

Human Milk Expression Practices, Experiences and Perceptions among Mothers: A Systematic Literature Review

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ABSTRACT

Human milk expression is commonly practiced among breastfeeding mothers. Their practices, experiences, and perceptions varies due to many underlying environments and issues. This review describes practices, experiences, and perceptions of mothers in expressing milk. Literature search was conducted for peer-reviewed articles on milk expression using Scopus, Krisalis Discovery, CINAHL, and PubMed from 2010 to 2020 for qualitative and mixed studies. This review and reporting was performed according to the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA). Screening and selection of articles were conducted using Distiller Systematic Review (DSR). Twenty-two qualitative studies were identified focusing on the milk expression practices, experiences, and perceptions of mothers. Their practices indicated time, duration and method of milk expression. The experiences found were on the reasons, challenges, coping strategies and motivations. The perceptions on milk expression were found to influence the experience and practices of milk expression. Human milk expression practices, experiences and perceptions have been highlighted in many studies; however, there is no clear association between practices, experiences and perception.

Keywords

human milk expression, milk expression practices, lactation, breastfeeding, systematic review

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INTRODUCTION

Mothers are increasingly practising milk expression due to various reasons.^{1,2} A few studies associated expressing milk in order to support mothers who wish to return to work.^{3,4} Some other studies focused on the expressing of their milk to provide human milk to ill babies or preterm babies who are hospitalised.⁴⁻⁷ A study also looked at sharing of milk or milk donation⁸ as part of the reason mothers were expressing milk. Some mothers were advised to express milk to provide milk supply when their babies could not latch.⁹

Regarding the method of expression of milk, many studies indicated that mothers were practicing breast pumping¹⁰ rather than by hand expression. The use of the breast pump is seen as early as antenatally, in antenatal classes, seminars, expo, and social media marketing.¹¹ Despite a lack of reporting, breast pump has been widely used and perceived by mothers as vital preparation¹² to later successful breastfeeding. Many support programs on

lactation worldwide has encouraged the use of breast pumps¹³ as part of the program component rather than providing training on how to conduct hand expression of milk. The terminology of 'expressing breast milk' in many articles, books, communication and education on breastfeeding has also focussed on 'breast pumping', leaving the other options of expressing milk by hand to be less popular and less appreciated.¹⁴

Expressing human milk has now turned into a positive trend among working mothers as it is associated with prolonging the duration of them providing human milk to their babies.¹³ However, this trend has also led mothers to quantify the volume of human milk expressed.¹⁵ Through social media, mothers tend to compare their human milk yields with other mothers and thus creating concerns about their ability to produce milk. It is unclear if this comparison of the volume of human milk expression has any benefit to the mothers.

Another trend that has become increasingly popular among mothers is to practice milk expression exclusively^{16,17} and provide the expressed milk to their babies using another apparatus like bottles and teats. Providing babies with human milk or a mother's own milk has been the ultimate goal for many of these mothers.⁵ However, some mothers struggled to get evidence-based information and support while practicing exclusive expressing milk.¹⁸

A systematic review focusing on milk expression methods¹⁹ included only randomized and quasi-randomized trials at any time after birth. The review tabled the maternal acceptability and satisfaction, adverse outcome, effectiveness, effect on milk composition, maternal physiological and economic implication of the milk expression method. However, it was not able to assess the safety and achievement of maternal goals for expressing milk.

Another Cochrane review on antenatal milk expression among women with diabetes²⁰ found no published or unpublished randomized controlled trials comparing antenatal expressing with not expressing. The review further suggested that there is no high-level systematic evidence to inform the safety and efficacy of expressing and storing breast milk antenatally.

A qualitative review of mothers' perception of breastmilk expression for the premature infant in neonatal care intensive unit²¹ has synthesized three main themes: maternal changes, pumping challenges, and motivation. A further review that explores the richness of complexity of mothers' practices, experiences and perceptions in milk expression is needed to enable decision-making among mothers to achieve their breastfeeding target. As such this systematic review aims to describe mothers' practices, experiences, and perceptions on expressing human milk.

MATERIALS AND METHODS

A systematic review of peer-reviewed literature was conducted to identify studies that have assessed mothers' practices, experiences and perceptions on milk expression. Preferred Reporting Items for

Systematic Review and Meta-Analysis (PRISMA) reporting guidelines to report the systematic review were used.²²

Inclusion and Exclusion Criteria

Qualitative and mixed method studies on milk expression, published between January 2010 and December 2020, full-text in English were included. Quantitative studies, review articles, policy statements, studies about instrument development, and non-human studies were excluded.

Search Strategy

A systematic literature search was conducted on four electronic databases (Scopus, Krisalis Discovery, CINAHL, and PubMed) in May 2021. Search terms included the following: ("milk expression" OR "expressing milk" OR "expressing breast milk" OR "breast milk expression" OR "milk pumping" OR "pumping milk" OR "breast pump") AND (practice OR experience OR challenge OR perception OR attitude OR feeling OR view) AND (qualitative OR "mixed studies") NOT (cow OR animal)

Study Selection

The initial literature search finding from all databases was uploaded to Distiller Systematic Review (DSR) software.²² The DSR is an internet-based program that facilitates the screening and data extraction process. Reusable forms were used for each level of screening and data extraction to ensure consistency throughout the process. In the first level, studies were selected based on their title and abstract. In the second level, full-text articles were uploaded to DSR to facilitate full-text assessment. The DSR software used was a free license type that enabled only one user. Therefore, only one reviewer assessed the title, abstract, and full text of the articles for the screening process. Then, two other reviewers further confirmed the result to ensure the quality of the process taken through this software.

Risk of Bias Assessment

Each study was further appraised using the Joanna Briggs Institute (JBI) Critical Appraisal tools: Checklist for

Qualitative Research.²³ The studies were assessed using ten checklists described in this tool (Appendix 1). The quality of each study was determined by the methodological quality of a study and the extent to which a study has addressed the possibility of bias in its design, conduct and analysis.

Data Extraction

Data were extracted by answering the research questions derived from Population, Interest and Context (PICO) identification.²⁴ The research questions derived from PICO were “What are mothers’ practices in milk expression?”, “How was the experience?” and “What were the perceptions towards milk expression practices?” General information of the studies including study design, sample size, method of data collection and major findings were extracted. The result was discussed among the researchers to reach consensus of the findings.

RESULTS

Description of the Included Studies

The initial search from all databases resulted in 780 articles. After removing duplicates, 545 articles remained. Forty-one articles remained after screening by title and abstract of abstract. After a full-text review, we excluded 19 articles that did not meet study inclusion criteria. Thus, twenty-two articles remained for inclusion in this review (Figure 1).

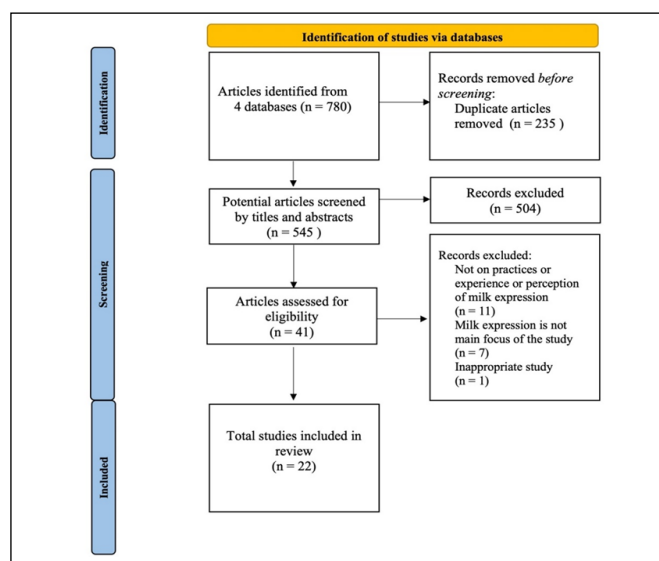


Figure 1. Flowchart on Selection of the Included Studies

There were 18 qualitative studies and four mixed studies identified that focussed on the milk expression practices, experiences and perceptions of mothers. Table 1 summarizes the descriptive statistics of these studies (n=22).

Table 1. Descriptive Statistics of Studies Included in the Systematic Review (n=22)

	Frequency (n)	Percentage (%)
Study design		
Qualitative	18	82
Mixed method	4	18
Study location		
USA	12	55
Australia	2	9
UK	2	9
Others	6	27
Study samples		
Less than 10	2	9
10-100	16	73
101-1000	3	14
1001-2000	1	4
Number of themes in manuscripts		
1 theme	5	23
2 themes	12	54
3 themes	5	23

Risk of Bias Assessment

Qualitative assessment based on Joanna Briggs Institute (JBI) Critical Appraisal tool found that most of the studies were congruent methodologically. Only five studies did not report clearly their philosophical or theoretical framework. Two studies were not congruent between the research methodology and the research question or objectives, and another one was not unclear. Overall, all studies had interpreted their findings in the result section and have clearly defined the conclusion.

Milk Expression Practices

Among 12 studies that reported on milk expression practices (Table 2), three studies were about antenatal practices²⁵⁻²⁷ which began at around 37 weeks of gestation. Other studies that looked into postpartum milk expression did not indicate the time milk expression started but discussed on the frequency of expression^{10,28,29} with highest reported as “several times a day” and duration of the practice³⁰ range from a few days to 17

months. Two studies were uniquely identified in the practice of milk expression which involved mothers who experienced perinatal loss³¹ and mothers who were expressing milk while simultaneously feeding their babies on the other breasts.³² On the method of practices, two studies reported the use of breast pump and hand expression,^{1,10} one study on the antenatal milk expression was using hand expression as a sole method²⁷ and one study describing the use of breast pump and simultaneously nursing their babies.³² The milk expression practices were associated with the perception on milk production,²⁸ mothers who were exclusively breastfeeding,²⁹ baby's health condition,³³ the needs to continue to provide human milk to their babies³⁰ and availability of private space.³⁴

Milk Expression Experiences

The experiences described in the fifteen studies this review (Table 3) was based on reasons, challenges, coping strategies and motivation to express breastmilk. Among the reasons indicated were to store extra milk, while returning back to work¹⁰ and a healing process following a perinatal loss.³¹ The reasons also changed over the time based on the needs at that time and desire of the mothers.³⁵ Among the challenges of milk expression reported in nine studies in this review were breast pain, physical and mental challenges, difficulty of milk pumping process, reduced time for doing other activities, inconsistent advices received, struggling in managing daily life routines and energy consuming.^{4,10,27,33,36-40} Five of these studies indicated that coping strategies of the

Table 2. Twelve Studies on Practices

Author Year Location	Study design Data Collection Method Sample size (n)	Major Findings on Practices
Clemons & Amir ¹⁰ 2010 Australia	Mixed Web-based survey n=903	Electric breast pumps were commonly used and most preferred method of expressing breast milk. Hand expression were highly used but very few women preferred this method. Frequency of expression varied over the time with highest of "several times a day" in weeks 0 to 4.
de Alencar & Seidl ²⁸ 2010 Brazil	Mixed Interview n=36	Main factors that influenced women's frequency of milk expression was the perception they had related to milk production.
Ismail et al. ²⁹ 2012 Malaysia	Qualitative In-depth interview n=20	Milk expression is common among exclusively breastfeeding mothers who are working and they commonly practiced expressing milk regularly at workplace, twice a day for < 1 hour for each session.
Welborn ³¹ 2012 USA	Qualitative Interview n=21	Mothers who experienced perinatal loss, expressed their milk after the loss or while their baby were in NICU and keep their supply up for few weeks or months.
Rossmann et al. ³³ 2013 USA	Qualitative In-depth interview n=23	Mothers with VLBW infant were maintaining regular pumping schedule regardless their ability to maintain adequate milk volume for their infants or not.
Brisbane & Giglia ²⁵ 2015 Australia	Qualitative Interview via Skype n=12	Out of 12 women who had attended a unique antenatal lactation clinic appointment at 37 weeks' gestation, nine women attempted to express colostrum antenatally.
Dinour et al. ³⁴ 2015 USA	Qualitative Interview n=32	Less students were pumping on campus as compared to more staff and faculty were able to do so is associated to accessibility to private space.
Felice et al. ³⁵ 2017 USA	Qualitative In-depth interviews and observations n=20	Some mothers used more than one method (single manual, single electric, double electric breast pump and hand expression) in the period of expression.
O'Sullivan et al. ³⁰ 2017 USA	Qualitative In-depth interview n=41	Many mothers in this study preferred to feed their infants on breast but due to certain circumstances, they have to find other strategies or practices to enable them to continue providing human milk to their babies. Duration of milk expression ranged from a few days to 17 months and duration of feeding expressed breastmilk ranged from a few days to 16 months.
Fair et al. ²⁶ 2018 UK	Mixed Online questionnaire n=688	Many mothers had heard of Antenatal Breastfeeding Expression (ABE). Compliance with advice to undertake ABE is relatively high.
Demirci et al. ²⁷ 2019 USA.	Qualitative In-depth interview n=19	Hand expression were suggested as a method to express milk antenatally. Mothers practiced AME once or twice a day antenatally.
McCue & Stulberger ³² 2019 USA	Qualitative Interview n=10	Using breast pump on one breast while simultaneously nursing a baby on the other breast is considered not feasible to continue this practice for long term due to the needs to hold both pump and infant at the same time but most useful in early days to increase milk supply.

mothers to continue expressing milk. Most of these hospitalized infants. Three studies reported that coping experiences were associated with their professional advice and information about milk

Table 3. Fifteen studies describing experiences of milk expression

Author Year Location (country)	Study design Data Collection Method Sample size (n)	Major Findings on Experience
Clemons & Amir ¹⁰ 2010 Australia	Mixed Web-based survey n=903	Common reason to express breastmilk were to store extra milk but most important reasons were to increase milk supply and enable them to return to work. A number of women reported that breast pumps caused negative side effects such as pain and damaged nipples.
de Alencar & Seidl ²⁸ 2010 Brazil.	Mixed Interview n=36	Frequency of milk expression was affected by positive and /or negative influences categorized by fluid intake, diet, mothers' routines, baby feeding frequency, emotions, time availability, growth of baby, period of the day, physical fatigue and laziness.
Sisk et al. ⁴ 2010 USA.	Qualitative In-depth interview n=32	Mothers experienced physical and mental challenges, lack of privacy as barriers while availability of breast pump as support to initiate milk expression. Distance and separation between mother and infant were factors influencing mothers experience to maintain breast milk expression for their hospitalized infant.
Welborn ³¹ 2012 USA	Qualitative Interview n=21	Milk expression experience following a perinatal loss helped bereaved mothers to identify as a mother and grieving the loss of motherhood. Mothers who lost their baby, expressing milk to minimize any discomfort from engorgement and to maintain a physical connection to their baby.
Hurst et al. ³⁶ 2013 USA	Qualitative In-depth interview and daily self-reported maternal pumping logs. n=14	Mothers who had previous breastfeeding experience found the pumping process was difficult. Adaptive strategies were needed to go through pumping process and influenced by environmental factors, milk ejection reflex factors and physical sensation related to pumping. All of the mothers dislike the pumping process but they came up with diversionary tactics to overcome the "dread" of pumping.
Rossmann et al. ³³ 2013 USA	Qualitative In-depth interview n=23	Mothers received consistent information on providing milk and pumping from NICU health care providers and peer counsellors. They continued expressing milk despite disliking the process and act because they understood that providing milk was of value to their infant's health and they had faith in the healing properties of their milk.
Froh et al. ⁴¹ 2015 USA	Qualitative In-depth Interview n=11	Human milk oral care engages mothers with CDH infants in infants' daily care. This positive and healthy routines motivates mothers to keep up their milk supply through milk expression.
Flaherman et al. ³⁷ 2016 USA.	Qualitative Focused group discussion among mothers with milk supply concern n=56	Mothers reported both positive and negative experiences of milk expression using pump. Positive experiences included an increased sense of control over breastfeeding due to the perception that the breast pump could increase the baby's intake. Negative experiences included pain, increased milk supply concern, reduced time for other activities and frustration with inconsistent advice from clinicians about pumping.
Ikonen et al. ³⁸ 2016 Finland	Mixed Internet-base questionnaire with open ended questions n=130	Mothers with baby in NICU were commonly struggling to cope with their life by managing the situation, daily life and feelings. However, most of them were positively looking forward to transition into easier breastfeeding experience in future.
Felice et al. ³⁵ 2017 USA	Qualitative In-depth interviews and observations n=20	Mothers who unable to latch need to rely on pump to be able to provide sufficient human milk for their babies. Mothers' reason to express milk changed over time associated with their current needs and desire.
O'Sullivan et al. ³⁰ 2017 USA	Qualitative In-depth interview n=41	Many mothers experienced HM over-production and had various ways on how to use the stockpile. Four basic HM-feeding strategies emerged, ranging from predominantly feeding at-the-breast; breastfeeding and express milk regularly; breastfeeding and predominantly express milk to be frozen to build stockpile; to exclusively feeding expressed-HM.
Bujold et al. ³⁹ 2018 Canada	Qualitative Self-recording via smartphone application. n=15	Expressing human milk was a difficult experience for all mothers. Mothers utilized a variety of strategies to help them cope with the challenges of milk expression and helping them achieving the closeness feeling.
Demirci et al. ²⁷ 2019 USA	Qualitative study within RCT groups In-depth interview n=19	Despite having some challenges to practice AME such as hand fatigue and breast soreness, mothers feel motivated to practice by using small container provided that has realistic volume expectation.
Jardine ¹⁸ 2019 USA, Canada, UK, Australia, Singapore, India, Malaysia and a few other countries	Mixed Online survey n=1215	Respondents reported that very few prenatal breastfeeding information sources mentioned or explained exclusive pumping. Most of them only heard about exclusive pumping after giving birth mostly through own research.
Möreljus et al. ⁴⁰ 2020 Sweden	Qualitative Interview n=9	Despite the barriers of energy and time consuming, mothers feel motivated to continue expressing milk when they received knowledge and information that the breast milk is the next best thing they could provide to their infant.

expression influenced the mother to initiate and continue the practice.^{33,40,41} Other than the perception of milk production³⁷ and belief in healing properties in human milk,³³ tools like a breast pump⁴ and small containers²⁷ that provided realistic expectations during milk collection were among the motivation factors stated in this review.

Perception on Milk Expression

Both positive and negative perceptions were found to influence the experiences and practices of milk expression (Table 4). The positive perceptions described in the studies selected were regarding the education and support from health care,^{25,31} healing properties in

breastmilk,³³ coping mechanism for mothers' of NICU infants³⁹ and antenatal milk expression as breastfeeding preparation.^{26,27} While negative perception were regarding attitude towards safety and hygiene,²⁹ negative thoughts on the practices,²⁵ inequality of support in campus,³⁴ pressure of being sole role to provide milk,⁵ lack of consistent and adequate advice,³⁵ lack of awareness in exclusive pumping¹⁸ and loss of control of situation in NICU setting.⁴⁰ Studies conducted among mothers who have hospitalized or very low birth weight infants highlighted the complex feeling while practicing milk expression and the practices were seen as separation and connection to their infant at the same time.^{36,39}

Table 4. Seventeen studies describing perception on milk expression

Author Year Location (country)	Study design Data Collection Method Sample size (n)	Major Findings
Sisk et al. ⁴ 2010 USA.	Qualitative In-depth interview n=32	The needs to balance work and pumping session; Positive and negative social interactions; time management and; mothers' attitudes toward milk expression were perceived as supporting factors by some mothers.
Ismail et al. ²⁹ 2012 Malaysia.	Qualitative In-depth interview n=20	Perceptions on feasibility of milk expression, attitude towards the practice and safety and hygiene of the expressed breastmilk had hindered mothers from practicing milk expression.
Welborn ³¹ 2012 USA	Qualitative Interview n=21	Information on expressing milk and donation should be available to mothers who experience perinatal lost to support mothers to make an informed decision.
Hurst et al. ³⁶ 2013 USA	Qualitative In-depth interview and daily self-reported maternal pumping logs. n=14	The complex duality of simultaneously experiencing 2 contrasting feelings—separation and connection—add to the understanding of pump-dependent mothers of very preterm infants.
Johnson et al. ⁴² 2013 UK	Qualitative Secondary analysis from a larger study. n=7	Expressing extensively practices were used to managing competing demands and dilemmas of breastfeeding in early days. Maintaining 'good maternal body' motivated mothers to express milk to ensure the continued provision of breast milk. Mothers perceived practice of milk expression as enabling a degree of freedom and convenience in early infant feeding.
Rossmann et al. ³³ 2013 USA	Qualitative In-depth interview n=23	Mothers believed that their milk has healing properties from the experience seeing their babies thriving well and eventually motivated them to continue expressing milk for their infant. Providing milk was viewed by the mothers as a means to renew the connection they felt to the infant when they were pregnant.
Brisbane & Giglia ²⁵ 2015 Australia	Qualitative Telephone Interview via Skype. n=12	Many women in this study found the teaching of Antenatal Breastmilk Expression to be a positive and worthwhile experience while some had negative thoughts on the practice such as embarrassment, challenging and pointless.
Dinour et al. ³⁴ 2015 USA	Qualitative Interview n=32	A dedicated space that is in close proximity, clean, quiet and has privacy could possibly remove barriers to all mothers who wish to express milk on campus. An inequality of current lactation support practice may exist at colleges and universities. It is necessary to extend this protection to all members of a workplace, regardless of their role.
Bower et al. ⁵ 2017 USA	Qualitative In-depth interview n=17	Mothers perceived it is their sole role to provide enough expressed milk to meet their infants' full nutrition needs. The perception put a lot of pressure on them to accomplish this aim.
Felice et al. ³⁵ 2017 USA	Qualitative In-depth interviews and observations n=20	All mothers end up pumping with perception that it is essential to meet their infant needs. Mothers felt that there is a lack of consistent and adequate advice in milk expression practices.
O'Sullivan et al. ³⁰ 2017 USA	Qualitative In-depth interview n=41	There was mixed perception among mothers about the meaning of feeding at the breast and feeding expressed breastmilk. Some mothers considered feeding at the breast and feeding expressed breastmilk are the same but some perceived they are two different behaviour.

Author Year Location (country)	Study design Data Collection Method Sample size (n)	Major Findings
Bujold et al. ³⁹ 2018 Canada	Qualitative Self-recording via smartphone application. n=15	Mothers of NICU infants who were expressing human milk experienced both closeness with their infant and a feeling of separation, and this could fluctuate in the short-term over time. Mothers' positive and negative feelings fluctuated and were influenced by 3 factors: coping mechanisms, perceived challenges, and mothers' location and environment while expressing milk.
Fair et al. ²⁶ 2018 UK	Mixed Online questionnaire n=688	While more than half mothers were not sure if ABE is a good idea, more mothers would consider to practise if it helps with breastfeeding preparation. There were positive, negative and uncertain perception about ABE among mothers.
Demirci et al. ²⁷ 2019 USA	Qualitative In-depth interview n=19	The AME practice was acceptable and increased mothers confidence in ability to make milk and to breastfeeding successfully postpartum. AME was not time consuming but sometimes difficult to remember to practice. Majority of mothers would prefer practicing AME in private without partners' presence.
Jardine ¹⁸ 2019 USA, Canada, UK, Australia, Singapore, India, Malaysia and a few other countries	Mixed Online survey n=1215	Mothers who have heard about exclusive pumping prior to giving birth feel more knowledgeable about how to exclusively pump. Being knowledgeable made mothers feel less frustrated, depressed, insecure, embarrassed, burdened, envious, disappointed, guilty, and rejected while exclusively pumping.
McCue & Stulberger ³² 2019 USA	Qualitative Interview n=10	Mothers were comparing parallel pumping with triple feeding protocol and was perceived as saving their time as they were doing two of the three action required on triple protocol at the same time. However it also required practice to sustain it in various setting.
Mörelis et al. ⁴⁰ 2020 Sweden	Qualitative Interview n=9	The feeling, emotion and thought of the mothers who expressed milk in NICU environment were summed up as loss of control of the situation. Despite feeling insecure, sad and continuously depending on breast pump, they had to continue expressing milk.

DISCUSSION

This review aims to describe practices, experiences, and perceptions of mothers on expressing human milk. While the focus of the included studies was not looking at the association of the themes, this review has highlighted some association between experiences or perceptions and practices of milk expression among mothers.

Most of the timing of the studies was during the postpartum period. Only three studies were including participants with milk practices during the antenatal period. During antenatal, the milk expression was more likely to be practiced if the mother's received information on the benefits and guidance on the practices. Mothers who expressed milk after giving birth begin the practices as early as six hours after delivery. Early initiation of milk expression was associated with early possession of breast pumps and previous milk expression experience among multiparous mothers. Some of the practices began early to support hospitalized and very low birth weight infants.

Two studies were related to milk donation and milk banks for various purposes. One study focussed on the experience of milk expression among donors of milk in Brazil²⁸ and another study in the United States of America was among donors specifically following a perinatal loss.³¹ Due to different purposes of the milk donation, the findings from the outcome varied as well. For example, the study done in Brazil focused on methods used by the participants, while the mothers who bereaved from their perinatal loss found that the experience of expressing milk was beneficial as part of the coping mechanism of grieving.

Of five studies on methods of milk expression, comparison of the methods was among the main outcome. A study in Brazil recommended hand expression as the technical standard for the study, but only 60% of the participants complied.²⁸ A study in Australia stated that electric breast pumps were commonly used and the most preferred method.¹⁰ A few other studies focused on the use of breast pumps as the

sole method in the studies. This can lead to the conclusion that a breast pump was the preferred method of milk expression among mothers during this review period.

On the negative experience of milk expression, pain experience has been reported as the common case involving both breast pump and hand expressions practices. The negative experience of breast pump was associated with a lack of support and appropriate advice on using the tool. In contrast, negative experience of hand expression was the outcome of experience among antenatal mothers.

There were limited studies that were associating experiences and perception with milk expression practices. Two studies that were related to the circumstances of the participants built the perception of the need to either expressing milk or not. A study in Malaysia²⁹ stated that due to the perception of the feasibility of milk expression, attitudes towards the practices, and safety and hygiene of the expressed milk, it limited the practices of milk expression among participants. A study among bereaved mothers who lost their baby indicated that their experience of expressing milk helped them re-identify as mothers and motivated them to keep up with the practices.

LIMITATIONS

The summary of the studies may be limited by the search term of practices, experience and perception. The specific term for practices, experience and perception (e.g., method, frequency, duration; mother's observation or thoughts) were not specified as search terms, but the theme related to the outcomes appears in our results. Many of the available studies were focusing on infant feeding practices and not milk expression practices. However, in some studies, the outcome and results captured the practices, experiences and perception of milk expression. These studies were included when the output was clearly defined as milk expression practices, experience and perception.

CONCLUSION

The findings of this review reveal that milk expression practices, experiences and perceptions were interrelated. While the practices may be influenced by the previous experience and perceptions among mothers, further research is needed to provide better guidance on the practices to understand this relationship.

ETHICAL ISSUES

This article was part of a research project approved by Human Research Ethics Committee University Science Malaysia with the approval code USM/JEPeM/17090416.

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CONFLICT OF INTEREST

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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