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Exploration of Types and Consumption Behaviour of Usada-based Herbal Galactagogue on Lactating Mothers in Bali

(*Explorasi Jenis dan Perilaku Konsumsi Galaktagogue Herbal berbasis Usada pada Ibu menyusui di Bali)*

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ABSTRACT

Breastfeeding is essential for the health of newborn infants and mothers. Basic health research in 2018 showed that exclusive breastfeeding in Bali has not reached the national target. High rates of cesarean section delay breastfeeding initiation, the important predictor of continued breastfeeding. Main concern for breastfeeding mothers about medications increased the use of herbal galactagogue to aid lactation. The use of traditional medicinal plant in Bali is 40% higher than national average and its existence is strengthened by the issuance of Bali Governor Regulation No. 55/2019 concerning Traditional Balinese Health Services. Despite increasing popularity of traditional medicine, there are currently limited data available on the plant list and pattern of use herbal galactagogue. This study aims to explore the galactagogue plants, pattern of use, perceived effectiveness of herbal galactagogues during breastfeeding among breastfeeding mother's in Bali. This study was conducted using a questionnaires and in-depth interviews. The questionnaire and interview guideline were validated by lactation consultants and traditional health practitioners in Bali. The study was approved by Human Research Ethic Committee of Bina Usada Bali. The use of herbal galaktagogue is mostly practiced by highly educated mothers, mother's occupation as health workers and primiparous. There are 26 types of plants that are often used by lactating mothers in Bali. Majority of respondent begin to use herbal galactagogue after giving birth (82%) for approximately less than 1 month. Majority of lactating mothers in Bali perceived effectiveness of herbal galactagogue usage based on breastfeeding adequacy indicators. About 95% respondents feel confidence and have self-empowerment after using herbal galactagogue, possessing psychological benefits. The use of herbal galactagogue is common amongst breastfeeding mothers in Bali, while information about efficacy and safety is lacking. Further research is needed to give evidence-based information to support exclusive breastfeeding.

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ABSTRAK

Optimalisasi tumbuh kembang anak melalui ASI eksklusif merupakan upaya membentuk SDM berkualitas. Riskesdas tahun 2018 menunjukkan capaian ASI eksklusif di Bali belum mencapai target nasional. Tingginya angka persalinan sectio caesarea menghambat Inisiasi Menyusui Dini, faktor kunci keberhasilan ASI eksklusif. Tren *back to nature* dan perhatian pada potensi efek samping, meningkatkan penggunaan galaktagogue herbal untuk mengisiasi laktasi. Pergub No 55 tahun 2019 tentang pelayanan kesehatan tradisional Bali meningkatkan eksistensi tanaman obat tradisional berbasis Usada. Namun, peningkatan popularitas penggunaan herbal, tidak diikuti oleh ketersediaan informasi tentang daftar jenis tanaman dan perilaku konsumsi galaktagogue herbal pada Ibu menyusui di Bali. Tujuan penelitian ini adalah untuk eksplorasi jenis tanaman, bentuk sediaan, permulaan dan durasi konsumsi, serta manfaat empiris dan potensi efek samping penggunaan galaktagogue herbal berbasis Usada. Penelitian ini adalah penelitian eksploratif dengan kuisioner dan in-depth interview pada Ibu menyusui berusia 21-35 tahun, menyusui 3 bulan – 1 tahun terakhir, dan mengonsumsi galaktagogue herbal. Uji validitas dan reliabilitas kuisioner dilakukan dengan *pilot testing* pada 20 partisipan. Pedoman wawancara divalidasi oleh konsultan laktasi dan praktisi kesehatan tradisional. Penelitian ini telah mendapatkan kelayakan etik dengan No: 125/EA/KEPK-BUB-2020. Data dianalisis secara kualitatif dengan pendekatan induktif. Hasil penelitian menunjukkan bahwa terdapat 26 jenis tanaman galaktagogue herbal berbasis usada yang dikonsumsi dalam bentuk sediaan: *tutuh*, *loloh*, *tampel* dan *boreh*. Mayoritas responden (82%) memulai terapi pasca persalinan dan durasi konsumsi < 1 bulan (36%). Sebanyak 89% responden memiliki durasi menyusui yang lebih singkat dan peningkatan volume ASI pada saat pumping. Sekitar 91% responden merasakan *breast enggorgement*. Sebanyak 95% responden mengalami peningkatan kepercayaan diri terhadap kecukupan produksi ASI. Terdapat 11% responden mengalami mual, muntah, dan diare saat mengonsumsi sediaan galaktagogue herbal. Penggunaan galaktagogue herbal berbasis Usada umum dilakukan oleh Ibu menyusui di Bali. Namun, informasi mengenai efektivitas dan keamanan sediaan galaktagogue herbal terbatas sehingga diperlukan penelitian lebih lanjut untuk mendukung keberhasilan ASI eksklusif.

Kata kunci: Laktasi, ASI, Galaktagogue herbal, Usada, pengobatan tradisional Bali.

INTRODUCTION

Breastfeeding is essential for the health of newborn infants and mothers. The nutritional content of breast milk is specially formulated to optimize growth, reduce the risk of sudden infant death syndrome (SIDS), obesity, and allergic/hypersensitivity disease relative to the use of infant formula. Breastfeeding may also play a role in decreasing postpartum depression, bleeding, and reduced the risk of breast and ovarian cancer (Odom et al, 2013).

Basic health research in 2018 showed that exclusive breastfeeding in Bali has not reached the national target set by the government (Badan Penelitian dan Pengembangan Kesehatan, 2018). Current trends in maternal health, such us high rates of cesarean section, delay breastfeeding initiation, the important predictor of continued breastfeeding (Hobbs et al., 2016).

Galactagogues are a group of substances or medicines either proven or believed to aid lactation during initiation and maintenance stages, thereby increasing human breast milk supply (Zuppa et al., 2010). Galactagogues are available in the form of either pharmaceutical medicines or herbal origin. Main concern for breastfeeding mothers about medications, include the safety for their breastfed infant, quantity and quality of breast milk, increase the use of herbal galactagogue.

The use of traditional medicinal plant in Bali is 40% higher than national average (Balitbangkes, 2018). Governor Regulation Number 55/2019 concerning Traditional Balinese Health Services strengthen the existence of complementary traditional medicine. Despite increasing popularity of traditional medicine, there are currently limited data available on the plant list and pattern of use herbal galactagogue among breastfeeding mothers in Bali.

The aim of the study was to explore the galactagogue plants, pattern of use, perceived effectiveness and safety of herbal galactagogues during breastfeeding based on Balinese mother's personal experiences and observations. Gaining a comprehensive galactagogue plant list and an understanding of their perspectives around how they used traditional Balinese galactagogues plant, the factors that influenced their breastfeeding adequacy, will provide insight into the potential value of herbal galactagogues, conserve traditional medicinal plants and identify research gaps to inform direction of future studies.

MATERIAL AND METHODS

Materials

This study is an exploratory research which was conducted in May 2020 till October 2020. The target population was breastfeeding mothers in Bali. The sample was taken by purposive sampling, followed by snowball sampling with the inclusion criteria of maternal age between 21 - 35 years, breastfeeding for 3 months - 1 year, and having used one or more herbal galactagogues during breastfeeding. The number of sample was determined according to the Lemeshow method for calculating the number of samples for an unknown population size (Lemeshow et al., 1997):

$$n = \frac{Z^2\, p\, (1 - p)}{d^2}$$

Where n = minimum sample size, Z = degree of trust 95% (1.96); p = proportion of population 50% (0.5), and d = level of precision.

Minimum sample size is 44 respondents lactating mothers in Bali who meet the inclusion criteria. The study was approved by Human Research Ethic Committee of Bina Usada Bali with Ethichal Clearance No: 125/EA/KEPK-BUB-2020.

Methods

This study was conducted using a questionnaires and in-depth interviews. A questionnaires instrument developed to assess the following conditions; demographic data, earlier and current use of herbal galactagogue, rationale for use, and satisfaction on the effectiveness of the galactagogue used. The validity and reliability test of the questions on the questionnaire was conducted by pilot testing on 20

participants who had similar characteristics to the research respondents. The validity and reliability of the questionnaire were measured with IBM SPSS Statistics 25.

The questionnaire was declared valid at a significance level of 0.05%, and reliable with a Cronbach alpha value of 0.760 (> 0.60). The interview guideline was validated by lactation consultants and traditional health practitioners in Bali.

All respondents were reassured at the start of the interviews that the study was not to advocate or discourage the use of any medicines or choice of therapy, but rather to obtain insight into participants' experiences and perception. Respondents signed the informed consent before filling out the questionnaire and continued with an in-depth interview for 30 minutes. Participants' responses to closed-ended questions were analysed using descriptive analysis to summarise the findings. Data were grouped systematically and analyzed qualitatively by using an inductive approach.

RESULTS AND DISCUSSION

Characteristic of respondents

Research respondents who met the inclusion criteria were 44 lactating mothers from 9 districts and cities in Bali (Badung, Bangli, Buleleng, Denpasar, Gianyar, Jembrana, Klungkung, Karangasem, and Tabanan). The respondents were all aged between 21 - 35 years. Majority of respondents received Diploma or have Bachelor degree (50%), works as a health worker (43.5%), primiparous (56.5%), and breastfed baby is female. Table 1 shows the characteristics of the population under study.

Table 1. Demografic characteristic of the respondents

Characteristic	N	%
Education level		
Junior high school	1	2,2
Secondary school	7	15,2
Diploma/Bachelor degree	22	50
Proffesional education/Master degree	14	32,6
Occupation		
Housewive	5	10,9
Education worker	9	19,6
Health worker	19	43,5
Private employee	11	26,1
Parity		
Primiparous	25	56,5
Multiparous	19	43,5
Baby's gender		
Male	21	47,8
Female	23	52,2

The use of herbal galaktagogue to initiate, maintain and increase milk production is mostly practiced by highly educated mothers, and majority mother's occupation as health workers. Based on previous

research, there is correlation between mother's education level and their awareness on the side effect of galactagogue (Othman et al., 2014). Current trends among modern society today is back to nature lifestyle. Natural characteristic and no serious reported side effect are main reason why lactating mothers in Bali use herbal galactagogue.

Majority of respondents are primiparaous, having given birth for the first time (56,5%). Primparity is the strongest risk factors for delayed onset of lactogenesis. Women experiencing delayed onset of lactogenesis II (milk secretion beyond 72 hours post partum) are at greater risk of short breastfeeding duration and early wearning (Nommsen-Rivers, et al., 2010). Therefore, mother with these risk use herbal galactagogue to provide breastfeeding support until lactation is fully established.

Galactagogue Plant based on Usada: Traditional Balinese Medicinal Plant

Various types of local medicinal plants are used in traditional Balinese medicine based on Usada. The list of local plant species was obtained from Usada Gede, Usada Taru Pramana's literature search and exploration of local wisdom in Bali. The plant parts used as galactagogue are plant leaves, fruit/seeds, rhizomes/roots. The list of plant types and parts used is shown in Table 2.

Table 2. Medicinal plants as herbal galactagogues and cure inflammations of the breast

No	Common name	Botanical name	Family	Part of plant used
1	Fennel	*Foeniculum vulgare*	Umbelliferae	Seed
2	Tamarind	*Tamarindus indica*	Fabaceae	Leaf
3	Garlic	*Allium sativum*	Liliaceae	Bulb
4	Giloy	*Tinospora cordifolia*	Menispermaceae	Leaf
5	Indian champhorweed	*Pluchea indica*	Asteracae	Leaf
6	Erythrina	*Erythrina sp.*	Fabaceae	Leaf
7	Gymnema	*Gymnema sylvestre*	Apocynaceae	Leaf
8	Sea hibiscus	*Hibiscus tiliaceus*	Malvaceae	Leaf
9	Torbangun	*Coleus amboinicus*	Lamiaceae	Leaf
10	Corn	*Zea mays*	Poacea	Seed
11	Peanut	*Arachis hypogaea*	Fabaceae	Seed
12	Mung bean	*Vigna radiata*	Fabaceae	Seed
13	Sweet leaf	*Sauropus androgynous*	Phyllanthaceae	Leaf
14	Water spinach	*Ipomoea reptans*	Convolvulaceae	Root
15	Moringa	*Moringa oleifera*	Moringaceae	Leaf
16	Sand ginger	*Kaempferia galanga*	Zingiberaceae	Rhizome
17	Cassava	*Manihot utilissima*	Euphorbiaceae	Leaf
18	Curcumin	*Curcuma domestica*	Zingiberaceae	Rhizome
19	Mesoyi	*Massoia aromatica*	Lauraceae	Seed
20	Bitter melon	*Momordica charantia*	Cucurbitaceae	Leaf
21	Papaya	*Carica papaya*	Caricaceae	Leaf
22	Areca palm	*Areca cathecu*	Arecaceae	Seed
23	Temulawak	*Curcuma zanthorrhiza*	Zingiberaceae	Rhizome
24	West Indian pea	*Sesbania grandiflora*	Fabaceae	Leaf
25	Betel pepper	*Piper bettle*	Piperaceae	Leaf
26	Coriander	*Coriandrum sativum*	Apiaceae	Seeds

Based on the results of exploration through questionnaires and interviews, there are 26 types of plants that are often used by lactating mothers in Bali to initiate, maintain and increase milk production. The group of traditional medicinal plants that are mostly consumed by lactating mothers comes from the legume family (Fabaceae). The most widely used parts of the plant are the leaves. Table 3 describe classification and dosage form of Balinese medicinal plant as galactagogue.

Table 3. Classification and dosage form Balinese medicinal plant as galactagogue

No	Common Name	Classification		Dosage form
		Internal use	External use	
1	Fennel	✓	-	*Loloh*
2	Tamarind	✓	✓	*Loloh, boreh*
3	Garlic	✓	✓	*Loloh, boreh*
4	Giloy	✓	-	*Loloh*
5	Indian champhorweed	✓	-	*Loloh*
6	Erythrina	-	✓	*Tampel*
7	Gymnema	-	✓	*Tampel*
8	Sea hibiscus	-	✓	*Tampel*
9	Torbangun	✓	-	*Loloh*
10	Corn	-	✓	*Boreh*
11	Peanut	✓	-	-
12	Mung bean	✓	-	-
13	Sweet leaf	✓	-	*Loloh*
14	Water spinach	-	✓	*Boreh*
15	Moringa	✓	-	*Loloh*
16	Sand ginger	-	✓	*Boreh*
17	Cassava	✓	✓	*Loloh, tampel*
18	Curcumin	✓	-	*Loloh*
19	Mesoyi	-	✓	*Boreh*
20	Bitter melon	✓	-	*Loloh*
21	Papaya	✓	-	*Loloh*
22	Areca palm	-	✓	*Boreh*
23	Temulawak	✓	-	*Loloh*
24	West Indian pea	✓	-	*Loloh*
25	Betel pepper	✓	-	*Loloh*
26	Coriander	-	✓	*Boreh*

The dosage form of herbal galactagogues for internal use is described as: 1) *tutuh/pepeh*, and 2) *loloh* (Dewi, et al., 2013; Arsana, 2019). *Tutuh* or *pepeh* is a plant extract taken by squeezing or grinding the ingredients and then filtering them to get the active subtances and dropping them in use. *Loloh* is concentrated extract which is obtained by kneading or grinding and adding the solvent that has been determined and drunk in its use. All lactating mothers in Bali consume galactagogue plants for internal use in the form of *loloh*.

The dosage form of herbal galactagogue for external use is described as: 1) *boreh/parem* dan 2) *tampel*. Boreh is a ‘lactation tincture’ obtained by refining combination of herbal ingredients, mixing with

liquids such as water, vinegar, or wine when used as shown in Figure 1. The dosage form of *boreh* is a powder containing coriander (*Coriandrum sativum*), sand ginger (*Kaempferia galanga*), garlic (*Allium sativum*), and mesoyi (*Massoia aromatica*). According to Usada Taru Pramana, the dosage form of *boreh* use corn (*Zea mays*) young seeds roasted or boiled combined with sweet leaves (*Sauropus androgynous*), then mixed with water to to increase breast milk production. According to Usada Gede, the dosage form of *boreh* are combination of erythrina leaves, betel leaves (*Piper bettle*), and areca (*Areca cathecu*).

Figure 1. The dosage form of *boreh* containing coriander (*Coriandrum sativum*), sand ginger (*Kaempferia galanga*), garlic (*Allium sativum*), and mesoyi (*Massoia aromatica*)

Tampel is a mixture obtained by heating or refining a mixture of ingredients and in use it is affixed to the treated part as shown in Figure 2. Tamarind leaves (*Tamarindus indica*), erythrina leaves (*Erythrina sp.*), sea hibiscus leaves (*Hibiscus tiliaceus*), and papaya leaves (*Carica papaya*) are used by heating and attached to the mother's breasts to initiate milk production and relieve milk clogging.

Figure 2. The dosage form of *tampel* erythrina leaves (*Erythrina sp.*),

Balinese local wisdom shows that consumption of green vegetables can accelerate milk production. These green vegetables include cassava (*Manihot utilissima*), moringa (*Moringa oleifera*), sweet leaf (*Sauropus androgynous*), papaya (*Carica papaya*), and turi (*Sesbania grandiflora*). Apart from being

consumed as a vegetable, lactating mothers also consume concentrated extract in the form of *loloh*. Types consumed in the form of *loloh* include torbangun leaves (*Coleus amboinicus*), moringa leaves (*Moringa oleifera*), sweet leaves (*Sauropus androgynous*), papaya leaves (*Carica papaya*), and bitter melon leaves (*Momordica charantia*).

Commencement and Duration of Therapy using Herbal Galactagogue

Lactation is initiated with parturition, expulsion of the placenta, and falling progesterone levels in the presence of very high prolactin levels. After secretory activation, the rate of milk synthesis is controlled locally in the mammary gland by autocrine control. Several potential risk factors delayed milk secretion beyond 72 hours postpartum. These factors are giving birth for the first time (primiparity), delivering baby via cesarean section, longer duration of labor, maternal post partum factor, newborn characteristic, and infant feeding variable (Nomsen-rivers, et al., 2010).

To initiate milk secretion, postpartum mother is assisted in a number of ways that are intended to ease their transition to motherhood and to optimize breastfeeding. Herbal galactogogues therapy have commonly been used to initiate and increase low milk supply. Commencement of therapy using herbal galactagogue majority start at postpartum (82%) as shown in Figure 3.

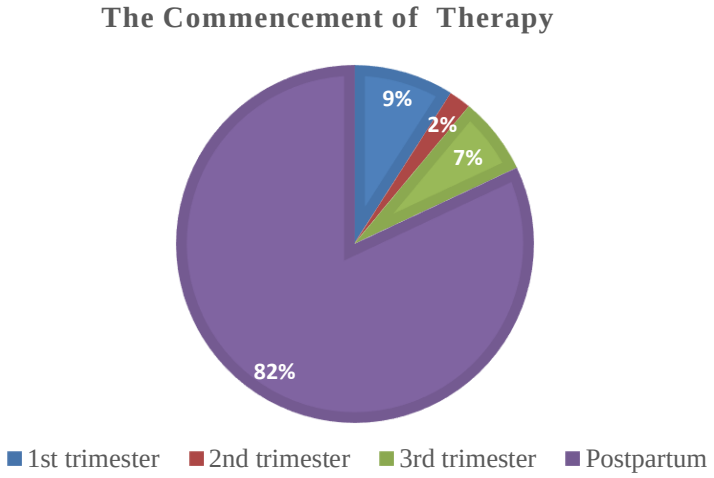

Figure 3. The commencement of herbal galactagogue therapy

Majority of respondent begin to use herbal galactagogue after giving birth (82%), followed by start therapy at 1st trimester of pregnancy (9%), 3rd trimester of pregnancy (7%), and 2nd trimester of pregnancy (2%). Lactating mothers have perception that consume medicine during pregnancy can cause

adverse effect or higher potential side effect. Therefore, most of them begin to use herbal galactagogue after baby's delivered to initiate brestmilk secretion.

The majority of respondents use herbal galactagogue for approximately 1 month (36%), followed with duration of use more than 6 months (32%) as shown in Figure 4.

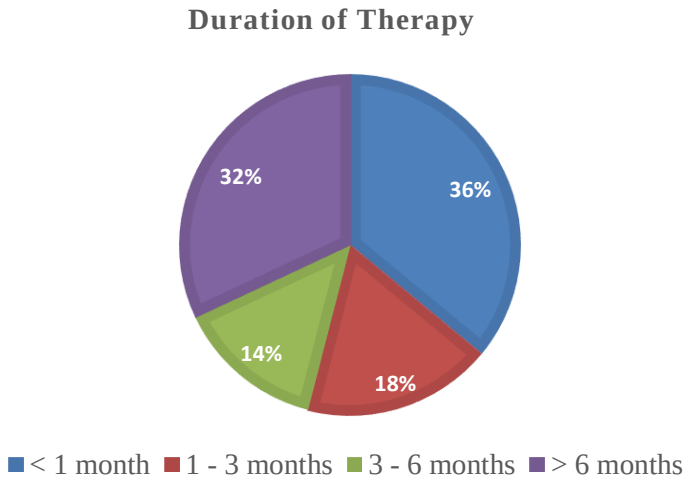

Figure 4. The duration of herbal galactagogue therapy

Most of respondents use herbal galactagogue for approximately 1 month (36%), followed by more than six months of therapy (32%), 1-3month therapy (18%), and 3-6month therapy (14%). In Balinese cultures, new mothers insist on a period of rest approximately 1 month till 42 days. Many also have traditional foods and herbs for postpartum women that are meant to increase the mother's strength and enhance lactation. With the improvement on breastfeeding techniques, the majority of respondent's milk secretion is adequat after 1 month since postpartum.

WHO recommended exclusive breastfeeding (EBF) for the first 6 months of life. Majority of respondents are working mothers (89,1%). After return to work, breastmilk production is decrease due to perception of inefficient milk supply, physical and physiological stress, and low stimulation by regularly pumping. Therefore, respondents consume herbal galactagogue for approximately more than six months to maintain breastmilk production until succesfully finish exclusive breastfeeding.

Perceived Effectiveness of Herbal Galactagogues

The mechanisms of action for most herbals are unknown. Most of them have not been scientifically evaluated, but traditional use suggests safety and possible efficacy. Various ways to evaluate if a herbal galactagogue was effective or useful were used and referred to "breastfeeding adequacy indicators" for the purpose of this research. In the absence of milk volume measurement, respondents described a range of subjective indicators to measure their breastfeeding adequacy as shown in Figure 5.

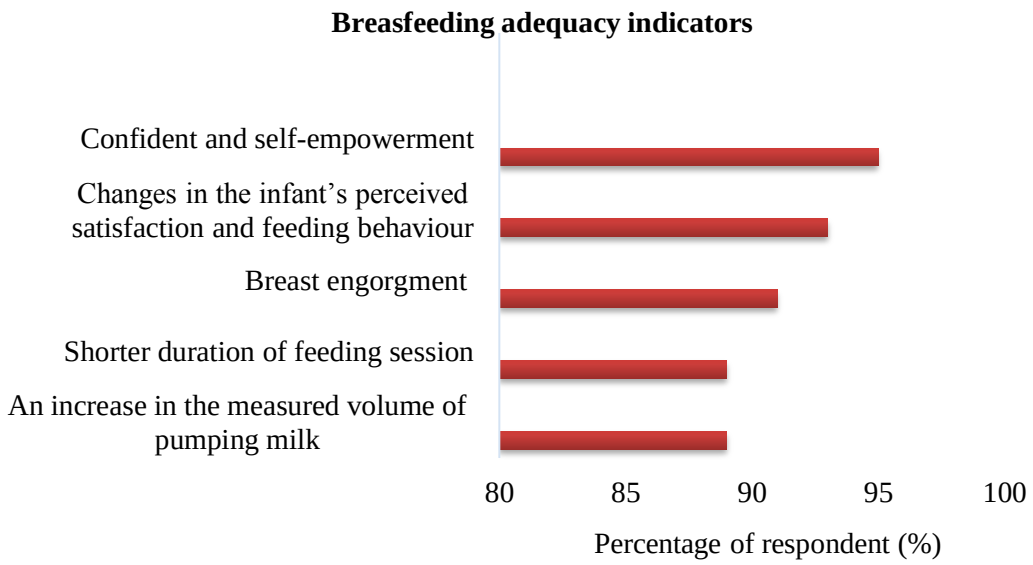

Figure 5. Percentage of breastfeeding adequacy indicators

Majority of lactating mothers in Bali perceived effectiveness of herbal galactagogue usage based on breastfeeding adequacy indicators. There are 89% of respondents have shorter duration of feeding session and an increase in the measured volume of pumping milk. About 91% respondent have breast engorgement and 93% respondents measure changes in the infant's perceived indicators and feeding behaviour.

Confidence and self-empowerment emerged as an over-arching theme linked to positive experiences with the use of herbal galactagogues. The use of herbal galactagogue booster respondent's confidence levels. About 95% respondents feel confidence and have self-empowerment after use herbal galactagogue, resultes in psychological benefits. The perception of inadequacy is common amongst breastfeeding women, leading to anxiety which may affect breastfeeding adequacy. This indicates a potential psychological role of herbal galactagogue used to enhance breastfeeding adequacy.

CONCLUSION

The use of herbal galaktagogue is mostly practiced by highly educated mothers, mother's occupation as health workers and primiparous. There are 26 types of plants that are often used by lactating mothers in Bali. Majority of respondent begin to use herbal galactagogue after giving birth (82%) for approximately < 1 month. Majority of lactating mothers in Bali perceived effectiveness of herbal galactagogue usage based on breastfeeding adequacy indicators. About 95% respondents feel confidence and have self-empowerment after use herbal galactagogue, resultes in psychological benefits. Futher research is needed to give evidence-based information to support exclusive breastfeeding.

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CONFLICT OF INTEREST

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