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Systematic Review

Effectiveness of Oral Herbal in Postpartum and Breastfeeding

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ABSTRACT

Background: *Health care during the postpartum and breastfeeding periods fulfils the needs of the mother and baby. 'Jamu', or herbal medicine, is often used for this purpose, but there needs to be more evidence of its effectiveness. The public's insufficient understanding of herbal medicine necessitates a systematic review to assess its contents, benefits, and side effects. The systematic review aimed to examine oral herbal medicines during puerperium or breastfeeding, using the RCT method to provide evidence of IB levels in EBM.*

Methods: *Inclusion criteria were articles in randomised controlled trials (RCTs) to investigate the effectiveness of oral herbs during the puerperium and lactation. The methodological quality of articles was tested with the Jadad Score.*

Results: *The five (5) selected articles have good quality (the Jadad Score was 5–8). The study tested five herbs, including fenugreek, honey, bitter fennel, Brazilian propolis, barley malt, and Thai herbal tea "Wang Nam Yean" (a mixture of sappan wood (secang), bael (maja) fruit, licorice, ginger, and tuba (Derris scandens)). Comparators included placebo and other herbs or Domperidone. Most clinical outcomes involved successful breastfeeding, but complications, infant weight gain, and side effects were also observed.*

Conclusion: *Herbs can aid in healthy breastfeeding, but they should be taken cautiously and in conjunction with the assessment, counselling, and support of healthcare professionals. No herbal medicine has the best evidence-based practices because the evidence has not been applied to clinical practice, so changes in clinical practice results have yet to be documented.*

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INTRODUCTION

A mother experiences the postpartum period from when the baby is born until the following six weeks, accompanied by the recovery of the reproductive organs. Breast milk is the first, primary, and best food for babies, which is natural, so the care of breastfeeding mothers focuses a lot on increasing milk production during the postpartum period. The needs of breastfeeding mothers during the postpartum period are not just enough breast milk.

Based on the objectives, postpartum services are carried out to meet the needs of mothers and babies, which include prevention, early detection, and treatment of complications and diseases that may occur, as well as provision of breastfeeding services, how to space pregnancies, immunisations, and nutrition for breastfeeding mothers (Kumalasari et al., 2014; Sukarsi, 2020).-Health services during the postpartum period can be carried out by optimising the use of herbal medicines. However, there is much debate about whether there is evidence related to using herbal medicine or herbs during the postpartum period that supports their effectiveness.

Herbal medicines could be helpful, but quality and safety issues must be considered. The use of subpar raw ingredients and inadequate quality control procedures may harm the effectiveness of herbal medications. Herbal medicines appear less dangerous than conventional ones since they are typically considered natural and pure. Regretfully, it is impossible to conclude that these drugs are entirely free of issues like toxicity and adverse effects (Babelghaith et al., 2024).

Evidence-based medicine (EBM) uses scientific methods to improve healthcare decisions by combining the latest data, clinical experience, and patient values. EBM begins with a clinical question and seeks relevant scientific evidence, including research and opinion. The strength of the evidence is evaluated, with more substantial evidence carrying more significant weight in clinical decisions, thereby ensuring better patient care. Clinical evidence derived from research results using a well-designed randomised control trial (RCT) method is level 1b in the EBM ranking and is the gold standard for clinical treatment guidelines (Tenny & Varacallo, 2022).

The problem is that the use of herbal medicine in the postpartum period is mostly only empirical or only based on experience. Herbal medicine faces obstacles, particularly with the rise of modern medicine and the pharmaceutical business. The discourse on the use of herbal medicine in the current day includes crucial themes such as safety, standardisation, and scientific confirmation (Widjaja, 2024). The public's lack of knowledge regarding herbal medicine is due to the need for more information about its contents, benefits, and side effects. It causes herbal medicine users to consider its effects and safety less.

The public still sees that anything traditional is good, so they pay less attention to the contents and effects of the products they consume (Triyantoro, 2020). It prompted the conduct of this systematic review. The review was done systematically to describe the effectiveness of oral herbal medicines during puerperium or breastfeeding. A review was carried out on oral herbal medicine research articles using the RCT method to provide evidence of IB levels in EBM.

MATERIALS AND METHOD

This research was descriptive. The systematic review described the herbal medicines or herbs used during the postpartum period. Researchers systematically searched articles through the Pubmed, ScienceDirect, and Ebsco databases. The search keywords were "herbs and oral and (breastfeeding, lactation, or postpartum)". Articles published in the last ten years were selected by researchers for review.

The inclusion criteria were oral herbal articles using a randomised control trial (RCT) method, open access, and examined the effectiveness of herbal medicines during the puerperium. Meanwhile, excluded articles were articles in the form of reviews, not published in English, and needed more complete information. The article search began in January 2023 and continued until February 2023 by entering keywords into the target

database. The results of all articles captured using keywords were saved in the form of the citation manager application dot nbib (.nbib) to be entered into Mendeley.

The results obtained a total of 1294 articles from 3 databases. Further screening was carried out to eliminate duplicate articles and examine the suitability of the articles based on the title and abstract from March 2023 to April 2023. The result is 14 articles ready to be tested for eligibility based on predetermined criteria. The results of 14 full-text articles were tested again for eligibility, so five articles met the inclusion-exclusion criteria. The five articles were tested for methodological quality, and data extraction was done.

The methodological quality test and extraction data were held at Mei 2023. The methodological quality of the publications was assessed using the JADAD Score, which has eight assessment components. These eight assessment components can be used as critical appraisal tools to determine the validity of research. The eight components of the assessment consist of a description of randomization, how to carry out randomization, a description of blinding in research, a method of conducting blinding, a description of sample withdrawal or dropout, a description of inclusion and exclusion criteria for research samples, methods for determining adversary effects, and statistical analysis used to assess clinical outcomes.

A scale of 1–3 is used for low-quality articles and a scale of 4–8 for high-quality articles. The researcher used the PICO (patient, intervention, comparator, and outcome) method to extract data. Data was tabulated to determine the effectiveness of traditional or herbal medicine in the postpartum period or for breastfeeding mothers. The synthesized data was collected narratively by discussing the data that the researchers had extracted. Data synthesis was carried out in May 2023, and reporting was carried out in June 2023.

RESULTS

Five articles were selected based on the selection criteria, as shown in Figure 1. The minimum jaded score is 5, and the maximum score is 8. It indicates that the articles were of good methodological quality. The herbal medicines used included fenugreek seeds, honey, bitter fennel seeds, barley malt (jali-jali), Brazilian propolis, and wang nam, which means tea. The comparators are herbal or other medicines (2 articles) (Mathew. et al., 2018; Simbar et al., 2022).

Placebo (2 articles) (Igarashi et al., 2019; Wesolowska et al., 2021) and Domperidone (1 article) (Saejueng et al., 2022). The dosage form used is drip syrup (Simbar et al., 2022), Simplicia stew (Mathew et al., 2018), powder drink (Wesolowska et al., 2021), capsule (Igarashi et al., 2019), and tea (Saejueng et al., 2022). The effectiveness tested is breastfeeding success, infant weight gain, atopic sensitization, herbal side effects, neonatal conditions, and subject satisfaction.

The results of article extraction can be found in table 1 stated that the mean BFS in the fenugreek and honey combination groups was significantly different. Adding honey to fenugreek makes this combination superior in increasing BFS compared to fenugreek alone. However, the incidence of complications in the fenugreek and honey combination group was more significant than in the fenugreek alone group, especially maternal complications of nausea, vomiting, and infant diarrhea. Complications in the form of maternal gastrointestinal problems occurred more frequently in the fenugreek alone group compared to the fenugreek and honey mixture group (Simbar et al., 2022).

RCT research comparing fenugreek and fennel stated that there was no significant difference in the effectiveness of the two herbs in increasing breastfeeding success. It can be seen in the p-value results for lactation rate, baby's weight, and lactational level, which are at a significance of 0.05. Fenugreek and fennel were equally effective in increasing lactation rate and baby weight growth (Mathew et al., 2018).

Breast milk volume began to differ significantly when research subjects in both groups consumed herbs from the seventh to the eleventh day, which was indicated by a p-value of less than 0.05. Barley malt increases breast milk volume during lactation (Wesolowska et al., 2021). Brazilian propolis did not affect atopic sensitisation or nonspecific symptoms Compared to Domperidone. Adverse events in the form of nausea in one woman in the propolis group should be a concern. Giving propolis to breastfeeding mothers must consider its efficacy and safety (Igarashi et al., 2019).

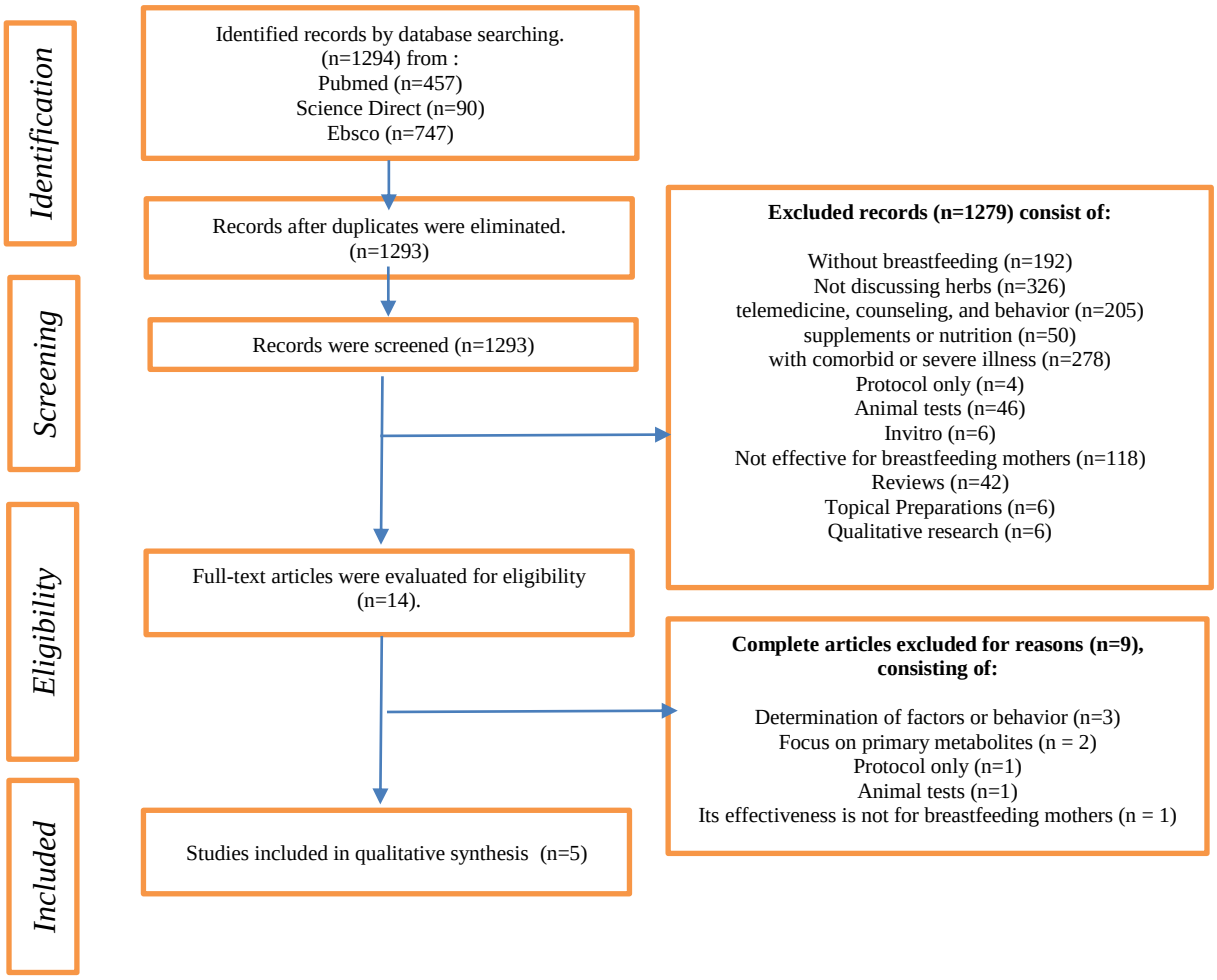

Figure 1. The Prisma Flow Diagram to Explain the Selection Process

Table 1. Extraction Results Review of the Effectiveness of Herbs in the Postpartum and Breastfeeding Period

Research theme (author)	Research Design	Jadad Score	Patient	Intervention	Comparator	Outcomes	Result	Conclusion
RCT to assess the effects of "combination of honey and fenugreek" and "fenugreek only" on breastfeeding success (Simbar et al., 2022)	A triple-blind randomized parallel clinical trial was conducted to compare the effect of "a combination of honey and fenugreek" with "fenugreek" on breastfeeding success—the herb in guttae form. Participants received 30 liquid drops three times daily for four weeks. The BFS form was completed twice, once before the intervention and again four weeks after. The CONSORT form was used.	8	39 vs 36 Breastfeeding mother 15 months	*Trigonella foenum-graecum* (fenugreek) + Mell depuratum (honey)	*Trigonella foenum-graecum* (fenugreek)	1. Breastfeeding success (BFS score) 2. complications	1. mean (SD) of BFS before and after intervention a. Fenugreek and honey group = 72.97 (6.72) versus 77.80(12.19), p-value t-test = 0.035 b. Fenugreek group = 77.46(7.30) versus 76.33(8.08), p-value t-test = 0.388 2. Mean (SD) of the Between-groups comparison, fenugreek and honey group versus fenugreek only group = 78.67 (1.71) versus 75.53(1.64), the p-value of ANCOVA = 0.023 3. Proportion of complication between fenugreek and honey group versus fenugreek group a. Maternal nausea and vomiting 1(2.8%) versus 0(0%) b. Maternal gastrointestinal problems 1(2.8%) versus 2(5.1%) c. Diarrhea of infant 1(2.8%) versus 6(15.4%)	BFS significantly improved when fenugreek and honey were combined, while BFS did not improve when fenugreek was used alone.
RCT to Evaluate the Effects of Fenugreek (Methi) Versus Fennel (Saunf)	Quantitative approach with 'RCT pre-test post-test design', based on Ludwig von Bertalanffy Systems	5	15 vs 15 Ten days to 3 months postpartum	*Trigonella foenum-graecum* (fenugreek)	*Foeniculum vulgare* (fennel)	1. 2. baby's weight growth	1. Mean value of Lactation rate: a. Fenugreek, before versus after = 4.75 versus 4.584 b. Fennel, before versus after = 4.729 versus 4.566	There was no significant difference in lactation rate in the fennel and fenugreek tea groups. Both herbs were equally effective

Research theme (author)	Research Design	Jadad Score	Patient	Intervention	Comparator	Outcomes	Result	Conclusion
on Lactation among Lactating Women in a Selected Community of New Delhi (Mathew et al., 2018).	model. Double-blind. The herb was administered in an infused dosage form for seven consecutive days. The babies' weights were recorded in the recording sheet before and after breastfeeding on all seven days.						2. T-value of baby's weight: a. Fenugreek, 't' value of 17.21 was significant at a 0.05 level b. Fennel 't' value of 21.51 was significant at a 0.05 level c. The average (approximate) ideal weekly weight gain of babies according to age and the obtained weight gain was computed using the 't' value. It was found to be 4.55, which was significant at 0.05 level. 3. Comparison of lactational levels between post administration of fennel and fenugreek, p-value = 0.96, which was not significant at 0.05 level	in increasing lactation rate and baby weight growth.
RCT to test the barley malt-based composition as a galactagogue in preterm moms (Wesolowska et al., 2021).	Randomized-placebo-controlled study. Double-blind. The herb and placebo were given in the form of formula milk. The primary outcome was the volume of milk expressed by mothers during the first two weeks after	8	40 vs. 40 people Breastfeeding mothers with premature birth on the second day to 14 days postpartum	barley / jali-jali (*Hordeum vulgare*)	placebo	1. Breast milk volume at last visit, 2. total breast milk volume during the study	1. Mean (SE) 0f Breastmilk volume (ml), experiment group versus placebo = 6036(498) versus 4209 (335). P-value = 0.003 2. Mean (SE) of total expression time (min), experiment group versus placebo = 2280(123) versus 2211(114), p-value = 0.68 3. Mean (SE) Number of	Barley malt was effective and safe in increasing the amount of breast milk by 500 mL/day in minimum target volume at the first week of lactation.

Research theme (author)	Research Design	Jadad Score	Patient	Intervention	Comparator	Outcomes	Result	Conclusion
	delivery, and the secondary outcome was the product's safety. The total treatment was 14 days.						expression sessions, experiment versus placebo = 85(2) versus 82(2), p-value = 0.27 4. Mean (SE) Duration of study (days), experiment group versus placebo = 12(0,2) versus 12(0,2), p-value = 0.40 5. Total breastmilk volume during the study: Mean (SE) of the daily volume of milk in the Galactagogue Group was still statistically significantly higher from day 7 to day 11 in comparison to the Placebo Group a. Day 7^{th} = 508.6(48.2) versus 359.5(29.7). p-value = 0.01 b. Day 8^{th} = 556.4 (0.6) versus 398.9 (32.0). p-value = 0.01 c. Day 9^{th} = 594.3 (54.0) versus 421.4(34.1), p-value = 0.008 d. Day 10^{th} = 579.5(48.0) versus 449.7(34.4). p-value = 0.03 e. Day 11^{th} = 605.8 (52.4) versus 469.2(37.9), p-value = 0.03	
RCT of Brazilian Propolis	Multicenter, double-blind, placebo-controlled trial.	8	40 vs 40 Breastfeeding mothers with	Brazilian propolis	placebo	1. atopic sensitization (IgE level),	1. Total IgE > 10UA/ml was detected in 26 (84%) newborns whose mothers	Supplementing with Brazilian propolis did not affect the risk of

Research theme (author)	Research Design	Jadad Score	Patient	Intervention	Comparator	Outcomes	Result	Conclusion
Supplementation for Japanese Lactating Women in the Case of Atopic Sensitivity and Nonspecific Symptoms in Their Offspring (Igarashi et al., 2019).	Propolis and placebo in capsule form. The examination is done as outpatients every month.		atopic sensitivity and their babies aged two months to 1 year			2. nonspecific allergy symptoms (eczema in mothers and babies), 3. side effects (Nausea, vomiting, inpatient events).	were administered propolis, which was not statistically different from the 19 (86%) given placebo (P = 0.80). 2. Total IgE, a continuous measure, showed no significant difference between the propolis and placebo groups (P value = 0.70). 3. Antigen-specific IgE levels for mites, egg white, cow's milk, and wheat, as dichotomous and continuous variables, showed no significant difference between the two groups. 4. The two groups had no significant differences in subjective improvements of nonspecific symptoms, except for one woman with temporary and mild Nausea in the propolis group.	atopic sensitization in babies compared to a placebo, nor did it help or exacerbate nonspecific symptoms in mothers or their children.
RCT of Wang Nam Yen for human milk production (Saejueng et al., 2022).	a three-arm, double-blind, randomized controlled study on human milk production. Wang Nam Yen, placebo, and Domperidone in tea bag form. The primer outcome was breast milk volume observed 72 hours	8	40 people on the tea and placebo tab, 40 people on the domperidone tab and placebo tea, 40 people on the tea and placebo tab	Wang Nam Yean tea	Domperidone and placebo	1. 72 hours postpartum breast milk volume 2. neonatal Conditions, 3. side effects, 4. participant satisfaction	Outcome between herbal tea, Domperidone, and control : 1. Milk volume at 24 hours (ml; mean ± SD) = 10.0 (1.4) versus 3.8(7.6) versus 2.6(6.2), p-value 0.036 a. P-value herbal versus placebo = 0.039 b. P-value domperidone versus placebo = 0.453 c. P-value herbal versus	Wang Nam Yen herbal tea and Domperidone were shown to be equally beneficial in increasing breast milk production at 72 hours postpartum in moms who had undergone cesarean delivery.

Research theme (author)	Research Design	Jadad Score	Patient	Intervention	Comparator	Outcomes	Result	Conclusion
	after delivery. Another secondary outcome was observed 72 daily.		Breastfeeding mother with Caesarean birth 28 to 42 weeks of gestation				domperidone = 0.089 2. Milk volume at 48 hours (ml; mean ± SD) = 28.0 ± 39.8 versus 28.4 ± 40.8 versus 17.2 ± 16.5, p-value 0.256 3. Milk volume at 72 hours (ml; mean ± SD) = 57.5 ± 50.7 versus 60.9 ± 70.7 versus 31.9 ± 27.7, p-value = 0.030 a. P-value herbal versus placebo = 0.007 b. P-value domperidone versus placebo = 0.018 c. P-value herbal versus placebo = 0.806 4. Maternal complication (Postpartum endometritis) = 0 (0.0%) versus 0 (0.0%) versus 1(2.5%), p-value =0.365 5. Neonatal complication a. Neonatal jaundice = 4(10%) versus 0(0%) versus 2(5%), p-value = 0.127 b. NICU admission = 1(2.5%) versus 2(5%) versus 3(7.5%), p-value 0.591 6. Drug adverse event at 24 hours = 1(2.5%) versus 1(2.5%) versus 0(0%), p-	

Research theme (author)	Research Design	Jadad Score	Patient	Intervention	Comparator	Outcomes	Result	Conclusion
							value 0.601 7. Satisfaction was measured from feelings of enjoyment when breastfeeding when using galactagogue, problems with breastfeeding, concerns about adverse events, the decision to continue using, willingness to recommend informing others about galactagogue, and using galactagogue in subsequent pregnancies. The result was that there was no difference in participant satisfaction between the three groups, as seen from the p-value for each variable, which was more than 0.05.	

Wang Nam Yean herbal tea was more effective in increasing breast milk volume when compared with placebo than tea compared with Domperidone. It can be seen in the results of breast milk volume at 24 hours and 72 hours. The herbal tea group and the domperidone group both did not experience maternal complications in the form of postpartum endometritis.

Neonatal jaundice occurred more frequently in the herbal tea group than in the domperidone group. Meanwhile, NICU admission also happened in the Wang Nam Yean group, although the incidence was more minor than with Domperidone. Drug adverse events occurred in the herbal tea and domperidone groups in 1 study subject each (2.5%).

The study found no significant difference in participant satisfaction between the three groups when using galactagogue, based on factors such as enjoyment, problems, concerns, the decision to continue, and willingness to recommend. Wang Nam Yean herbal tea increased the volume of breastmilk during the postpartum period. However, no significant differences were found in neonatal conditions, side effects, or participant satisfaction outcomes. There is no significant difference between herbal and positive control.

DISCUSSION

All five articles had a blind RCT research design. If we look at the research design, the five articles are phase IIa clinical trials. This can be seen from the number and nature of research subjects, objectives, and time the research takes place. Phase II clinical trial recruits around 5-100 patients of either sex. Due to the specific nature of galactagogue research, it is impossible for men to be research subjects.

The research uses the effective dosage and the therapeutic effects on patients. It decides the therapeutic regimen and drug-drug interactions—usually, multicentre studies. Phase II is divided into two groups. Phase IIa decides the drug dosage, includes 20–30 patients, and takes up to weeks or months. Phase IIb studies dose-response relationships, drug-drug interactions, and comparison with a placebo. Phase II clinical trials still require continuation to phase III clinical trials, especially if the herbs used have changed shape into various pharmaceutical dosage forms.

The phase III clinical trial is the therapeutic confirmatory trial, with more than three hundred research subjects, and is multicenter. This clinical trial is a premarketing phase that examines the efficacy and safety of the drug. The next test is the phase IV clinical trial, a post-approval study. It does phase IV after approval/post-licensure and post-marketing/surveillance studies. It follows up on the patients for a long time for potential adverse reactions and drug-drug interactions (Kandi & Vadakedath, 2023).

Fenugreek seeds combined with honey have higher effectiveness than fenugreek seeds alone. Honey can be used to increase the effectiveness of fenugreek and other galactagogue herbs. This effect is because honey can improve intestinal performance as a prebiotic, antioxidant, and anti-inflammatory activity (Mathew et al., 2018; Simbar et al., 2022).

The complications experienced by the fenugreek and honey mixture group were maternal nausea and vomiting (1(2.8%)), maternal gastrointestinal problems (1(2.8%)), and diarrhoea in infants (1(2.8%)). The gastrointestinal issues included pain, constipation, indigestion, and diarrhea. Maternal nausea and vomiting incidence only occurred in the fenugreek and honey mixture group. Gastrointestinal problems occurred

more frequently in the fenugreek-only group than in the fenugreek and honey mixture group.

Diarrhoea in infants occurred more frequently in the fenugreek alone group than in the fenugreek and honey mixture group (Simbar et al., 2022). Preliminary human experiments indicated that the administration of fenugreek appears to be potentially related to clinical side effects such as diarrhea, dyspepsia, abdominal pain, flatulence, and hypoglycemia (Ouzir et al., 2016). Honey added to fenugreek can increase maternal nausea and vomiting, according to research results (Simbar et al., 2022).

Honey bees may forage up to several kilometers from their colonies. Thus, they make honey from various plants, including dangerous species. If the quantity of flowering hazardous plants or, in some cases, honeydew from insects that feed on poisonous plants is high during a given season, the honey may acquire a substantial amount of natural toxins such as grayanotoxin, resulting in "Mad honey poisoning."

The symptoms of honey poisoning vary depending on the type and concentration of the poisons. Common symptoms include nausea and vomiting. In severe circumstances, low blood pressure, shock, or even death may result (CFS, 2018).

Only a minimal number of cases of anaphylactic shock due to consumption of mad honey have been documented. The adverse effects of mad honey consumption include heart diseases such as hypotension, atrioventricular block, atrial fibrillation, asystole, and, in rare cases, central nervous system (CNS) disorders such as convulsions and syncope. Grayanotoxin I and III isoforms discovered in rhododendrons are thought to be responsible for such instances. These toxins interfere with the voltage-gated sodium channels by binding them in the active state, causing hyperpolarisation consequences (Jha et al., 2024).

Maternal gastrointestinal problems were higher in the fenugreek-only group than in the mixture of fenugreek and honey group. Clinical literature supports this, stating that honey can treat several gastrointestinal tract diseases, including diarrhea, peptic ulcer, dyspepsia, periodontal disease, and other oral problems. Honey can also inhibit the growth of H. pylori bacteria (Babelghaith et al., 2024).

Small numbers of pollen grains may be present in raw honey. There have been reports of adverse responses after consuming raw honey that contained pollen. Symptoms might range from oral mucosal irritation to anaphylactic shock. People allergic to pollen or severe seasonal allergies (hay fever) should know the risks of eating raw honey.

The pollen of large amounts of honey during proper processing dilutes any hazardous substances for commercial honey. On the other hand, raw or wild honey from small-scale beekeepers or honey hunters may not have been treated to dilute certain poison levels (CFS, 2018). Diarrhea in infants occurred more frequently in the Fenugreek group than in the Fenugreek-honey mixture group. Breastfeeding babies may get diarrhoea due to antibiotics, parasites, viruses, or dietary changes in their mothers (Allison, 2024).

Diarrhea in babies may also be caused by allergies experienced by the mother when consuming fenugreek. There have been reports of allergic responses, asthma flare-ups, and a 14% drop in serum potassium after taking fenugreek (National Library of Medicine, 2024). There was no significant difference between boiled fenugreek and boiled bitter fennel on lactation levels. Fenugreek is believed to stimulate sweat production, and because the breasts have modified sweat glands, milk production can occur in this way.

A study using in vitro tests found that Fenugreek seeds contained estrogen-like compounds and stimulated pS2 expression in the MCF-7 cell line. Phytoestrogens are chemically similar to endogenous estrogens and can bind to estrogen receptors. Bitter fennel has been used as an estrogenic agent for centuries with a mechanism similar to fenugreek, which is the presence of phytoestrogens that are chemically similar to endogenous estrogens and can bind to estrogen receptors. Therefore, they have the potential to act as estrogen agonists or antagonists that can change the structure or function of the endocrine system (Patel et al., 2013).

RCTs that compared the effectiveness of barley malt and placebo showed that the breast milk volume in the *jali-jali* seed group was significantly higher than placebo. Jali contains maltose and β-glucan. Preliminary studies conducted with experimental animals show that polysaccharides, such as β-glucan, can increase milk production by a prolactin-dependent mechanism after intravenous injection (Wesolowska et al., 2021).

The increase in breast milk volume began to differ significantly when research subjects in both groups consumed herbs for seven days. The significant differences continued until the eleventh day. It has to do with the mother's serum progesterone levels. The mother generates a small amount of breast milk, particularly colostrum, within 48 hours following giving birth.

However, more breast milk will be produced up to four days postpartum when serum progesterone levels drop considerably. Lactogenesis may be delayed if the infant is born before its due date. Galagtagagogues can stimulate the production of breast milk and pituitary prolactin by antagonistically interacting with dopamine. Galactagogue works best when administered three weeks after delivery.

Eight hours after the initial dose, prolactin levels rise. However, breast alterations take roughly two weeks to sustain milk production. Based on a limited number of controlled research and long-term controlled clinical trials, a safe length of galactagogue administration should be 10–14 days (McGuire, 2018). RCTs comparing Brazilian propolis with placebo demonstrated that Brazilian propolis did not affect the atopic sensitization risk in infants.

However, it could not improve or exacerbate nonspecific symptoms in mothers or infants (Igarashi et al., 2019). Propolis is a valuable resinous substance produced by various bee species, including *Apis mellifera* honeybees and *Meliponini stingless* bees. Each species' propolis is unique, with different chemical makeup. Botanical species within a radius of up to a few kilometers around beehives significantly impact propolis's composition and physiochemical content (Zullkiflee et al., 2022).

Several preclinical investigations have shown that propolis has therapeutic effects against allergic and inflammation symptoms, which may partly be attributable to its inhibitory effect on mast cell and basophil activity. Clinically, utilizing propolis as an additional or extra treatment is safe and lowers many pathological states of asthma (Liew et al., 2022). Propolis is used to treat respiratory tract illnesses such as asthma. Artepillin C, baccharin, caffeic acid phenethyl ester (CAPE), chrysin, galangin, kaempferide, kaempferol, naringenin, pinocembrin, benzyl caffeine, geranyl caffeate, and 3-methyl-2-butenyl caffeine are the active ingredients for asthma.

The compound's mechanism involves inhibiting mast cell degranulation, allergen-induced inflammation, and ROS generation. It inhibits NF-κB expression in macrophage cells and has anti-inflammatory and anti-allergic properties. Caffeic acid, CAPE, cinnamic acid, aromandendrin, N-acetylcysteine, and p-coumaric acid can help cure chronic obstructive pulmonary disease (COPD) by preventing acute lung

inflammation, reducing stomatitis, oral infections, and dental plaque, inhibiting the NF-κB pathway, and decreasing pro-inflammatory cytokines (Zullkiflee et al., 2022).

One woman had an adverse event as mild Nausea in the propolis group (Igarashi et al., 2019). There are still few studies that report the adverse effects of propolis. A study even reported that propolis is effective as an antiemetic to treat nausea caused by using antituberculous drugs (Mahani et al., 2021). Studies report allergic reactions as an adverse event from the use of propolis. Similar to honey, eating pollen can cause allergic reactions in humans.

There have been numerous case reports of severe hepatitis brought on by consuming bee pollen. There are case reports of allergies, anaphylaxis, acute asthma exacerbations, and fatalities. There are published case reports of fixed-drug eruptions caused by propolis. To overcome this, the type of product, origin of plant species, processing methods, and dosage forms must all be standardized. All the parameters above have been proven to influence propolis' appropriate dose and duration, safety, and effectiveness (Babelghaith et al., 2024).

Wang Nam Yean tea contains 500 mg sappan lignum (*Caesalpinia sappan* Linn.), 500 mg bael fruit (*Aegle marmelos* L. Corr), 500 mg licorice (*Glycyrrhiza glabra* Linn.), 500 mg ginger (*Zingiber officinale* Roscoe), and 500 mg tuba (*Derris scandens* (Roxb.) Benth) (Saejueng et al., 2022). The results of the Wang Nam Yean compared to Domperidone at RCT showed no differences between the Wang Nam Yen and the Domperidone groups in 72-hour milk volume, neonatal status, side effects, and group satisfaction (Saejueng et al., 2022). Consuming bael fruit once a day can help increase prolactin and corticoid production. Bael fruit juice with ginger and a pinch of jaggery can enhance the galactagogue action (Basu, 2023).

Some mothers in Turkey have reported using licorice to improve the taste and quality of breast milk. Licorice is an approved galactagogue used in several Asian preparations to increase milk production. However, there have been no scientifically valid clinical studies demonstrating this use. Licorice tends to decrease serum prolactin, which can reduce breast milk production in early lactation. Women who consumed licorice experienced increased blood pressure (LactMed, 2021).

Tuba is often used traditionally as an anti-inflammatory, with the main active component being genistein glycoside derivatives (isoflavones). Tuba is contraindicated in pregnant women and should be used cautiously in patients with gastric ulcers because it exhibits an anti-inflammatory mechanism similar to non-steroidal anti-inflammatory drugs (NSAIDs) with inhibition of prostaglandin production (Ayameang et al., 2020). Sappan wood is usually used traditionally as a blood purifier. Sappan also has emmanagogic, solid qualities. Sappan is known to have blood vitalizing activity.

It is used in treating toxic side effects due to radiation and chemotherapy in traditional Chinese medicine (Mathew et al., 2007). Sappan is an agent to reduce the toxicity of liquorice and bael fruit of Wang Nam Yean. However, its use must still be careful and according to the recommendations from health professionals. Galactagogues should not replace the evaluation and counselling of variable factors affecting milk production. From Wang Nam Yean's research, it can be concluded that the responsible use of herbs should be accompanied by assistance and counselling from health workers (LactMed, 2021).

One woman had maternal complications, such as postpartum endometritis, in the placebo group. No previous research has discussed maternal endometritis as an adverse event from the use of herbal tea. Endometritis is an infectious inflammation of the

endometrium, often underdiagnosed and challenging to treat. It requires antibiotics, prompt diagnosis, and collaboration among multidisciplinary specialists.

Pregnant women are less likely to contract endometritis due to the amniotic barrier and increased risk of infection due to cervix dilation and tear. Postpartum endometritis is associated with various risk factors, one of which is a caesarean section (Taylor et al., 2023). Postpartum endometritis is a clinical diagnosis involving unexplained fever in postpartum patients. Early-onset symptoms occur within 48 hours of delivery, while late-onset symptoms occur within six weeks. Laboratory studies can help exclude differential diagnoses or monitor for infection.

Leukocytosis is normal, but peripartum chorioamnionitis and postpartum endometritis often present leukocytosis of 15,000 to 30,000 cells/μL. Urinalysis and culture should be obtained to rule out urinary tract infections. Pelvic ultrasound is usually the first-line modality, but imaging is rarely helpful unless an alternative diagnosis is suspected. Pelvic CT may be considered in some alleged conditions.

To prevent endometritis, the doctor will give antibiotics before and after curettage, cesarean section, or prolonged abor. The use of several antibiotic regimens is also a guideline for the treatment of maternal endometritis (Taylor et al., 2023). Six infants developed jaundice, two in the control group and four in the herbal tea group. Six infants required neonatal intensive care unit admission due to the newborn's respiratory distress syndrome or transient tachypnea: one in the Wang Nam Yen herbal group, two in the domperidone group, and three in the placebo group (Saejueng et al., 2022).

In this study, neonatal jaundice and NICU admission were adverse events for babies born via caesarean section. There has been no previous research that states the effectiveness of herbal tea or Domperidone in reducing jaundice or NICU incidence due to respiratory distress syndrome or transient tachypnea of the newborn. Neonatal jaundice, or hyperbilirubinemia, is a condition where an infant's skin accumulates bilirubin, causing symptoms like jaundice.

It can be unconjugated or conjugated, with unconjugated being the most common cause. Common causes include dehydration, early birth, and medical issues. Premature newborns' livers struggle to eliminate bilirubin effectively (Ansong-Assoku et al., 2024). Neonates undergoing elective C-sections between 35 and 38 weeks of gestation have been linked to respiratory morbidity. Transient tachypnea of the newborn (TTN) and respiratory distress syndrome (RDS) are the most often encountered respiratory abnormalities in infants admitted to the neonatal intensive care unit (NICU).

To reduce the likelihood and severity of respiratory distress in newborns undergoing elective C-sections, the use of prenatal corticosteroids has been suggested as a viable preventive measure. TTN is a frequent respiratory condition that causes distress soon after birth, along with tachypnea. Due to insufficient respiratory epithelial sodium ion transport and lung fluid reabsorption, it is frequently seen in term or near-term newborns. It is linked to delayed lung fluid clearance.

During the early neonatal period, infants delivered via C-section to moms who are fat and diabetic are more likely to experience TTN, respiratory distress syndrome, and hypoglycemia (Yeganegi et al., 2024). Wang Nam Yen herbal tea and Domperidone were found to have no severe side effects on mothers or infants, with most participants recommending them for increasing milk volume production. One participant reported diarrhea, and one participant reported dry mouth, which was adversely affected by the herbal tea and domperidone groups, respectively.

The side effects of dry mouth with Domperidone are those reported in the literature. Apart from dry mouth, Domperidone also causes side effects in the form of headaches, diarrhea, or abdominal cramping (HeallthLinkBC, 2022). Diarrhea effect may be caused by bael fruit. Bael fruits can be used as a treatment for digestion and constipation (Basu, 2023). Ginger can also cause mild side effects such as heartburn, diarrhea, and abdominal discomfort (Bodagh et al., 2019). The side effects can occur if consumed more than 5 grams daily (Yeh & Golianu, 2014).

Some of the herbs that have been discussed contribute to a database of their efficacy and safety when used in breastfeeding mothers. It shows that caution is needed when using herbal medicines while breastfeeding. Consumption of herbal medicines should be with the approval and supervision of health workers who care for breastfeeding mothers. Excessive consumption of herbal medicines must be avoided, and dosage instructions must be followed. It should not be used every day and in large quantities. It must be purchased from a pharmacy only if the plant's name is listed on its packaging and has a distribution permit (Kahraman et al., 2021).

The five articles showed level IB evidence because the evidence was obtained from well-designed RCTs level IIa results. The average clinical outcome of the five articles is smooth breastfeeding. The herbal medicine with the best evidence-based practice (EBP) cannot be determined. EBP evolved from EBM to provide the process of reviewing, translating, and applying research to practice to improve the quality of patient care. EBP applications must be carried out through the five steps of the EBP process, namely (1) asking questions, (2) obtaining the best evidence, (3) assessing the evidence, (4) applying the findings to clinical practice, and (5) evaluating the resulting changes (Dusin et al., 2023; Richard et al., 2023).

Development questions based on PICO are necessary to determine which herb has the best EBP. If the question asked is, 'What is the effectiveness of herbal medicines compared to chemical medicines in facilitating breast milk in breastfeeding mothers with caesarean sections 28 to 42 weeks of gestation? The research we prioritise is research on Wang Nam Yean. The herbal chosen is Wang Nam Yean Tea. If the question is, "What is the effectiveness of Brazilian propolis compared to placebo to increase breast milk volume in breastfeeding mothers with atopic sensitivity and their babies from the age of the baby two months to 1 year?" the research highlighted the results of research on Brazilian propolis compared to placebo.

We will highlight the barley versus placebo research to answer the question, "What is the effectiveness of barley compared to placebo in breastfeeding mothers with premature births in increasing breast milk volume when given for fourteen days?". The same thing also happens when there is a question, "What is the effectiveness of herbal medicines compared to other herbal medicines in increasing breast milk in breastfeeding mothers for a specific time? The question still refers to PICO. The questions above are included in the type of intervention questions.

The highest level of evidence for this type of question intervention is systematic reviews or meta-analyses of RCTs (Dusin et al., 2023). Unfortunately, evidence for each research result for each question was only obtained from one article, so meta-analysis could not be carried out for this systematic review. This systematic review only applies three of the five EBP steps. The three steps are asking questions, obtaining literature, and assessing evidence.

Still, the fourth and fifth steps have yet to be carried out, namely applying the findings in clinical practice and evaluating the changes. This is also why we cannot

judge which herbal has the best EBP, especially since the five studies are in phase IIa clinical trials, which still need to be continued into phase III and IV clinical trials. The foundation of EBP focuses on asking questions, obtaining literature, and assessing the evidence. Still, it needs help to integrate evidence into practice.

If the quality of the evidence is good and the intervention is very beneficial but if the results of discussions with the patient produce a reason that makes the patient refuse treatment, then the intervention cannot be applied. EBP models and frameworks provide insight into the complexity of converting evidence into clinical practice. They also allow organisations to benefit from implementation science because the EBP model includes all five steps of EBP to determine readiness, willingness, and potential outcomes for a hospital or clinic system.

EBP also differs from implementation science because the EBP model includes all five steps of EBP. Nonprocess implementation science models typically focus on two final steps (Dusin et al., 2023). The weakness of this research is the limited number of articles included. It is caused by limited research funding. Many articles are not open-access, so they cannot be included in this systematic review.

Another limitation is that this research focuses on oral herbal medicines, so a systematic review of topical herbal medicines is highly recommended for future research. However, this research provides sufficient scientific evidence regarding the efficacy and safety of oral herbal medicines with level 1B in EBM.

CONCLUSION

Five articles obtained from the review explained that herbal RCTs during the postpartum and breastfeeding period had been carried out on fenugreek, honey, bitter fennel, jali-jali, propolis, and wang nam year, with the majority of clinical outcomes being successful breastfeeding. There was no significant difference in the effectiveness of the herbs and positive comparators. Even though herbs are effective for successful breastfeeding, they should be used carefully and accompanied by health workers' evaluation, counselling, and breastfeeding assistance.

No single herb has the best EBP because the best herbal recommendation depends on the intervention question based on the PICO proposed, and the steps taken in this research only reach the point of assessing the evidence. Application steps in clinical practice and evaluation of changes in results in clinical practice have yet to be carried out.

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REFERENCES

Allison. (2024). *How Do I Help My Breastfed Baby with Diarrhea and Constipation*.. Happy Family Organic. Acessed : Septermber 13, 2023. from: https://www.happyfamilyorganics.com/learning-center/article/diarrhea-and-constipation-in-breastfed-children/

Ansong-Assoku, B., Shah, S. D., Adnan, M., & Ankola, P. A. (2024). *Neonatal Jaundice*. StatPearls Publishing. https://doi.org/10.1007/978-3-031-06089-2_4

Ayameang, O., Rattarom, R., Mekjaruskul, C., & Caichompoo, W. (2020). Anti-Inflammatory Activity and Quantitative Analysis of Major Compounds of the Mixtures of Derris Scandens (DZSS) Formula. *Pharmacognosy Journal*, *12*(4), 828–834. https://doi.org/10.5530/pj.2020.12.119

Babelghaith, S. D., Sales, I., Syed, W., & Al-Arifi, M. N. (2024). The Use of Complementary and Alternative Medicine for Functional Gastrointestinal Disorders among the Saudi Population. *Saudi Pharmaceutical Journal*, *32*(6), 102084. https://doi.org/10.1016/j.jsps.2024.102084

Basu, S. (2023). *Bael: Medicinal Uses, Therapeutic Benefits For Skin, Diabetes And Supplements*. Netmeds.Com. Acessed: July 7, 2023 from https://www.netmeds.com/health-library/post/bael-medicinal-uses-therapeutic-benefits-for-skin-diabetes-and-supplements

Bodagh, M. N., Maleki, I., & Hekmatdoost, A. (2019). Ginger in Gastrointestinal Disorders: A Systematic Review of Clinical Trials. *Food Science and Nutrition*, *7*(1), 96–108. https://doi.org/10.1002/fsn3.807

CFS. (2018). *The Risk of Eating Raw Honey*. CFS. Accessed: September 13, 2024, from: https://www.cfs.gov.hk/english/whatsnew/whatsnew_fst/whatsnew_fst_The_Risks_of_Eating_Raw_Honey.html#:~:text=Honey%20may%20contain%20natural%20toxins&text=The%20symptoms%20of%20poisoning%20due,or%20even%20death%20may%20occur.

Dusin, J., Melanson, A., & Mische-Lawson, L. (2023). Evidence-Based Practice Models and Frameworks in the Healthcare Setting: A Scoping Review. *BMJ Open*, *13*(5), 1–9. https://doi.org/10.1136/bmjopen-2022-071188

HeallthLinkBC. (2022). *Domperidon - Oral*. HeallthLinkBC. Acessed : Septermber 13, 2024. from : https://www.healthlinkbc.ca/medications/domperidone-oral#:~:text=Headache%2C dry mouth%2C diarrhea%2C,the risk of side effects.

Igarashi, G., Segawa, T., Akiyama, N., Nishino, T., Ito, T., Tachimoto, H., & Urashima, M. (2019). Efficacy of Brazilian Propolis Supplementation for Japanese Lactating Women for Atopic Sensitization and Nonspecific Symptoms in Their Offspring: A Randomized, Double-Blind, Placebo-Controlled Trial. *Evidence-Based Complementary & Alternative Medicine (ECAM)*, 1–8. https://doi.org/10.1155/2019/8647205

Jha, B., Jha, A., Karki, S., KC, P., Pandey, A., Ghimire, A., & Acharya, B. (2024). Anaphylactic Shock Following the Mad Honey Consumption: A Case Report. *Annals of Medicine & Surgery*, *86*(2), 1120–1123. https://doi.org/10.1097/ms9.0000000000001610

Kahraman, C., Ceren Arituluk, Z., & Irem Tatli Cankaya, I. (2021). The Clinical Importance of Herb-Drug Interactions and Toxicological Risks of Plants and

Herbal Products. In *Medical Toxicology* (Issue Cii, pp. 1–31). https://doi.org/10.5772/intechopen.92040

Kandi, V., & Vadakedath, S. (2023). Clinical Trials and Clinical Research: A Comprehensive Review. *Cureus*, *15*(2), 1–15. https://doi.org/10.7759/cureus.35077

Kumalasari, R., Arimbi, D., & Ismunandar, A. (2014). Pemberian Jamu Uyup – Uyup Terhadap Kelancaran Pengeluaran Air Susu Ibu (ASI) Pada Ibu Nifas. *Prosiding Seminar Nasional & Internasional LPPM Universitas Negeri Semarang.* Semarang , 21 Agustus 2014.

LactMed. (2021). *Licorice : Drug and Lactation Database*. National Library of Medicine. Acessed: July 17, 2023. https://www.ncbi.nlm.nih.gov/books/NBK501774/pdf/Bookshelf_NBK501774.pdf

Liew, K. Y., Kamise, N. I., Ong, H. M., Aw Yong, P. Y., Islam, F., Tan, J. W., & Tham, C. L. (2022). Anti-Allergic Properties of Propolis: Evidence From Preclinical and Clinical Studies. *Frontiers in Pharmacology*, *12*(January). https://doi.org/10.3389/fphar.2021.785371

Mahani, Faturachman, F., Michelle, Lembong, E., Sulaeman, A., Hardinsyah, Nurjanah, N., Sunarno, & Sariadji, K. (2021). Antiemetic Activities of Indonesian Stingless Bee Propolis on Emetic Induced By Anti-Tuberculosis Drugs. *International Journal of Pharmacy and Pharmaceutical Sciences*, *13*(4), 39–44. https://doi.org/10.22159/ijpps.2021v13i4.39618

Mathew, A. T., Chhugani, M., & Gupta, R. (2018). A Randomised Controlled Trial to Evaluate the Effectiveness of Fenugreek (Methi) Versus Fennel (Saunf) on Lactation among Lactating Women in a Selected Community of New Delhi. *International Journal of Nursing Education*, *10*(2), 1–6. https://doi.org/10.5958/0974-9357.2018.00029.6

Mathew, G., Skaria, B. P., Mathew, S., & Joy, P. P. (2007). Caesalpinia Sappan - an Economic Medicinal Tree for the Tropics. *National Symposium on 'Medicinal and Aromatic Plants for the Economic Benefit of Rural People (MAPER), February* 16 - 18, 2007. 1–7.

McGuire, T. M. (2018). Drugs Affecting Milk Supply during Lactation. *Australian Prescriber*, *41*(1), 7–9. https://doi.org/10.18773/austprescr.2018.002

National Library of Medicine. (2024). Fenugreek Drug Levels and Effects. *LactMed@NIH*, *Md*, 1–6. https://www.ncbi.nlm.nih.gov/books/

Ouzir, M., El Bairi, K., & Amzazi, S. (2016). Toxicological Properties of Fenugreek (Trigonella Foenum Graecum). In *Food and Chemical Toxicology* (Vol. 96, pp. 145–154). https://doi.org/10.1016/j.fct.2016.08.003

Patel, H. N., Desai, H. B., & Krishnamurthy, R. (2013). Plants as a Booster for Lactation. *Natural Products An Indian Journal*, *9*(7), 298–304. https://doi.org/10.11648/j.ajcem.20150302.12

Richard, S. D., Ariyanto, H., & Setiawan, H. (2023). Implementation of Evidence-Based Nursing for Expelling Sputum in Tuberculosis Patients with Chest Physiotherapy and Effective Coughing Exercises: A Case Study. *Ijnhs.Net*, *4*(2), 74–78. https://doi.org/10.35654/ijnhs.v5i3.596

Saejueng, K., Nopsopon, T., Wuttikonsammakit, P., Khumbun, W., & Pongpirul, K. (2022). Efficacy of Wang Nam Yen Herbal Tea on Human Milk Production: A Randomized Controlled Trial. *PloS One*, *17*(1), e0247637. https://doi.org/10.1371/journal.pone.0247637

Simbar, M., Nazarpour, S., Mojab, F., Kholosi Badr, F., Khorrami, M., Jafari Torkamani, Z., & Alavi-Majd, H. (2022a). A Comparative Study on the Effects of "Honey and Fenugreek" with "Fenugreek" on the Breastfeeding Success: A Randomized Trial. *Evidence-Based Complementary and Alternative Medicine*, *2022*.

Sukarsi, S. (2020). Pengaruh Pemberian Jamu Tradisional Gepyokan Terhadap Produksi ASI Pada Ibu Nifas Di Wilayah Kerja Puskesmas Lenteng Kabupaten Sumenep. *Ovary Midwifery Journal*, *2*(06), 1–8. http://ovari.id/index.php/ovari/article/view/21

Taylor, M., Jenkins, S. M., & Pillariseity, L. S. (2023). *Endometritis*. StatPearls Publishing. Acessed: September 13, 2024 from https://pubmed.ncbi.nlm.nih.gov/31985918/

Tenny, S., & Varacallo, M. (2022). *Evidence-Based Medicine*. Stateperals Publishing. Acessed: August 24, 2024. From: https://www.ncbi.nlm.nih.gov/books/NBK470182/

Triyantoro, A. (2020). Standarisasi Mutu Tanaman Obat Tradisional. *Webinar Obat Traditional, Universitas Lambung Amangkurat, Banjarbaru*.

Wesolowska, A., Pietrzak, B., Kociszewska-Najman, B., Wielgos, M., Czajkowski, K., Wietrak, E., Karzel, K., & Borszewska-Kornacka, M. K. (2021). Barley Malt-Based Composition as a Galactagogue - a Randomized, Controlled Trial in Preterm Mothers. *Ginekologia Polska*, *92*(2), 118–125. https://doi.org/10.5603/GP.a2020.0107

Widjaja, G. (2024). The Role And Existence Of Herbal Medicine In Traditional Medicine Indonesia. *Jurnal Kesehatan*, *2*(5), 296–308. https://jurnalkesehatan.joln.org/index.php/health/article/view/133

Yeganegi, M., Bahrami, R., Azizi, S., Marzbanrad, Z., Hajizadeh, N., Mirjalili, S. R., Saeida-Ardekani, M., Lookzadeh, M. H., Alijanpour, K., Aghasipour, M.,

Golshan-Tafti, M., Noorishadkam, M., & Neamatzadeh, H. (2024). Caesarean Section and Respiratory System Disorders in Newborns. *European Journal of Obstetrics and Gynecology and Reproductive Biology: X*, *23*(August), 100336. https://doi.org/10.1016/j.eurox.2024.100336

Yeh, A. M., & Golianu, B. (2014). Integrative Treatment of Reflux and Functional Dyspepsia in Children. *Children*, *1*(2), 119–133. https://doi.org/10.3390/children1020119

Zullkiflee, N., Taha, H., & Usman, A. (2022). Propolis: Its Role and Efficacy in Human Health and Diseases. *Molecules*, *27*(18). https://doi.org/10.3390/molecules27186120