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THE REBORN OF EXCLUSIVE BREASTFEEDING METHOD: ANTENATAL BREAST EXPRESSION (ABE) : A LITERATURE REVIEW

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ABSTRACT

Background: *Antenatal Breast Expression (ABE) is believed as a potential method to improve colostrum secretion upon labor which the complex content of colostrum can prevent the infection, obesity, diabetes and malignant diseases among newborns. This study aims to to analyze and provide detailed description on the practice of ABE to support the exclusive breastfeeding program.*
Method: *Literature review was conducted in this study using the PRISMA protocol guidelines. Data were obtained by accessing electronic resources from Science Direct, Sage Publications, PubMed, and Google Scholar with 'antenatal breast expression', 'antenatal milk expression', and 'colostrum secretion' as the keywords. The articles analyzed in this study were published from 2009 to 2018 and written in English.*
Results: *There were eighty articles recorded, of which eight articles were included in the systematic review. ABE was performed every day when the pregnancy reaches 37 weeks. The average secretion time of this practice was 5-10 minutes each for 1-4 times a day, preferably during showers. The ABE affected babies in that it allowed them to get timely nutritional intake in order to stabilize blood sugar and to prevent icterus. Even though the practice of ABE was viewed differently among women of reproductive age, it nonetheless helped to improve self-confidence among breastfeeding mothers, to reduce transition interval from Early Initiation of Breastfeeding (EIB) to full lactation, to improve lactation performance, and to induce natural delivery. However, it was not yet widely practiced as it was still under consideration by the International Board Certified Lactation Consultant (IBCLC).*
***Conclusion**: ABE has proven to benefit both mothers and babies, despite existing pros and cons. Therefore, there is a need for more systematic review using other keywords and methods on the safety and efficacy of ABE practice to ensure its benefit for breastfeeding.*

Keywords: *Antenatal breast expression, colostrum secretion, exclusive breastfeeding*

INTRODUCTION

Breastfeeding is the main intervention strategy with the proven highest impact and hence, has become the global gold standard in providing optimum nutrition for the growth and development of babies [1]. Lactation itself reduces mortality and morbidity rates among babies, as well as strengthening the bond between mother and their babies [2]. Colostrum is the first ever breast milk a mother produces. Colostrum contains main immunology components such as hepatocyte growth factor (HGF); transforming growth factor- (TGF-) 1, 2, and 3 that protect babies; and immunoglobulin A (IgA) that plays pivotal role in stimulating digestion and immunity systems in babies. The complex content of colostrum prevents infection, obesity, diabetes and malignant diseases. It also helps development of the

neural system, reduces risk of infection, swelling in the stomach (necrotizing enterocolitis), prevents diarrhea and stunting among babies [3–6]. Fulfillment of nutritional needs should be performed as early as possible in order to improve the chance of proper process to attain the goals set. Sustainable Development Goals (SDG) of 2030 mentions that it is set to reduce neonatal death rate to 12 per 1000 live birth and lower mortality rate among toddlers to 25 per 1000 live birth [7,8]. Other than that, the World Health Assembly (WHA) has set its goal for comprehensive health of mothers and children it its Maternal, Infant, and Young Child Nutrition (MIYCN) program for 2025. Among the goals the MIYCN set to achieve is 40% reduction in the number of toddlers suffering from stunting, 30% reduction in Low Birth Weight Babies, zero growth on the number of children with obesity, and 50% increase in the number of babies given exclusive breastfeeding [9].

In Indonesia, the number of babies getting exclusive breastfeeding is at 61.33%, which has exceeded the 44% target of its Strategic Plan for the year 2017 [10]. However, results of the Basic Health Research in 2013 by the Health Ministry of the Republic of Indonesia show significantly high number of prelacteal feeding of 79.8% [11]. One of the prelacteal foods often given to newborns is formulated milk. Formulated milk contains less nutrition and immunology components compared to breast milk and it also lacks important defensive factors, hormones, and bacteria needed by babies. Formulated milk makes babies prone to infection and it interferes with breastfeeding [12–17].

One of the major factors affecting the provision of formulated milk for babies aged 0-6 months is delayed breast milk secretion [18]. Therefore, one method to reduce the provision of breast milk within the first 24 hours of birth is to secrete the colostrum during pregnancy [19,20]. Secretion of colostrum itself requires a special technique as to be optimum in fulfilling the needs of babies in their early stage of life.

Antenatal Breast Expression (ABE) is one of the methods used to secrete colostrum during pregnancy. The colostrum secreted during pregnancy can be stored and used when the baby is born [21]. It serves as readily available intake when a baby requires immediate nutrition but the mother has not produce breast milk.

ABE was first performed in the mid-20th century for the purpose of improving breast milk production and smoothen postnatal lactation [22,23]. However, this practice was ceased in the 1970s as nipple stimulation causes the release of oxytocin that in turn result in natural induction of giving birth, and hence, increases the risk of premature labor [24]. The latest literature shows that there are new potential avenues for the secretion and storage of colostrum during pregnancy, even though statistical physical evidence on this matter is still scarce to prove the safety and efficacy of ABE practice [24–28].

These potential avenues are supported by some research on ABE practice starting from pregnancies of 37 weeks or the early term pregnancy. ABE that is practiced since early term pregnancy will not cause premature labor. It only speeds up calculation for the date of birth [28, 29]. ABE also improves self-confidence among mothers in preparing for lactation, help them better adapt to their breasts, provides calm as breast milk stock is in place, and prepares both physical and psychological aspects to deal with postpartum period. Other than that, ABE that performed regularly during pregnancy can also improve colostrum secretion upon labor and speeds up the process of lactogenesis II in the early postpartum period [21,30]. Pros and cons concerning ABE practice have made it a lengthy discussion in the search for its safety and efficacy. Based on the aforementioned elaboration, this literature review aims to analyze and provide detailed description on the practice of ABE as one of the many attempts to meet the exclusive breastfeeding target for newborns.

METHOD

Study Design and Study Selection

Article reviews were conducted by accessing online library resources available on the database of ScienceDirect, Sage Publications, PubMed, and Google Scholar from 24th December 2018 to 20th February 2019. There were 43 publications from PubMed, 19 publications from Science Direct, 2 publications from Sage Publications and 16 publications from Google Scholar. The keywords used for article search were 'antenatal breast expression', 'antenatal milk expression', and 'colostrum secretion'.

Inclusion Criteria

Selected articles are written in English and are available in full-text from 2009-2018. There was no limitation in terms of study design.

Exclusion Criteria

Undergraduate thesis, thesis, guidelines, and proceedings are out of scope. Duplicate articles and those with non-matching keywords are not included either.

Data Collection Technique

The standard protocol used to select articles was PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses). The 80 articles identified were further screened for title and abstract match. This process resulted in 64 selected articles. The next steps was article fitness screening for relevance and whether those articles were full-text or otherwise. This process resulted in 48 articles being screened out. Afterwards, the remaining 16 relevant articles were found to have duplicates, and hence, only 8 articles were found all criteria of systematic review in this research.

Data Extraction

Out of 80 articles obtained, only eight articles meet the criteria herein.

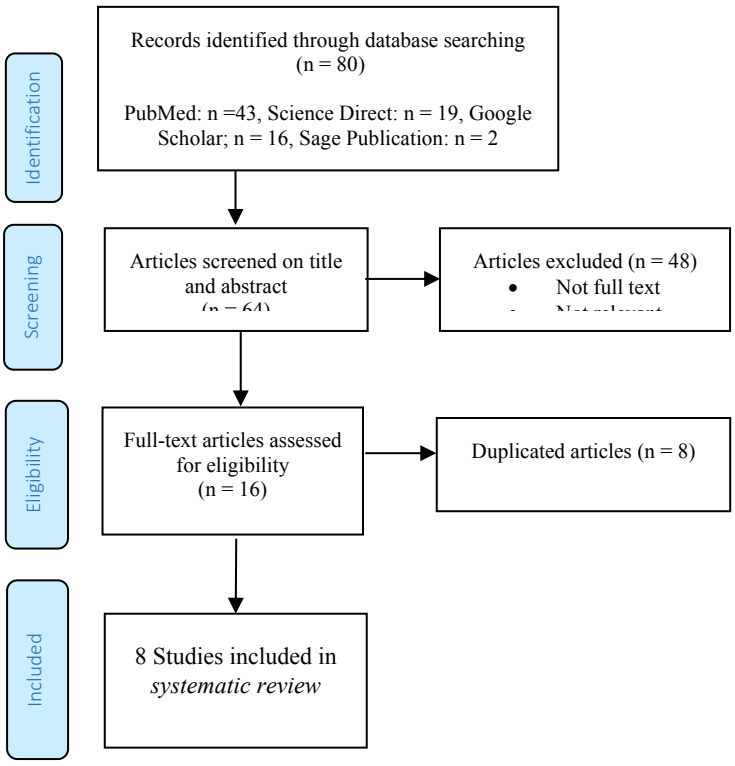

Figure 1: Preferred Reporting Items for Systematic Reviews and

RESULT

Eight articles were obtained for review, four of which discuss lactation performance, one discusses views of ABE among women in reproductive age, one covers the practice of ABE teaching among internationally certified midwives in Australia, another one critically reviews ABE practice, and the other one covers experiences of mothers performing ABE.

DISCUSSION

A. The Abe Practice

The proper start for ABE practice varies in different articles. A research by Waller in 1946 shows that ABE is performed at 28 week of pregnancy [23]. However, it sparked controversy due to contraction that results from nipple stimulation by one of the stages involved in this ABE method. Blaikley (1953) repeated Waller's (1946) method but with the onset at 32-36 weeks of pregnancy [31]. The latest research (2012) on ABE shows the start of this practice at 37 weeks of pregnancy as it enters the early phase. Hence, there is no concern for possible premature deliveries [21,29,32–35].

Frequency and duration of ABE differs: once a day, twice a day or four times a day for 5-10 minutes or 5-20 minutes. Yet all research agree that ABE should be performed while taking showers [27,29,30,32,33,35]. Mothers performing ABE are advised to stop the practice of colostrum secretion if contraction ensues [25,26,36]. Once collected, they are suggested to take notes or provide labels on container showing the date and time of ABE practice and put the colostrum containers in a freezer [27]. The ABE method practiced in the research by Forster (2009) produced 36.6 ml (in the 5-310 ml range) of colostrum for 14 days on average [27].
Conceiving mothers who are not allowed to perform ABE are those with history of premature labor, prenatal bleeding, placenta previa, or serotinus pregnancy [27,35].

B. The benefits of abe

1. Abe on lactation peformance and newborns

Colostrum is readily available in the second trimester pregnancy in the mammary gland and can therefore be secreted. Oxytocin is responsible for myoepithelial contraction around the mammary gland that leads to secretion of breast milk from the gland into the lactiferous sinus and lactiferous duct. The method employed here allows cellular glands to produce milk, open up lactiferous duct, and hence, facilitate lactation [32].
Mothers performing ABE experience shorter transition interval from EIB to full breast milk lactation as to allow their babies to get breast milk sooner, compared to those not performing ABE [29,32–34]. ABE reduces the cases of breastfeeding failure, improves mothers' breastfeeding performance, and increases babies' satisfaction in being breastfed.
Colostrum helps babies to excrete meconium and prevents them from having icterus. Some babies experience difficulties whilst breastfed. This is certainly an issue as they are in a phase of maintaining blood sugar level after being born, hence their need for rich and proper nutrition. Colostrum increases the level of ketone and allows blood sugar in babies to stabilize, compared to formulated milk [37,38]. Therefore, the secreted and stored colostrum during pregnancy can readily be used once the baby is delivered.

Delayed colostrum secretion is perhaps due to hypogalactia or the delay in lactogenesis. A research in 2018 reveals an innovation in dealing with hypogalactia among postpartum mothers using a combination of electrical acupoint and massage therapy [39]. Hence, a combination of these two methods and ABE practice may prevent hypogalactia.

No	Title	Author	Year	Methods	Sample	Intervention	Findings
1.	Effect of Antenatal Expression of Breast Milk at Term in Reducing Breast feeding Failures	Lt Col G Singh, Capt R Chouhan, Maj K Sidhu	2009	A prospective study	180 pregnant women above 37 weeks; 90 women in the intervention group and 90 women in control group	Secreting colostrum on a daily basis whilst showering for 3-5 minutes	Within the intervention group, 85 respondents (94.44%) managed to perform full lactation within half an hour, while within the control group only 63 respondents (70%) managed to perform full lactation within half an hour after the early initiation of breastfeeding, and 2 respondents experienced failure in partial lactation. There is a significant interval between the early initiation of breastfeeding to full lactation for the intervention group (94.44%) and the control group (70%) p = ≤ 0.001.
2.	Effect of antenatal expression of breast milk at term to improve lactational performance: a prospective study	Singh Gurneesh , Dasgupta Ellora	2009	A prospective study	100 pregnant women above 37 weeks; 50 women in the intervention group and 50 women in the control group	Secreting colostrum on a daily basis whilst showering	Within the intervention group, 48 respondents (96%) managed to perform full lactation within half an hour, while within the control group only 36 respondents (72%) managed to perform full lactation within half an hour after the early initiation of breastfeeding. There is a significant interval between the early initiation of breastfeeding to full lactation for the intervention group (96%) and the control group (72%) p = < 0.01.
3.	Effect of Antenatal Breast Milk Expression at Term Pregnancy to Improve Post Natal Lactational Performance	Lamba Sunita, Chopra Simmy, Negi Mamta	2015	A case control study	200 pregnant women above 37 weeks; 100 women in the intervention group and 100 women in the control group	Secreting colostrum on a daily basis whilst showering for 5 minutes	Within the intervention group, 89 respondents (89%) managed to perform full lactation within 6 hours, while within the control group only 72 respondents (72%) managed to perform full lactation within 6 hours after the early initiation of breastfeeding. There is a significant interval between the early initiation of breastfeeding to full lactation between both groups, p = < 0.05.

4.	Antenatal breast milk expression at term increases postnatal lactational performance	P.A. Uikey, Palak Agrawal, Surekha Khandale	2017	A prospective, comparative study	200 pregnant women above 37 weeks; 100 women in the intervention group and 100 women in the control group	Secreting colostrum 2-3 times a day whilst showering	Within the intervention group, 78% respondents managed to perform full lactation within half an hour after the early initiation of breastfeeding, while within the control group, only 38 % managed to do so. There is a significant interval between the early initiation of breastfeeding to full lactation between both groups, $p < 0.001$.

Table 1: Articles on ABE vs. lactation performance

No.	Title	Author	Year	Methods	Sample	Intervention	Findings
1	Women's perspectives on antenatal breast expression: a cross-sectional survey	Frankie J. Fair, Helen Watson, Rachel Gardner, Hora Soltani	2018	A cross-sectional study	688 women	Distributing questionnaires online	64.5% respondents have heard of ABE; 8.2% were recommended to perform ABE; and 14.2% have performed ABE. Out of 56 women recommended to perform ABE, 38 of them (67.9%) have done so. But most respondents (58.6%) were not sure if ABE is an effective intervention method. However, 80.9% will consider performing ABE to prepare them for proper breastfeeding. The obesity group has significantly known ABE with $p < 0.001$, and even a better response rate was also obtained from the BMI group

Table 2: Views Concerning ABE Among Women in Reproductive Age

No.	Title	Author	Year	Methods	Sample	Intervention	Findings
1.	Antenatal breast expression: Exploration and extent of teaching practices amongst International Board Certified Lactation Consultant (IBCLC) midwives across Australia	Tegan Chapman, Jan Pincombe, Mary Harris, Jennifer Fereday	2013	A descriptive cross-sectional study	1269 midwives of IBCLC Australia responded, and 347 were taken as sample	Distributing questionnaires online	Of the 347 respondents, 322 (92.8%) have heard of ABE and 248 (69.9%) responded positively. Out of 255 respondents, 134 (59.6%) are actively teaching ABE and are certified, and 11.6% are still teaching ABE, even though they are no longer registered, due to lack of certificate.

Table 3: Practice of ABE Teaching Among Midwives

No.	**Title**	**Author**	**Year**	**Methods**	**Sample**	**Intervention**	**Findings**
1.	Antenatal breast expression: A critical review of the literature	Tegan Chapman, Jan Pincombe, Mary Harris	2013	A critical review	Six articles concerning ABE, six articles related to nipple stimulation, two preliminary studies and one conference paper directly related to ABE	12 journal articles related to ABE were then used for systematic review	It is found that ABE has historically been performed to prepare the breast during the postpartum period. Colostrum storage is also recommended to prevent hypoglycemia among newborns and to speed up lactogenesis 2. Studies related to nipple stimulation were also criticized as it may trigger premature labor. Safety and efficacy of ABE have not been proven. Three articles concerning the benefit of ABE teaching are week in terms of methodology. Experiments related to nipple stimulation were also discovered, but they have limited research substances. Therefore, the benefit of this practice has not been confirmed.

Table 4: Critical Reviews About ABE Practice

No	Title	Author	Year	Methods	Sample	Intervention	Findings
1.	Experiences of expressing and storing colostrum antenatally: A qualitative study of mothers in regional Western Australia	Joanna M Brisban, Roslyn C Giglia	2015	A qualitative study	46 pregnant women with pregnancies > 37 weeks; two women were not willing to participate, three women had invalid data, 12 women no longer showed up at the clinic, 17 women can no longer be contacted, hence the remaining 12 pregnant women of > 37 weeks pregnancies	Carrying out interviews with 12 respondents	Interview results from 12 respondents reveal that 9 of them secreted colostrum and the other 3 did not. There were seven reasons affecting ABE practice; shyness and awkwardness of secreting colostrum before a midwives, uncertainty whether colostrum can be secreted during ABE, pregnant women are already familiar with their own breasts, ABE can be physically hurtful for some women, feeling of security for having breast milk supply, ABE as a learning process to secrete breast milk, and opinion that ABE is useless.

Table 5: Experiences of Mothers Performing ABE

2. *Abe On Induced Labor*

Some research preformed between 2000 and 2006 reveal that oxytocin secreted due to ABE practice takes a few hours to affect contraction and is not causing the cervix to become ripe and ready for dilatation [40]. It proves that the purpose of ABE practice is not to ripen the cervix or to induce labor, but to secrete and store colostrum instead [25,26].

However, a research in 2013 discovered that even though ABE is not aimed at ripening the cervix, frequent stimulation of the nipples cause the cervix to ripen and trigger dilation that labor during early term and premature pregnancy is augmented [41]. Average labor for ABE group is at 37.1 weeks, whereas average labor for non-ABE group is at 38.2 weeks. Nonetheless, increases the number of babies requiring special care for the ABE group [28].

3. *Abe On Self-Confidence Among Mothers*

Manual secretion of breast milk in ABE practice prepares mothers physically (breasts and nipples) and psychologically to perform lactation [32]. Mothers performing ABE are more confident and are more prepared to lactate. They are also more positive in their preparation to care for the babies by preparing colostrum and learning how to secrete breast milk. On the other hand, the negative effects often associated with ABE is difficulties in some of the techniques used and blisters in nipples [27].

4. *Abe As Seen By Women In Reproductive Age*

a. *Positive View*

ABE improves the confidence of mothers in breastfeeding, as they are able to secrete colostrum. Mothers get used to their breasts that breastfeeding no longer feels awkward. Some mothers experience discomfort whilst performing massage during ABE practice. It is therefore the task of midwives to find better methods of performing ABE [21].

Most respondents agree that ABE is beneficial especially when either the mother or the baby has a history of diabetes, breast operation, postpartum complications, premature labor, low blood sugar, breastfeeding difficulties, and perinatology.

They also mention that ABE is a good preparation for the success of breastfeeding as it gives them more confidence in the proper technique of breast milk secretion they can use later after labor and the ways to provide colostrum supply, to increase breast milk supply, and to avoid the use of formulated milk.

b. *Negative View*

Some respondents argue that this practice is dangerous as it may result in premature labor, pain stimulation, and interference with natural lactation. There are also concerns that what the baby will get as he/she is born is not colostrum, but the transitional breast milk instead, as the colostrum is already secreted when the baby was not yet born [35].

c. *Vague View*

Some respondents state concerns about whether ABE is really a good ideas because they lack knowledge about it. They are somehow have never heard about ABE practice or at least are not well-informed about its benefits and risks [35].

5. *Abe Teaching Among Midwives At The International Level*

Midwives and the International Board Certified Lactation Consultant (IBCLC) are in dilemma as there is not yet sufficient research data on the negative effects of ABE, as well as those that support the positive aspects of ABE for both mothers and babies [41].

However, the general consensus is that the benefits of ABE outweigh its downsides that lactation consultants and educators are encouraged to promote the practice of ABE to pregnant mothers [24]. Nonetheless, midwives and the IBCLC will look forward to getting the latest results from research

on the benefits of ABE practice to allow it to be properly approved and disseminated by midwives and the IBCLC, including varied methods of its implementation [25,26,36,42,43].

CONCLUSION

ABE is the practice of colostrum secretion that is beneficial for both mothers and babies. Therefore, *there is a need more systematic review using other keywords and methods on the safety and efficacy of ABE practice to ensure its benefit for breastfeeding.* Such research are expected to prove that ABE is beneficial in starting the process of breastfeeding, that in turn will result in lower figures of prelacteal feeding for newborns and hypogalactia cases among mothers. Another important factor is to increase the knowledge of mothers by educating them on the benefits of ABE for both mothers and babies.

CONFLICT OF INTEREST

There is no conflict of interest.

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