

The impact of breast pump usage of breastfeeding mother: scoping review

Sakinah Yusro Pohan^{1*}, Sri Ratna Ningsih², Andari Wuri Astuti³

^{1,2,3}Fakultas Ilmu Kesehatan, Universitas 'Aisyiyah Yogyakarta, Ringroad Barat No.63 Jalan Nogotirto, Gamping Sleman 55292, Yogyakarta Indonesia

¹sakinahyusropohan@gmail.com*; ²ratna_ningsih@unisayogya.ac.id; ³astutiandari@unisayogya.ac.id
*corresponding author

Submission date: 22 Maret 2021, Receipt date: 19 Mei 2021, Publication date: 1 Juli 2021

Abstract

WHO recommended mother breastfeeds exclusively for the first six months. However, many mothers do not realize it. Generally, the anxiety on milk production, the family and occupation commitment, waking up at night & perceiving uncomfortable breastfeeding in public place. The objectives of this study that is for reviewing evidence related the impact of breast pump usage on mother. According to Arskey & O'Malley: 1) Identifying review questions with PICO 2) Identifying relevant article 3) Selecting article 4) Data Charting 5) Arranging, summing up & reporting findings. The theme is the impact of breastfeeding success, the negative outcome of breast pump, & factors influence decision mother's milk pumping.

Keywords: *breast pump, pumping, breastfeeding mother*

INTRODUCTION

Breastmilk provides many nutrition and bioactive agent for baby in the form which is digested easily and available biologically for maintaining the growth and development baby. Breastfeeding exclusively supplies the best protection for baby on serious and chronic illness in the future. The estimation of providing breastfeeding exclusively during six months and sustaining breastfeeding on the first year can prevent 13% of 10 million more of deaths every year among children under 5 years (Bai, Dinour and Pope, 2016).

(World Health Organization, 2019) suggested that mother breastfeed exclusively for the first six months. However a lot of mothers are not realizing and even when high initiation level, the breastfeeding production is fall sharply on the first postnatal weeks. The worriness on milk production, family and occupation commitment, waking up at night and perceiving uncomfortable breastfeeding in public place become the reason for mother does not want to breastfeed but every country has complex and different mother's reason (Fewtrell, Kennedy, Lukoyanova, Wei, Potak, Borovik, Namazova, Baranova et al., 2019). In line with the research of (Purnamasari and Mufdlilah, 2018) the failure of providing breastmilk exclusively is affected by mother's information and occupation ($p < 0.05$).



The results showed (Fan *et al.*, 2020) 14.6%, 20.2% and 15% of mothers were given breast pumps for their babies at 1.5, 3 and 6 months, respectively. Less than half of them only give direct breastfeeding at the age of 1.5 and 3 months. In the first six months postpartum, 84.6% of participants had given expressed breast milk. More than 80% of participants received a breast pump before delivery, benefiting from an electric pump. The most common reason for expressing breast milk in the first 1.5 months postpartum was having difficulty breastfeeding (35%). Return to work was the strongest predictor of expressing expressed breast milk at three months postpartum (adjusted OR=8.71, 95% (12-14.8)). This results reveals that women can be said success for breastfeeding in outdoor, either in the office or in the public places, additional support is necessary. A work can impact respondents in providing back for exclusive breastfeeding (54.7%) (Efriani & Astuti, 2021).

The returning work of breastfeeding mother after postnatal become marketing technique for baby food industry related to women who do not breastfeed exclusively in the first six month and move to formula milk. The promotion of substituting breast milk by health system, including pediatrician, is related to the enhancement in utilizing substitute breast milk dramatically and the breastfeeding reduction. In essence, every women want to give the best for their children and when given accurate and professional information as well as social support. Almost mothers are able to breastfeeding, if they are given accurate information, guidance and support (Iellamo, Sobel and Engelhardt, 2015).

The usage of breast pump is one of the solutions for mother's obstacle in giving exclusive breast milk and it can be a facilitator in breastmilk excretion ASI (Sheehan and Bowcher, 2017). Breast pump is an effective and important tool for managing challenge of breastfeeding such as for providing breastmilk for premature baby and for mother who return to work. The suitable usage and setting-up of breast pump is important for optimizing breastmilk supply and preventing injury (Eglash and Malloy, 2015). There are many benefits and problems of the breastmilk usage including pumping process. However the problems related breastmilk usage is frequently ignored. A research declared that the breast pump usage is associated with the high-risk of mastitis, the pumping technique, and the wrong pumping setting (> 200mmHg) relate with painful nipple and painful breast tissue. The bacteria infection can occur if the breast pump is not cleaned and saved well; it leads to high-risk for baby and mother (Qi *et al.*, 2014b). Moreover, exclusive pumping is an unoptimal approach for breastmilk production (Keim *et al.*, 2017).

Another study showed that electric breast pumping was more effective than other methods in terms of the volume of milk obtained. The use of breast pumps to express breast milk is becoming more common and opens up opportunities for mothers who are already working to breastfeed their babies, thereby reducing the risk of failure of exclusive breastfeeding. most studies discuss the effect of the breast pump on the volume of breast milk so that a further review of the effect of the breast pump on nursing mothers is needed so that it can increase the provision of appropriate maternal needs (Johns *et al.*, 2013). The scope of the review is a part of literature that aims to make relevant articles/literature or the process of summarizing the evidence to express its breadth and depth (Davis, Drey and Gould, 2009). This review uses a method for designing clustering as suggested by Arksey and O'Malley (2005) and further developed by Levac *et al.* (2010)

There are four reasons to carry out the scope of research to examine the range and activities of research, determine the value of systematic, summarize and disseminate research findings, to find research in the existing literature and clarify complex concepts and further research questions.

Based on background study above, the objective of this study is reviewing evidence related to the impact of breast pump usage on breastfeeding mother.

RESEARCH METHODS

The framework of scoping review adopted from Arksey and O'Malley (2005), the stages are as follows (1) Identifying scoping review question (2) Identifying relevant article (3) Selecting article (4) Data Charting and (5) Arranging, summing-up and

P (Population)	I (INTERVENTION)	C(compare)	O (Outcomes)
Breastfeeding mothers Employee Women	Breast pump	Hand expression	Effect breast pump Impact breast pump

reporting finding (Arksey & O'Malley, 2005).

1. Identifying Scoping Review Questions

For identifying scoping review questions used PICO framework

Table 1. PICO

Based on PICO framework above, the scoping review question: How does the impact of breast pump usage on breastfeeding mother?

2. Identifying Relevant Article

There are three stages for identifying article. The first stage is determining inclusion and exclusion criteria based on article published in last 10 years, English and Indonesian article, original research, the research population on the normal, complication, or death baby and the exclusion opinion's article, reviewed article and article that form a report or book. The second stage is determining keyword that the keyword used for scoping review that is "breastfeeding mothers" OR "employee" OR "women" AND "breast pump" AND effect OR "impact". The third stage, inserting keyword in search engine at PubMed, Science Direct, Wiley and EBSCO and Gray literature that is Google Scholar.

3. Selecting Article

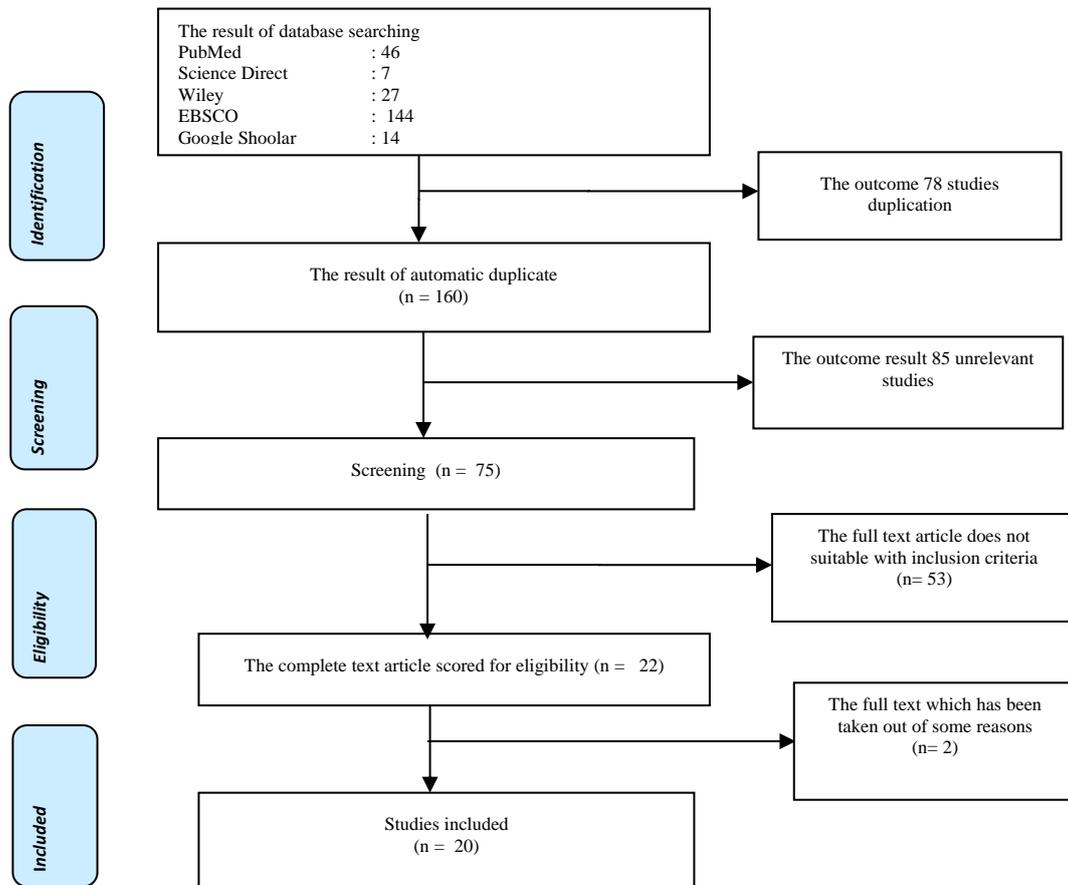


Figure 1 Selecting Article

4. Data Charting

Table 2. Data Charting

No.	Title/Writer /Year	Country	The Objective	Method	Respondent s	Result	Grades
1.	Alternative Hospital Gift Bags and Breastfeeding Exclusivity/ (Bai, Wunderlich and Kashdan, 2013)	USA	To comparing the impact of an innovative debit gift bag on the exclusivity and duration of breastfeeding compared to a commercial discharge bag.	Prospective	All mother who were pregnant with their first youngster matured 18 years or over had full-term children as numerous as 386 members.	The mean duration of EBF (weeks) in prizes containing breast pump ($n = 138, 8.28 \pm 4.86$) and BF-Info ($n = 121, 7.87 \pm 4.63$) was significantly longer ($P < 0.01$) rather than commercial bags containing formula ($n = 127, 6.12 \pm 4.49$). EBF levels up to 12 weeks on a breast pump are the most consistent.	A
2.	The Effect of Breast pump Use on Exclusive Breastfeeding at 2 Months Postpartum in an Inner-City Population/ (Bream, Li and Furman, 2017a)	Ohio	To determining whether the use of a breast pump increases exclusive breastfeeding at 1.5–3.5 months postnatal	retrospective	There are 905 infants with a recorded diet, 487 (54%) received breast milk, of whom 355 (72.9%) attended visits at 1.5-3.5 months (95.4% African American (AA)	The level of exclusive breastfeeding at 1.5-3.5 months (19.4% vs 16.3%) were similar between those who had a breast pump and those who did not, whereas the rate of breastfeeding was higher among those who did not have a breast pump. breast pump (46.9% vs 31.4%, $p = 0.004$)	A
3.	Early Breast Milk Pumping Intentions Among Postpartum Women/ (Loewenberg Weisband <i>et al.</i> , 2017)	Ohio	To measuring among women who had recently given birth, the intentions associated with breastfeeding and pumping,	cross-sectional study	There 100 women who had desire for breastfeeding during six months before postnatal	More than a quarter of participants (29%) has started pumping or intends to start within the next few days. Women who started pumping	A

			reasons for pumping, and time of initiation of pumping			while in hospital also noted that they pumped to increase their milk supply and overcome difficulties.	
4.	Breastfeeding Women's Experience of Expressing: A Descriptive Study/ (Clemons and Amir, 2010a)	Australia	To investigating women experience in breastfeeding .	A Descriptive Study	21 Member Victoria of the Australian Breastfeeding Association (ABA)	The breast pump may have a role in enabling women to extend the duration of breastfeeding, but more research is needed	A
5.	Breast Milk Pumping Beliefs, Supports, and Barriers on a University Campus/ (Dinour, Pope and Bai, 2015)	India	To comparing the beliefs of employees and students affiliated with universities about pumping breastmilk on campus.	Qualitative Study	Thirty-two women (11 students, 8 staff, 13 faculty) participated in the overall interview	Generally, most members oftentimes revealed that keeping up bosom milk supply/broadening the span of breastfeeding was a bit of leeway for siphoning nearby.	A
6.	Pumping human milk in the early postpartum period: its impact on long-term practices for feeding at the breast & exclusively feeding human milk in a longitudinal survey cohort/(Felicie, Cassano and Rasmussen, 2016)	America	To examining how the frequency of pumping and the type of reason for pumping between 1.5 and 4.5 months postpartum were related to the duration of HM administration	Cohort study	There were 1116 mothers in a longitudinal cohort who were feeding and pumping HM 1.5-4.5 mo postpartum.	Mother who report that they are utilizing a bosom siphon for reasons identified with one or the other work or FAB challenges and their children might be more inclined to the dangers related with more limited span of HM taking care of.	A
7.	Short-term efficacy of two <i>breast pumps</i> and impact on breastfeeding	Beijing Moscow London	To comparing the effectiveness and acceptance of	Randomized control trial	The mothers randomized to 3-4 weeks post-partum (Beijing (n = 30), Moscow	Pumps are equally effective for expressing breast milk. Provision of a	B

	g outcomes at 6 months in exclusively breastfeeding mothers: a randomised trial/(Fewtrell, Kennedy, Lukoyanova, Wei, Potak, Borovik, Namazova-Baranova, <i>et al.</i> , 2019b)	New York	two breast pumps in mothers who exclusively breastfeed (EBF) their healthy babies. .		(n = 34), London (n = 45), New York (n = 3))	pump did not significantly affect breastfeeding practice or goal achievement, but resulted in higher EBM supply, which was associated with lower EBF but not other categories of breastfeeding	
8.	Randomised trial comparing hand expression with <i>breast pumping</i> for mothers of term newborns feeding poorly/ (Flaherman <i>et al.</i> , 2012a)	California	To compare the bilateral electricity of pumping breasts to hand expression among mothers healthy term babies suckle poorly 12-36 hours after birth.	Randomized control trial	68 patients were mothers of newborns aged 12-36 hours	The mean volume of breastmilk delivered (range) was 0.5 (0-5) ml for moms utilizing manual hands and 1 (0-40) ml for siphoning moms (p = 0.07). Torment, breastfeeding certainty and BMEE didn't contrast from mediation.	A
9.	Positive and negative experiences of <i>breast pumping</i> during the first 6 months/(Flaherman <i>et al.</i> , 2016a)	California	To exploring the mother's experience of breast pumping	Qualitative Study	There were 10 focus groups of 56 mothers who have milk supply concerns in the first month after postnatal.	(1) Additional control over breastfeeding from pumping (2) Painful experiences (3) Volume pumped affects milk supply concerns. (4) Pumping interferes with other maintenance (5) Frustration of inconsistent provider suggestions	A

10	Physical Analysis of the Breast After Direct Breastfeeding Compared with Hand or Pump Expression: A Randomized Clinical Trial/(Francis and Dickton, 2019)	Amerika	To measuring the physical changes of the breasts with various carefully observed breast milk transfer modalities.	Randomized Control Trial	50 eligible women were approached with 92% of the participants	The use of a mechanical pump was correlated with a significant increase in nipple length and diameter compared to post-feed dimensions and hand expression. Pump use correlated significantly with pain scores and resulted in local inflammatory changes.	B
11	Employee Perception of Breastfeeding-Friendly Support and Benefits of Breastfeeding as a Predictor of Intention to Use Breast-Pumping Breaks After Returning to Work Among Employed Mothers/(S.-Y. Tsai, 2014)	Taiwan	To exploring the impact of employees' perceptions of breastfeeding support from the workplace and the benefits of breastfeeding on women to use paused breast pumping after returning to work	Qualitative Study	715 mothers who work at an electronics manufacturing factory in Tainan Science Park in Southern Taiwan.	Advanced education (chances proportion [OR] 2.33), working environment without tidy up rooms (OR 1.51), consciousness of breastfeeding rest (OR 4.70), support by friends to utilize bosom siphoning breaks (OR 1.76), and more noteworthy attention to the advantages of breastfeeding (OR 1.08) was a critical indicator of the utilization of resting bosom siphoning subsequent to getting back to work.	A
12	Maternal and Breast pump Factors Associated with Breast pump	US	To describing problems and injuries associated with breast pumps and	Cross sectional	1,844 mothers approximately 62% and 15% of mothers	Issues and wounds related with bosom siphon use can happen in all moms financial	A

	Problems and Injuries/ (Qi <i>et al.</i> , 2014a)		identify associated factors these problems and injuries.		reported pump-related problems and injuries, respectively.	attributes. Nursing moms can diminish the danger of issues and wounds by not utilizing siphoning batteries and can decrease bosom siphon issues by not utilizing a manual siphon and by mastering somebody's bosom siphon abilities as opposed to adhering to composed or video guidelines.	
13	We Just Kind of Had to Figure It Out”: A Qualitative Exploration of the Information Needs of Mothers Who Express Human Milk/Dietrich Leurer <i>et al.</i> /2019	Western Canada	To gathering mothers’ experience concerning the information and source relating breast milkexpression	Qualitative Study	There were 35 participants. They were 25 participants in southern health region (RQHR) and 10 participants in northern health region (PAPHR)	Suggestions for inconsistent dispensing methods confused participants, and many health care providers reported that they did not answer all the learning needs of the method of expressing breastmilk, one of which was the breast pump. Topics of interest in the area include practical advice on dispensing, determining the frequency / timing / duration of expressing milk, guidelines for milk storage, effects of dispensing on milk supply, product information, and general	A

						support / encouragement.	
14	Determinants of the Intention to Pump Breast Milk on a University Campus / (Bai, Dinour and Pope, 2016)	United States	To examining factors relating to the desire concerning breast pump in the university campus.	Cross Sectional	There were 218 women participating in this research (62 employees and 156 students, the finishing survey result was 71,7%)	The important determinant for pumping in the campus, including overcoming uncomfortable because of swelling, the available storage milk, is the agreement of coworker and uncomfortable bringing pump tool.	A
15	Breastfeeding” but not at the breast: Mothers' descriptions of providing pumped human milk to their infants via other containers and caregivers/ (Felice <i>et al.</i> , 2017)	New York States	To finding out knowledge about the mother's motivation, practice and perceptions regarding pumping, and about the motivation, practices, and perceptions of mothers and other caregivers associated with HM pumped feeding	Qualitative Study	20 mothers were observed from the end of pregnancy to 1 year postpartum	The result showed that mother uses their milk bottle for measuring their baby's need and comparing information about pump output.	A
16	Maternal Response to Two Electric Breast pumps/ (Hopkinson and Heird, 2009b)	large metropolitan area (Harris County, Texas)	To evaluating the impact of designing new pump on milk extraction, milk fat content, the respond of mother's hormone, the mother's satisfaction, long-term milk production, and the duration of mother's	Crossover design	There were 62 healthy women want to return work or school and breastfeeding exclusively who is registered in 4 months in the end pregnancy	Prolactin responds are bigger (p = 0.005) with new pump. The efficiency of milk extraction is bigger (p = 0.001) with standard pump. The production stimulus milk during 24 hour is not difference among pump. Women tend to have two pumps. The attitude of	A

			breastfeeding after returning work.			giving exclusive breast milk for six months is not related selected pump.	
17	Women's views about a free <i>breast pump</i> service: an online survey to inform intervention development / (McInnes <i>et al.</i> , 2019)	UK	To gaining opinion concerning breast pump intervention, breast pump usage, and information about individual's experience in expressing, supporting health service and demographic participant	Qualitative Study	This survey is finished by 666 women, most of them are breastfeeding and using breast pump.	The participant agrees that free pump rental must be supplied. There are 567 women or 85% agree for being rented and 408 women or 61,3% agree for being saved. The free comment text is given by 408 women (free pump) and 309 women (free salary) stated that the potential benefits are helping mother to breastfeed continually, express breast milk, overcoming difficulties, the lack of breast milk production, pumping can be a replacement for breastfeeding and the health of pumping rent. Personal and social expenses are important trouble.	A

18	A Double-Edged Sword: Lactation Consultants' Perceptions of the Impact of <i>Breast pumps</i> on the Practice of Breastfeeding/ (Buckley, 2009)	US	To identifying and describing LC's beliefs and experiences associated with the impact of increased breast pump availability on breastfeeding practice	Descriptive qualitative study	12 lactation consultants	The enhancement of breast pump usage is caused because the higher promotion, the society's opinion concerning breast pump. By using breast pump the mother's control of breastfeeding is better and for measuring breast milk production. The worries is revealed related excessive usage.	A
19	Differing Experiences with Breastfeeding in Residency Between Mothers and Coresidents/ (Ames and Burrows, 2019)	Michigan	To identifying the distinctive of mother's opinion and the correspondence concerning breast pump.	Qualitative Study	There were 413 people in Pediatrics, Internal Medicine, Family Medicine, and Anesthesia in the University of Michigan Health System	The mothers do not have enough time for pumping during breaktime. It is around 74% women have returned to work when breastfeeding. 40% of them perceive that the breast pump has bad impact for team.	A
20	Maternal Hospital Experiences Associated With Breastfeeding at 6 Months in a Northern California County/(Dabritz, Hinton and Babb, 2010)	Yolo County	To evaluating the impact of the experience in breastfeeding at six months in the hospital and predictor counting known from breastfeeding duration.	A retrospective	All mothers were recruited postnatally from 133 to 186 babies	For helping the level of giving breastfeed exclusively in this region by creating breastfeeding support after postnatal accessible and promoting pumping with low cost.	A

5. Arranging, Summing-Up and Reporting Results

In this stage, the reviewer conducts three phases approach for arranging, summing-up and reporting result. The first result is distributing the characteristic of

articles based on modern and developing countries, as well as article grade and the method of study. The second mapping is based on the themes. The last step is reviewing the implication of result in relating with study, practice and policy in the future.

RESULT & DISCUSSION

The Characteristics of Article Based on Country, Article Quality and Design of Study

The article utilized for scoping review is taken from modern and developing countries. There are 17 articles from developed country, 2 articles from developing country and 1 articles from both of them

Whereas in assessing article quality by using critical appraisal and uses Joana Briggs Institute (JBI) as many as 20 articles consists of 18 articles scored Grade A and 2 article scored Grade B.

The design of the study is divided into 2 designs that is quantitative and qualitative. From 20 selected articles, 12 articles used quantitative method that consist of 3 articles used randomized control trial design, 2 articles used prospective study, 2 articles used retrospective, an article used quasi experimental design and 4 articles used cross sectional design. Whereas 8 articles utilized qualitative study.

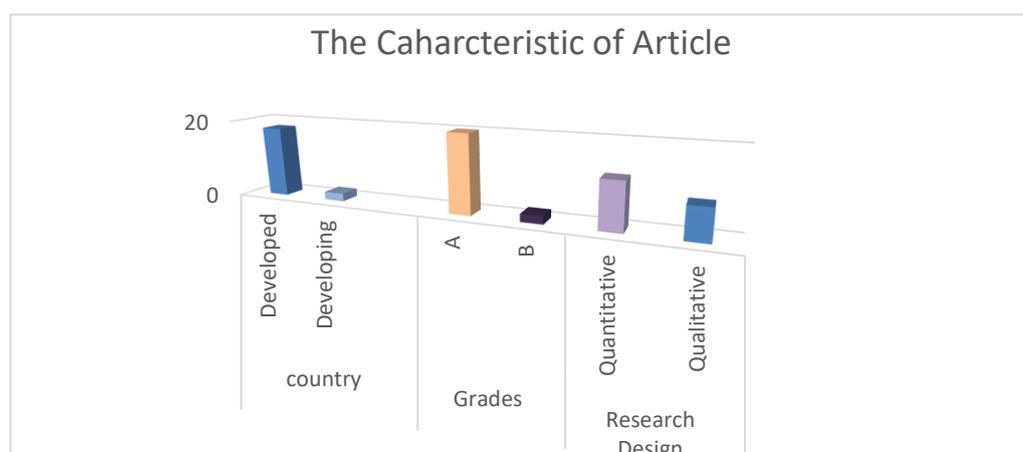


Figure 2. The Characteristic of Articel

Theme	SubTheme
The impact of successful breastfeeding	1. Breasfeeding Duration ^{1,2,4,5,6}
	2. Breastmilk production ^{3,7,8,9,16,18}
Outcome negative of breast pump	Painful Nipple ^{3,9,10,12}
Factors influencing the decision for breasmilk pumping	1. The breastpump information Pump ^{9, 12,13,,15,19} .
	2. Lactation Room Facitities ^{5,14,19}
	3. Attitude ^{11,14}
	4. The rest time ^{11,18,19}

Breast Pump Support	1. The breastpump available ^{1,9,20} 2. Family and colleague support ^{4,11}
----------------------------	--

Table 3. The Data Theme

1. The Impact of Successful Breastfeeding

a. Breastfeeding Duration

One of successful indicators in breastfeeding is showed by breastfeeding duration especially for supporting exclusive breastfeeding. Based on 20 reviewed articles, there are 4 articles reveal the impact resul of breast pum on breastfeeding duration. The result of the study (Bai, Wunderlich and Kashdan, 2013) showed that the average duration (EBF) in a week with PUMP (n = 138, 8.26 ± 4.86) and BF-info (n = 121, 7.87 ± 4.63) is longer ($P < 0.01$) than commercial (n = 127, 6.12 ± 4.49). This matter showed the giving gift containing manual pump has positive impact on breastfeeding duration and exclusivity.

In line with that study, the result of the study (Clemons and Amir, 2010b) one third of respondent agrees that breast pum has role for breastfeeding extention and with out breast pum they will stop breastfeeding quickly. This result of the study is supported by the resuly of didukung (Dinour, Pope and Bai, 2015) overall, the respondents report maintaining breastfeeding supply/ extending breastfeeding duration is the advantages for pumping at campus.

However the result of the study penelitian (Bream, Li and Furman, 2017b) there is relation between breastfeeding pumping with the enhancement of giving exclusive breastfeeding at 1.5 – 3.5 months. This matter is associated with family support, the older age of mother, the term of pregnancy, and normal childbirth. (Felice, Cassano and Rasmussen, 2016) stated that pumping frequency is higher on the first birth. It has a risk to stop FAB.

b. Breastfeeding Production

In the research ((Loewenberg Weisband *et al.*, 2017) declared two third of women pump temporary for increasing their breastfeeding supply. The result of interview has been conducted. 29% participants have started to pumping temporary, in the hospital is alsod recorded that they pump for increasing milk supply and overcoming its difficult. According to (Bartels, Ditomasso and Macht, 2020) pumping can be a accurate tool giving confirmation and objective certainty that breasmil supply is sufficient and breastmilk production is going well especially for the first week of postnatal.

The result of (Flaherman *et al.*, 2012b) study revealed the average volume of breastmilk is taken out around 0.5 (0-5) ml for mother using hand and 1 (0-40) ml for mother using pump ($p = 0.07$). it showed the volume of using pump is higher than using hand. According to ((Francis and Dickton, 2019) stated that pump affect breast tissue in helping for increasing the experience of breast pump and can increase the successful breastmilk. According to (Flaherman *et al.*, 2016) declared the positive experience including the enhancement of self-control in breastfeeding because breast pump can increase milk supply for baby. Frequency pumping and breastmilk production of mother pumping ≥ 6 times/ day produce more breatmilk significantly in the 43 days ($P = 0.009$) compared with mother pumping < 6 times/

days. It showed that minimal pumping 6 times/ day can assist increasing breastmilk production in the 42 days (Ru, Huang and Feng, 2020).

Providing pump insignificantly affects the breastmilk practice or achieves the objective but produces higher EBM (Fewtrell, Kennedy, Lukoyanova, Wei, Potak, Borovik, Namazova-Baranova, *et al.*, 2019). The prolactin's responses is bigger ($p = 0.005$) by new pump (Novel Pump) while the efficiency extracts more milk with higher fat content in 10 minutes pumping ($p = 0.001$) by standar pumping (Hopkinson and Heird, 2009).

2. Outcome Negative Of Breast Pump

Painful Nipple

According the finding (Francis and Dickton, 2019) demonstrated that the usage of pumping has the correlation between painful score and produced local inflammation. It stated that pumping affects breast tissue. In line with the result (Flaherman *et al.*, 2016) mentioned the painful experience when conducting breast pump. Based on (Loewenberg Weisband *et al.*, 2017) examined that the risk of breast which often identified is breast tissue damage, infection, and contamination of breastmilk. LC (Lactation Consultant's) stated this problem frequently is caused by the usage or the choice of pump.

The similar result of study (Qi *et al.*, 2014) conveyed that two third mother reports the problem of their breast pumpa and 15% reports get injury caused by their pump. The most injury frequently report are painful nipple followed by bruising pressure and nipple injury. The role of health workers in this case is making sure the needs for baby as well as comfortable using by mother (Meier *et al.*, 2016).

3. Factors influencing the decision for breastmilk pumping

a. The Breastpump Information

In view of the 20 reviewed articles, 5 articles examined mother who expressed that they didn't get information about breastpump, which brought about the mother staying in negative opinion, in particular the mother's opinion of torment during breastpump. In a study (Qi *et al.*, 2014) noted that the most frequent breast pump injury is painful nipples and improper insertion. According to (Flaherman *et al.*, 2016b) stated that mothers experience frustration due to inconsistent advice from health providers so that mothers get information from the internet or other people. This results in a lack of confidence in the mother and creates negative opinions about pumping.

Based on this review, breastfeeding mothers do not have fair time to pumping. The majority (74%) has worked and is breastfeeding. Forty percent of breastfeeding mothers feel that their pumping has a bad impact on the team, whereas only 10% of correspondents feel the same way (Ames and Burrows, 2019). According to ((Felice *et al.*, 2017) stated that mothers interpret information about feeding bottles to measure their baby's necessity, and oppose this information to their pumping output, to determine their abilities to find the baby's necessity, it is important because this practice may have two consequences of worriness. In this case, mothers need clear information about the benefits of breastpump. The study (Dietrich Leurer *et al.*,

2019) revealed that breastpump guidelines are not universally available so mothers do not clearly understand. So that inconsistencies and information gaps often occur leads to the confusion for participants, and many health service providers are reported not to answer all the needs of learning the method of expressing breast milk, one of which is the breast pump method.

b. Lactation Room Facilities

According to (Dinour, Pope and Bai, 2015) declared that maintaining breast milk supply and prolonging breastfeeding are the advantages most often identified for pumping on campus, while the disadvantages most often reported are timing and scheduling issues. The absence of room to pump is one of the obstacles when in public places. According to (Bai, Dinour and Pope, 2016) revealed that the factors that cause a working mother to pump breast milk are swelling in the breasts due to breastfeeding that is not released, the availability of milk storage after breastpumping, support from colleagues / superiors, and the inconvenience of carrying breast pump equipment. However, the negative consequences of the importance of a focus on pumping and storage facilities may lead policymakers and employers to neglect other issues such as maternity leave, job flexibility and child care. The total of time to rest and access to a private room that can (not the bathroom) pump is one way to avoid obstacles in using a breast pump.

The other thing that determines breastfeeding mothers to do a breast pump in the lactation room is that storing milk is very important for the mother. Storage of milk is an important factor because cooling is needed to prevent bacterial growth after the milk is removed. The availability of clean milk storage places can encourage more mothers to pump breast milk on campus (Bai, Dinour and Pope, 2016). Another study states that women feel comfortable expressing in front of family members or friends (Clemons and Amir, 2010).

c. Attitude

The results of the study (S. Y. Tsai, 2014) show that the intention to do a breast pump on campus by breastfeeding mothers is very important and is influenced by psychosocial variables. Workplace social support is very important to breastfeeding behavior, even more so than hospital support or health care providers, because workplace support is ongoing. In line with research results (Bai, Dinour and Pope, 2016) mentioned that attitude has been found to be a strong predictor of breastfeeding in a number of studies using planned Behavior Theory. As in this study, behavioral beliefs to relieve discomfort from swollen breasts due to non-excreted breastmilk largely influenced employee attitudes.

d. The Rest Time

Another deciding variable for mother doing breast pump at work is because of restricted rest periods. The consequences of the examination (Ames and Burrows, 2019) showed that breastfeeding mother who was experienced needed more an ideal opportunity to breast pump. Consciousness of rest for breast milk pump is a huge indicator. In line with the above research (S.-Y. Tsai, 2014) stated that the challenges that breastfeeding mothers must face while working are the following: absence of rest time, deficient offices for pumping and putting away milk, absence

of assets that advance breastfeeding and knowledge of breastfeeding, and lack of support from colleagues. Consequently, it is basic that work environments give breastfeeding-accommodating and strong working conditions (e.g., breastfeeding breaks, breastfeeding offices, breastfeeding instruction programs or gifted advisors, and inspirational mentalities of managers and associates towards breastfeeding laborers to empower new moms to keep breastfeeding or release. Breast milk and subsequently keeps up adequate milk creation to address issues). In a study (Buckley, 2009) mentioned that the reasons most often cited for using a breast pump are maintaining milk supply while away from the baby (73%) and increasing milk supply (67%), as well as preparing breastmilk in the freezer when breastfeeding mothers return to work.

4. Breast Pump Support

a. The Breastpump Available

Various forms of support are carried out in the usage of breast pumps for nursing mothers. One of the results of research (Bai, Wunderlich and Kashdan, 2013) stated that by giving gifts in the form of commercial bags containing formula samples and bags containing information and breastfeeding supplies and giving breast pumps when the mother returns from the postpartum hospital, commercial bags have a negative effect on the duration of breastfeeding. Then, giving a blessing pack containing a breast pump decidedly affects the term and restrictiveness of breastfeeding. The pace of selective breastfeeding more than a quarter of a year among moms who got the pump pack development in this investigation was amazing: 62.2%, well over the objectives.

Another support include making breast pump rentals at low or no cost to help increase rates of exclusive breastfeeding in this region (Dabritz, Hinton and Babb, 2010). In line with the results of the study (McInnes *et al.*, 2019) revealed that participants agreed that free pump rental (rent / loan) (567 women; 85.1%) or free pumps for storage (408; 61.3%) supported development. further services. Whereas the preference for access to pump rental services (rent or loan) provided free of charge according to women's needs. Other support is also in the study (Flaherman *et al.*, 2016) declared that by teaching mothers hand expressions which can reduce negative experiences for some mothers.

b. Family and Colleague Support

The family environment husband, guardians, or other siblings significantly decides the support of breastfeeding. A mother who gets support from her husband and other family individuals will increment breastfeeding to her baby (Efriani and Astuti, 2021). According to (Clemons and Amir, 2010a) referenced that mentalities about breastfeeding connections are affected by accomplices, relatives, companions, and experts. Our examination has discovered that the spouse is a significant wellspring of consolation when women choose to breastfeed. In line with the study (S.-Y. Tsai, 2014) expressed that there are 32.5% of working mother detailed inclination humiliated about taking breast pumping breaks, and 51.1% felt that taking breast pumping breaks would diminish their work proficiency. There are

45.2% ideas they would get a helpless assessment by their administrator for siphoning their bosoms very still. Strong perspectives from bosses and collaborators can lessen pressure by adjusting work with breastfeeding. The investigation's discoveries are likewise predictable with those of past reports and recommend that support by associates (OR 1.76) may help working women exploit breast pumping breaks in the wake of getting back to work. Work environments and managers can assist working mother with understanding the advantages of breastfeeding, which can build a mother's expectation to pump during resttime.

CONCLUSION

The usage of breast pump is one of ways for overcoming the failure in providing exclusive breastfeeding mainly for mother who return to work. Based on 20 articles which have been analyzed, the impact of breast pump usage affects breastfeeding duration and milk production as well as the painful breast. In reviewed articles, most of them discuss on the lack of mother's information about breast pump, involving how to decrease the pain, how to use, and saving method after conducting breast pump. Based on the review above, the reviewer find some gaps that can be used as further research reference especially in developing countries. They are the midwife perspective about breast pump, what breast pump is as women centre care, the experience using breast pump and quantitative research about the effectiveness of breast pump in breast milk production.

REFERENCES

- Ames, E. G., & Burrows, H. L. (2019). *Differing Experiences With Breastfeeding In Residency Between Mothers And Coresidents*. *Breastfeeding Medicine: The Official Journal of the Academy of Breastfeeding Medicine*, 14(8), 575–579. <https://doi.org/10.1089/bfm.2019.0001>
- Arksey, H., & O'Malley, L. (2005). *Scoping Studies: Towards A Methodologic al Framework*. *International Journal Of Social Research Methodology: Theory And Practice*, 8(1), 19–32. <https://doi.org/10.1080/1364557032000119616>
- Bai, Y. K., Dinour, L. M., & Pope, G. A. (2016). *Determinants Of The Intention To Pump Breast Milk On A University Campus*. *Journal of Midwifery & Women's Health*, 61(5), 563–570. <https://doi.org/10.1111/jmwh.12488>
- Bai, Y., Wunderlich, S. M., & Kashdan, R. (2013). *Alternative Hospital Gift Bags And Breastfeeding Exclusivity*. *ISRN Nutrition*, 2013, 1–7. <https://doi.org/10.5402/2013/560810>
- Bartels, R. L., Ditomasso, D. and Macht, G. A. (2020) 'A Mother-Centered Evaluation Of Breast Pumps', *Applied Ergonomics*. Elsevier Ltd, 88(May), p. 103123. doi: 10.1016/j.apergo.2020.103123.
- Bream, E., Li, H., & Furman, L. (2017). *The Effect Of Breast Pump Use On Exclusive Breastfeeding At 2 Months Postpartum In An Inner-City Population*. *Breastfeeding Medicine*, 12(3), 149–155. <https://doi.org/10.1089/bfm.2016.0160>

- Buckley, K. M. (2009). *A Double-Edged Sword: Lactation Consultants' Perceptions Of The Impact Of Breast Pumps On The Practice Of Breastfeeding. The Journal of Perinatal Education*, 18(2), 13–22. <https://doi.org/10.1624/105812409X426297>
- Clemons, S. N., & Amir, L. H. (2010a). *Breastfeeding Women's Experience Of Expressing: A Descriptive Study. Journal of Human Lactation : Official Journal of International Lactation Consultant Association*, 26(3), 258–265. <https://doi.org/10.1177/0890334410371209>
- Dabritz, H. A., Hinton, B. G., & Babb, J. (2010). *Maternal Hospital Experiences Associated With Breastfeeding At 6 Months In A Northern California County. Journal of Human Lactation*, 26(3), 274–285. <https://doi.org/10.1177/0890334410362222>
- Davis, K., Drey, N. and Gould, D. (2009) 'What Are Scoping Studies? A Review Of The Nursing Literature', *International Journal of Nursing Studies*, 46(10), pp. 1386–1400. doi: 10.1016/j.ijnurstu.2009.02.01
- Dietrich Leurer, M., McCabe, J., Bigalky, J., Mackey, A., Laczko, D., & Deobald, V. (2019). "We Just Kind Of Had To Figure It Out": A Qualitative Exploration Of The Information Needs Of Mothers Who Express Human Milk. *Journal of Human Lactation*, 089033441988320. <https://doi.org/10.1177/0890334419883203>
- Dinour, L. M., Pope, G. A., & Bai, Y. K. (2015). *Breast Milk Pumping Beliefs, Supports, And Barriers On A University Campus. Journal of Human Lactation : Official Journal of International Lactation Consultant Association*, 31(1), 156–165. <https://doi.org/10.1177/0890334414557522>
- Efriani, R., & Astuti, D. A. (2021). *The Relationship Husband's Support And Exclusive Breastfeeding In The Work Area Of Umbulharjo 1 Public Health Center, Yogyakarta City. International Journal of Health Science and Technology*, 2(2), 1–7. <https://doi.org/10.31101/ijhst.v2i2.1836>
- Eglash, A. and Malloy, M. L. (2015) 'Breastmilk Expression And Breast Pump Technology.', *Clinical obstetrics and gynecology*, 58(4), pp. 855–67. doi: 10.1097/GRF.0000000000000141.
- Fan, H. S. L. et al. (2020) 'Expressed Breast Milk Feeding Practices In Hong Kong Chinese Women: A Descriptive Study', *Midwifery*. Midwifery, 91. doi: 10.1016/J.MIDW.2020.102835.
- Felice, J. P., Cassano, P. A., & Rasmussen, K. M. (2016). *Pumping Human Milk In The Early Postpartum Period: Its Impact On Long-Term Practices For Feeding At The Breast And Exclusively Feeding Human Milk In A Longitudinal Survey Cohort. The American Journal of Clinical Nutrition*, 103(5), 1267–1277. <https://doi.org/10.3945/ajcn.115.115733>
- Felice, J. P., Geraghty, S. R., Quaglieri, C. W., Yamada, R., Wong, A. J., & Rasmussen, K. M. (2017). "Breastfeeding" But Not At The Breast: Mothers' Descriptions Of Providing Pumped Human Milk To Their Infants Via Other Containers And

- Caregivers. *Maternal and Child Nutrition*, 13(3). <https://doi.org/10.1111/mcn.12425>
- Fewtrell, M., Kennedy, K., Lukoyanova, O., Wei, Z., Potak, D., Borovik, T., ... Schanler, R. (2019). *Short-Term Efficacy Of Two Breast Pumps And Impact On Breastfeeding Outcomes At 6 Months In Exclusively Breastfeeding Mothers: A Randomised Trial*. *Maternal & Child Nutrition*, 15(3), e12779. <https://doi.org/10.1111/mcn.12779>
- Flaherman, V. J., Gay, B., Scott, C., Avins, A., Lee, K. A., & Newman, T. B. (2012). *Randomised Trial Comparing Hand Expression With Breast Pumping For Mothers Of Term Newborns Feeding Poorly*. *Archives of Disease in Childhood - Fetal and Neonatal Edition*, 97(1), F18–F23. <https://doi.org/10.1136/adc.2010.209213>
- Flaherman, V. J., Hicks, K. G., Huynh, J., Cabana, M. D., & Lee, K. A. (2016a). *Positive And Negative Experiences Of Breast Pumping During The First 6 Months*. *Maternal and Child Nutrition*, 12(2), 291–
- Francis, J., & Dickton, D. (2019). *Physical Analysis of the Breast After Direct Breastfeeding Compared with Hand or Pump Expression: A Randomized Clinical Trial*. *Breastfeeding Medicine*, 14(10), 705–711. <https://doi.org/10.1089/bfm.2019.0008>
- Hawkins, S. S., Stern, A. D., & Gillman, M. W. (2013). *Do State Breastfeeding Laws In The USA Promote Breast Feeding? Journal of Epidemiology and Community Health*, 67(3), 250–256. <https://doi.org/10.1136/jech-2012-201619>
- Hopkinson, J., & Heird, W. (2009). *Maternal Response To Two Electric Breast Pumps*. *Breastfeeding Medicine: The Official Journal of the Academy of Breastfeeding Medicine*, 4(1), 17–23. <https://doi.org/10.1089/bfm.2008.0133>
- Iellamo, A., Sobel, H., & Engelhardt, K. (2015). *Working Mothers Of The World Health Organization Western Pacific Offices: Lessons And Experiences To Protect, Promote, And Support Breastfeeding*. *Journal of Human Lactation*, 31(1), 36–39. <https://doi.org/10.1177/0890334414558847>
- Johns, H. M. *et al.* (2013) ‘Prevalence and outcomes of breast milk expressing in women with healthy term infants: A systematic review’, *BMC Pregnancy and Childbirth*, 13. doi: 10.1186/1471-2393-13-212.
- Keim, S. A. *et al.* (2017) ‘Pumping Milk Without Ever Feeding At The Breast In The Moms2Moms Study’, *Breastfeeding Medicine*. Mary Ann Liebert Inc., 12(7), pp. 422–429. doi: 10.1089/bfm.2017.0025.
- Loewenberg Weisband, Y., Keim, S. A., Keder, L. M., Geraghty, S. R., & Gallo, M. F. (2017). *Early Breast Milk Pumping Intentions Among Postpartum Women*. *Breastfeeding Medicine*, 12(1), 28–32. <https://doi.org/10.1089/bfm.2016.0142>
- McInnes, R. J., Gillespie, N., Crossland, N., Hall Moran, V., & Hoddinott, P. (2019). *Women’s Views About A Free Breast Pump Service: Online Survey Informing Intervention Development*. *Maternal and Child Nutrition*, 15(2). <https://doi.org/10.1111/mcn.12745>

- Meier, P. P. *et al.* (2016) ‘Which Breast Pump For Which Mother: An Evidence-Based Approach To Individualizing Breast Pump Technology’, *Journal of Perinatology*. Nature Publishing Group, pp. 493–499. doi: 10.1038/jp.2016.14.
- Purnamasari, D., & Mufdlilah, M. (2018). *Factors Associated With Failure Of Exclusive Breastfeeding Practice*. *Journal of Health Technology Assessment in Midwifery*, 1(1), 17–22. <https://doi.org/10.31101/jhtam.443>
- Qi, Y. *et al.* (2014b) ‘Maternal and Breast Pump Factors Associated with Breast Pump Problems and Injuries’, *Journal of Human Lactation*, 30(1), pp. 62–72. doi: 10.1177/0890334413507499.
- Ru, X., Huang, X. and Feng, Q. (2020) ‘Successful Full Lactation Achieved by Mothers of Preterm Infants Using Exclusive Pumping’, *Frontiers in Pediatrics*. Frontiers Media S.A., 8. doi: 10.3389/fped.2020.00191.
- Sheehan, A., & Bowcher, W. L. (2017). *Messages To New Mothers: An Analysis Of Breast Pump Advertisements*. *Maternal and Child Nutrition*, 13(2). <https://doi.org/10.1111/mcn.12313>
- Tsai, S.-Y. (2014). *Employee Perception Of Breastfeeding-Friendly Support And Benefits Of Breastfeeding As A Predictor Of Intention To Use Breast-Pumping Breaks After Returning To Work Among Employed Mothers*. *Breastfeeding Medicine*, 9(1), 16–23. <https://doi.org/10.1089/bfm.2013.0082>