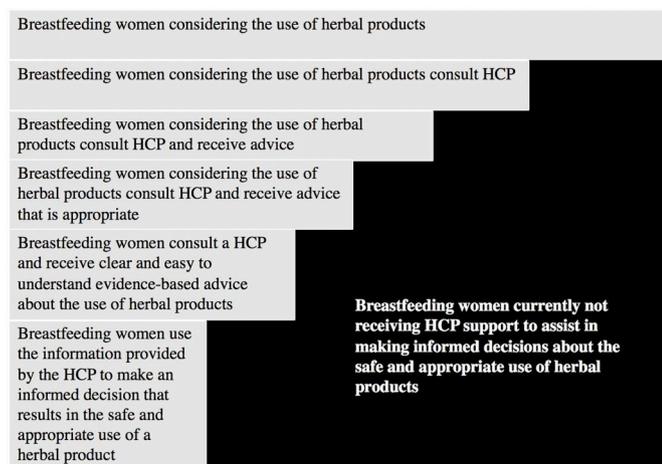


Fig. 2. The role of healthcare providers in supporting breastfeeding women who inquire about herbal products' use.

responsibilities by healthcare providers at various point of time could be a way of navigating shared care that is person centered. At the prenatal stage, it is important to first empower women who consider breastfeeding by offering breastfeeding self-efficacy-based interventions as this has been shown to decrease maternal perception of insufficient milk supply. Women with confidence in their breastfeeding capacity will not only increase the likelihood or duration of exclusive breastfeeding [32], they might also be less likely to use herbal products to increase milk supply [2,8]. Expecting mothers may also rely more on nurses/midwives at prenatal clinics or prenatal classes and therefore these healthcare providers could integrate patient education about the current evidence related to the risks and benefits of herbal products [2,8,19,24,29,33]. During the postpartum stage, breastfeeding women are more likely to visit specialists and general practitioners at their clinics providing an opportunity for further information, either verbal or written, to be provided by the healthcare providers further supporting breastfeeding women' knowledge [2,8,14,17]. During the entire breastfeeding period, given their availability and easy accessibility, community pharmacists may play a role in helping breastfeeding

women make informed choices and making any necessary referrals [5,8,9,14,15,26,27]. The role and responsibilities of pharmacists in assisting consumers make informed decision about herbal products has been discussed elsewhere and generally supported [8,15,19,27,30,34].

The enablers for the safe and appropriate use of herbal products by breastfeeding women identified in this study were multifaceted and we propose a collaborative effort is required as illustrated in Fig. 3. As previously identified, the majority of strategic and enabling actions identified in this study are centered around the role and responsibilities of healthcare providers [30,34–36] and are similar to a strategic model that was developed about the use of complementary medicines in Australia [37]. The development of the evidence base for herbal products is identified as a 'backbone' for facilitating the provision of professional care by healthcare providers to breastfeeding women. Research that evaluates the efficacy and safety and quality use of herbal products can contribute to the safe and appropriate use these medicines by breastfeeding women [2,5,8,9,11,15,19,27]. Funding from the governments and other independent sources were needed to support such studies [20,31,37]. The findings from quality research could be used to inform subsequent actions in different aspects related to herbal products: (1) the development of tighter regulations that facilitates higher standards and thus the availability of herbal products with acceptable quality, and safety and efficacy data, (2) the development of an undergraduate syllabus and continuing professional education materials that appropriately address the knowledge gaps of future and current healthcare providers, (3) identifying the scope of practice for different healthcare providers that fosters a consistent approach and inter-professional collaboration, (4) formulation of related policy and legislative support that encourage healthcare providers to improve their practice and care for breastfeeding women's needs, and (5) the development of standardized herbal products information that is accessible by breastfeeding women and healthcare providers.

There are many other studies that have identified the barriers and enablers summarized in this review. However, what is unique about the strategic model proposed here is the broader holistic approach presented, that has taken into account the reality of the breastfeeding women journey and the various healthcare providers she may encounter. Importantly, this study highlights through the proposal of a collaborative and strategic model the potential impact that could be

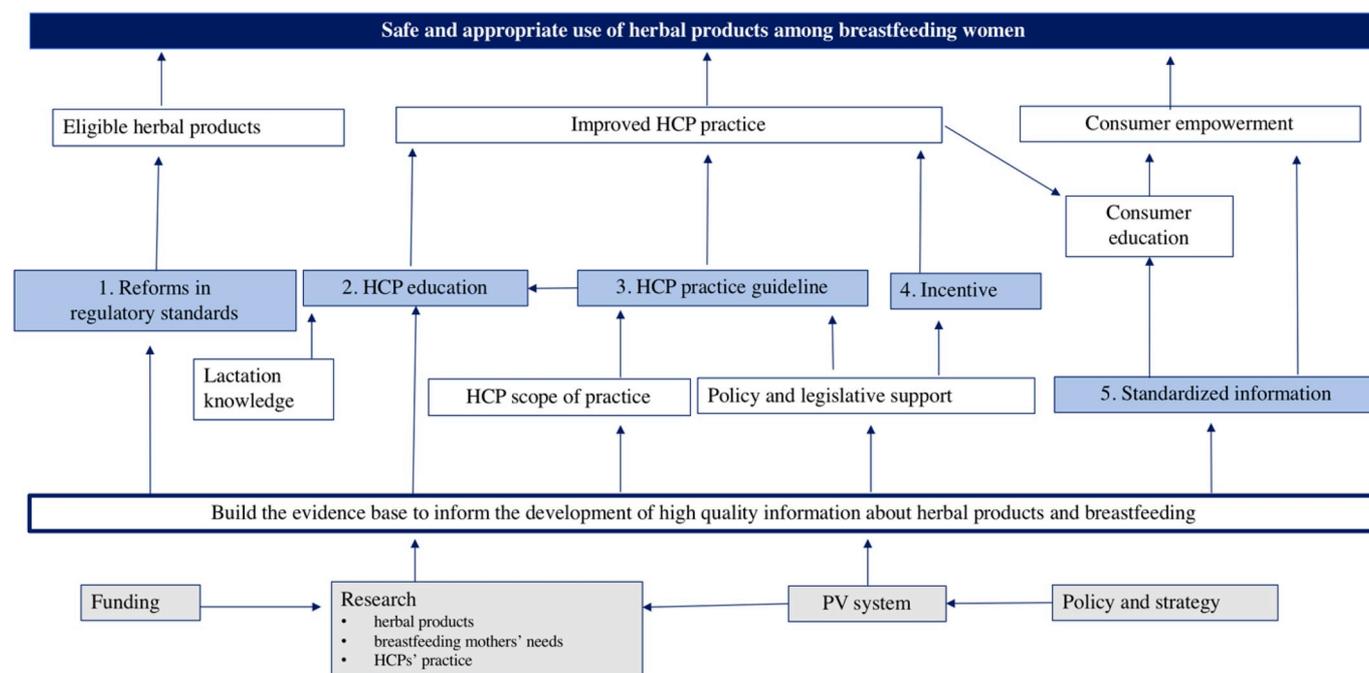


Fig. 3. Collaborative efforts supporting the safe and appropriate use of herbal products. by breastfeeding women.

made to promote the safe and appropriate use of herbal products among breastfeeding women. We encourage further research in this area. Another important theme emerged from this study is the need to pay attention to the mothers' stress factor. Negative emotions among mothers especially during postpartum period are common but usually under-recognised [38]. Healthcare providers being more sensitive to the mothers' emotional state during the discussion will not only help convey information about herbal products, this will also help to detect any potential issues about the mothers' emotions which might have profound implications to both the mothers and their children.

4.1. Limitations

There were some limitations to this study. This review only selected English studies. The results presented in this review are obtained from a number of studies conducted in different countries and therefore some of the findings may be more or less relevant to individual countries. In order to capture the most updated viewpoints on the research question, only the literature published after 2013 was included. Non-English articles and those published before 2013 which might be relevant to the study topic were excluded.

5. Conclusion

Given the prevalent use of herbal products by breastfeeding women and the numerous gaps that exist in ensuring the safe and appropriate use of such products, multifaceted interventions that involve key stakeholders including government, professional associations, healthcare providers, education and research institutes are needed. While the need for research on safety and efficacy remains, healthcare providers could at least inform breastfeeding women about the available current scientific knowledge about herbal products and direct them to reliable information sources. In light of the heavy reliance on peer support, professional bodies and governmental health departments could consider working with support groups to provide quality information/education aimed at improving the health literacy of women related to herbal product use. Inter-professional communication and collaboration is encouraged to address the needs of women as they transition through the prenatal, postnatal and entire breastfeeding period.

Declarations

Ethics approval and consent to participate

Not applicable.

Consent for publication

Not applicable

Availability of data and material

All data generated or analysed during this study are included in this published article.

Competing interests

Not applicable.

Funding

This study was funded by the National Center for Licensed Pharmacist Development at the China Pharmaceutical University (201805).

Authors' contributions

CU and JH conceptualized the study. TZ and CU performed the literature search. TZ, JH and CU conducted data analysis. TZ, HH, DNY and WJC drafted the manuscript. JH, HH and CU conducted a critical review of the manuscript. All authors read and approved the final manuscript.

Acknowledgements

We are grateful for the contributions of all authors to this manuscript.

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