

Supporting Breastfeeding Mothers at Work and at Home in Indonesia



Authors: Nicole Alves, Michaela Dowling, Matthew Mahan



Supporting Breastfeeding Mothers at Work and at Home in Indonesia

An Interactive Qualifying Project completed in partial fulfillment of the
Degree of Bachelor of Science at
WORCESTER POLYTECHNIC INSTITUTE

By:

Nicole Alves

Michaela Dowling

Matthew Mahan

May 2, 2017

WPI Faculty Advisor

Dr. Elisabeth Stoddard

In Cooperation with Our Sponsor

Jeanette Frem, Lactation Consultant

This report represents work of WPI undergraduate students submitted to the faculty as evidence of a degree requirement. WPI routinely publishes these reports on its web site without editorial or peer review. For more information about the projects program at WPI please see <http://www.wpi.edu/academics/ugradstudies/project-learning.html>

Abstract

To combat infant mortality, Indonesian law requires women to provide children younger than six months breast milk. However, a lack of employee support and educational resources has kept compliance of this law to less than fifty percent. This paper analyzes potential avenues to assist working mothers in Indonesia to provide breast milk to their child. This includes physical and policy changes in the workplace, employing context appropriate methods to express breast milk, and utilizing community support and organization provided training and education.

Acknowledgements

This project is sponsored by Jeanette Mesite Frem, MHS, IBCLC, RLC, CCE, CD, a registered lactation consultant, childbirth educator, and birth doula for a Massachusetts business called Babies In Common. Her extensive knowledge of breastfeeding practices--including proper technique, breast pump use, and other options to express breast milk--aided us in meeting the needs of mothers. She also acted as a source of knowledge regarding the positives and negatives of breastfeeding once back at work after birth.

We would especially like to thank our project advisor Professor Elisabeth Stoddard for her encouragement with every step of our proposal.

Table of Authorship

	Primary Author(s)
Executive Summary:	
Problem	Matt
Project Focus	Matt
Objectives	Nicole
Recommendations	Michaela
Introduction:	Nicole
Literature Review:	Matt
Importance of Breastfeeding	Matt
Breastfeeding Law in Indonesia	Matt
Lack of Access to Information on Breastfeeding	Matt
Indonesian Garment Factory Work Conditions	Matt
Methodology:	
Objective One	Nicole
Objective Two	Nicole
Objective Three	Nicole
Objective Four	Nicole/Matt
Results:	
Objective One	Michaela
Objective Two	Michaela
Objective Three	Michaela
Objective Four	Michaela
Recommendations:	Michaela
Conclusion:	Nicole/Michaela
References:	All
Appendices:	
Appendix A	All
Appendix B	All
Appendix C	Nicole
Appendix D	Nicole
Appendix E	Michaela
Appendix F	All
Appendix G	All
Appendix H	All
Appendix I	Matt/Nicole

Table of Contents

Executive Summary:	6
Problem	6
Project Focus	6
Objectives	7
Recommendations	8
Introduction	10
Literature Review:	12
Importance of Breastfeeding	12
Breastfeeding Law in Indonesia	13
Lack of Access to Information on Breastfeeding	15
Indonesian Garment Factory Work Conditions	15
Methodology:	19
Objective One	19
Objective Two	20
Objective Three	20
Objective Four	21
Results:	23
Objective One	23
Objective Two	24
Objective Three	27
Objective Four	29
Recommendations	32
Conclusion	35
References	37
Appendices:	
Appendix A	40
Appendix B	41
Appendix C	42
Appendix D	43
Appendix E	44
Appendix F	46
Appendix G	47
Appendix H	48
Appendix I	49

Executive Summary:

Problem

A lack of exclusive breastfeeding for an infant's first six months of life contributes to the deaths of 800,000 children less than five years of age each year (Shetty, 2014). For those first six months, all the nutrients and antibodies a baby needs to grow and develop can be supplied by solely from breast milk. In the developing world, the rising number of women working outside of the home, the fragmentation of extended family, and the adoption of Western approaches to medicine that discourage co-sleeping and constant contact with mom and infant has led to the decline in the community support and cultural value of breastfeeding and breast milk ("Food and Nutrition Bulletin," 1981). Widely available and aggressively promoted, formula is seen as a superior alternative for mothers. However, formula use can lead to malnourishment due to watering down formula to save money, as well as infectious disease due to the challenge of preparing a hygienic bottle in areas with shortages in clean water, utensils, and storage facilities ("Food and Nutrition Bulletin," 1981).

In 2009, the Indonesian government enacted a law calling for every baby to be exclusively breastfed or to be given expressed breast milk for six months after birth. However, from 2007 to 2012 the exclusive breastfeeding rate only increased by 10% due to poor implementation of the law, with approximately 60% of infants still not receiving the benefits of breast milk (Shetty, 2014). Although Indonesia has enacted legislation at the national level to increase the rate of exclusive breastfeeding, we argue that the solution lies in support for mothers at the local level: at home, in their communities, and in their workplaces. Our research shows that the rates of breast milk fed infants can be increased significantly through training provided directly to mothers from local organizations, as well as the increased cooperation and support from a mother's employer.

Objectives

The goal of our project is to understand the challenges that women working in factories in Indonesia face in providing breast milk to their infants. To accomplish this, we created a set of four objectives. The first objective was to identify the conditions of factories in Indonesia that influence the ability of women to safely and comfortably express breast milk. Our second

objective was to evaluate breast pump designs to determine what pump features meet the needs of women who work in factories in Indonesia. The third objective was to analyze breast milk and breast pumping policies; both at the Indonesian national level and the factory level that impact a woman's ability to provide breast milk for her infant. Our fourth objective was to analyze breast milk and breast pumping educational resources (or lack there of) in Indonesia that impact a woman's ability to provide breast milk for her infant.

To achieve our objectives, our team conducted extensive research over six months in the form of cyclical literary searches and semi-structured interviews. Scholarly articles, governmental and non-governmental organization reports, and online databases with a focus on maternal health, infant health, breastfeeding, and breast pumping in the developing world were the primary mediums of our literary searches. Semi-structured interviews were conducted with a series of eight international professionals and organizations with expertise in the subject matter of one, or more, of our four objectives. Contact with the first set of interview participants was established through the findings from our initial literary searches. Following said interviews, our team was able to attain new leads for literary searches and interviews through snowball sampling.

Results

One of the original intended outcomes of our project was to design a new breast pump that would be more suitable for use in a factory setting in Indonesia. However, our research showed that electric breast pumps are not suitable for women working in Indonesian factories because: 1) the cost of a breast pump to the employee or employer is too high (AIMI Representative, Informal Conversation, March 21, 2017), 2) proper pump cleaning and sanitizing is not possible due to a lack of proper tools and supplies, as well as exposure to an unsanitary environment at work (Micaela Collins, Informal Conversation, October 5, 2016) 3) often times an employee may need personalized pump parts due to variations in the size of women's breasts and nipples (Micaela Collins, Informal Conversation, October 5, 2016), and 4) hand expression of breast milk has and can be just as effective as using an electric pump, has no direct economic costs, and requires no equipment or electricity (AIMI Representative, Informal Conversation, March 21, 2017). From these results, our team concluded that the design of an electric pump

suitable for the context of Indonesian factories was not needed. Instead, we concluded that there was a need for greater educational and policy support at the home, work, and community level.

In terms of the need for educational and policy support, we found that the most significant obstacle to women who need to provide breast milk while at work are 1) a lack of educational resources highlighting the benefits of breast milk and how to express breast milk while at work (Micaela Collins, Informal Conversation, October 5, 2016), 2) a lack of cultural and community support for breastfeeding to increase a mother's confidence in the effectiveness of her own breast milk to meet her baby's needs, as opposed to formula (AIMI Representative, Informal Conversation, March 21, 2017), 3) a lack of supportive culture at work, and a lack of compliance of breastfeeding and breast pumping relevant laws and policies by employers (Micaela Collins, Informal Conversation, October 5, 2016). Employers do not see the incorporation of breast pump usage as a benefit to the workplace (Micaela Collins, Informal Conversation, October 5, 2016)

Recommendations

Based on our findings, we have created the following set of recommendations. These recommendations are intended to be implemented in areas where women are working in factories in Indonesia, though modifications should be made to accommodate regional, ethnic, and religious differences among groups of women and families in the country or in other areas with low breastfeeding rates and support.

Our first recommendation is to develop and create a program to educate employers about the mutually beneficial role of breastfeeding in the workplace, and to encourage employers to follow breastfeeding regulations. The employers would be educated about the financial and labor benefits of creating a supportive work culture, where women are encouraged to express breast milk for their babies at home during breaks. The benefits to be highlighted are increased productivity, increased employee morale, and lower employee turnover rate, with the end goal of increased profits and efficiency. Additionally, employers would be shown how to successfully develop educational programs for women about breastfeeding and expressing milk in the workplace to ensure the success of such a program for both the employee and employer.

Our second recommendation is to provide educational resources for mothers and families on how to successfully breastfeed in the form of community support groups and one on one

counseling sessions. Community support groups would be led by trained professionals that teach and encourage the inexpensive, hygienic, and effective method of hand expression of breast milk. One on one breastfeeding counseling sessions led by a trained professional would be provided to assist women struggling to breastfeed and express milk successfully.

Our third recommendation is to increase the public awareness in Indonesia of the benefits of breast milk and the dangers of formula in areas with shortages in clean water, utensils, and storage facilities. This information is to be made more aware through the proper training of and endorsement from health professionals and the educating of women in community support groups and one on one counseling sessions. The benefits of a woman's breast milk should be highlighted in public education campaigns, to women and families during health care visits, and for women before and after childbirth.

Introduction:

Research shows breastfeeding has tremendous benefits for babies and their mothers (Natural, 2016). Being breastfed for the first six months of life reduces the risk of immune-related diseases later in life. Breastfeeding has also been proven to set babies up for a healthier life, promoting fewer bacterial infections and diseases. Dental health, body temperature regulation, and cognitive ability are also enhanced by the consumption of breast milk. Mothers also experience many health benefits mentally and physically due to breastfeeding. Research has shown that for every twelve months a mother breastfeeds, her risk of breast cancer is reduced by four and a half percent (Cordeiro, 2014). The bond between a mother and her child is also strengthened during the breastfeeding process (Johnson-Grass, 2015).

Governments like Indonesia's have recognized the importance of breastfeeding and breast milk, and they have enacted policies with the intention of improving breastfeeding rates. In 2009, Indonesian Health Law No. 36 was enacted, calling for every baby to be breastfed for the first six months of life, unless impossible due to a medical condition (Indonesia, 2012). Though this law aims to increase breastfeeding, workplaces are not well regulated, and employers are not held accountable for providing aid to new mothers who must breastfeed or breast pump at work. Since a woman's breasts supply milk in response to demand, when she is unable to release milk regularly, a mother's milk production decreases. The law states that women can face fines and/or jail time for not providing their child with breast milk for the required amount of time.

The goal of our project is to understand the challenges that women working in factories in Indonesia face in providing breast milk to their infants. To accomplish this, we have created a set of four objectives. The first objective is to identify the conditions of factories in Indonesia that influence the ability of women to safely and comfortably express breast milk. Our second objective is to evaluate breast pump designs to determine what pump features meet the needs of women who work in factories in Indonesia. The third objective is to analyze breast milk and breast pumping policies; both at the Indonesian national level and the factory level that impact a woman's ability to provide breast milk for her infant. Our fourth objective is to analyze breast milk and breast pumping educational resources (or lack there of) in Indonesia that impact a woman's ability to provide breast milk for her infant.

In this report, we first discuss the literature around the following topics: the importance of breastfeeding, the breastfeeding law in Indonesia, the lack of access to education on breastfeeding, and Indonesian garment factory working conditions. Then, we lay out the methodology we used to meet our four objectives. The results of our research will follow, along with our recommendations for breast pump design changes and educational resources. A portion of this report is in the process of being published in the proceedings of the 2017 Northeast Section American Society for Engineering Education Conference.

Literature Review:

Breast milk is widely considered to be ‘liquid gold’ by health professionals (U.S. Department of Health and Human Services, 2014). For the first six months of life, all the nutrients and antibodies a baby needs to grow and develop can be supplied by breast milk. Indonesian law requires a mother to feed her child human milk for the first six months of life. Factory policies create challenges for women in the workforce to comply with this law. In this section, we discuss the literature on the importance of breastfeeding, the breastfeeding law in Indonesia, the lack of access to information on breastfeeding, Indonesian garment factory work conditions, the importance of breast pumping, and a Bangladeshi factory case study.

Importance of Breastfeeding

Breast milk is uniquely essential for infant development. It is the perfect balance of required fats, proteins, vitamins, and carbohydrates (U.S. Department of Health and Human Services, 2014). These nutrients account for brain, retina, digestive, immune, and nervous system development among others. Although formula provides many of these ingredients, there are at least one hundred others unique to human milk (U.S. Department of Health and Human Services, 2014). Nutrition is only one of the reasons why the World Health Organization sets breastfeeding as the gold standard.

Breast milk helps protect infants from disease-causing organisms. It supplies hormones, stem cells, and immune factors (U.S. Department of Health and Human Services, 2014). Breast milk contains macrophages, a special type of cell that kills bacteria, fungi and viruses. Macrophages protect babes from illnesses such as pneumonia, bronchitis, the flu, sudden infant death syndrome, and ear infections, to name a few. In addition, babies cannot be allergic to their mother’s milk. The immune function of breast milk is individualized. A mother's pathogens will colonize her baby (S. Department of Health and Human Services, 2014). Her body then produces antibodies that are passed through the milk. In return, her baby becomes more resistant to disease (S. Department of Health and Human Services, 2014)). Infants who do not drink breast milk are more susceptible to illness. In developing countries, these infants suffer a mortality rate five to ten times higher than those breast-fed (Solomon, 1981).

Being breastfed for the first six months of life reduces the risk of immune-related diseases later in life. Weaning from breast milk too early can lead to underdevelopment of the

immune system. A variety of studies have proven that children who are breastfed for the first six months have a reduced risk for type I and II diabetes, Hodgkin's disease, leukemia, obesity, high blood pressure, high cholesterol, Crohn's disease, ulcerative colitis, eczema and asthma (Johnson-Grass, 2015).

Dental health, body temperature regulation, and cognitive ability are also enhanced by breast milk. Children who are breastfed must work harder to get milk from the mother's breast. Consequently, the jaw and oral cavity becomes stronger and teeth grow in straight and healthy. Breast-feeding can regulate a baby's body temperature. Breasts can detect a one-degree fluctuation in baby's body temperature (Johnson-Grass, 2015). In response, they adjust accordingly to heat up or cool down baby as needed. Breast milk also has effects on the brain. Breastfed children have shown increased cognitive ability and greater self-confidence. They also have fewer psychological, behavioral, or learning problems (Johnson-Grass, 2015).

Mothers who breastfeed see a variety of benefits. Breastfeeding assists in the return of the uterus to its pre-pregnancy size. It also reduces postpartum bleeding. Milk production takes one thousand calories daily, helping the mother to return to her pre-pregnancy weight (Johnson-Grass, 2015). Benefits can also be psychological. Through breastfeeding, mothers enter a state of relaxation, improve sleep patterns, and decrease anxiety. Mothers form a close bond with their child physically and emotionally through skin-to-skin contact (Johnson-Grass, 2015). The mother develops security in breastfeeding and in turn releases stress. The choice to breastfeed can also save a mother \$2,000 to \$4,000 annually, compared to the cost of formula (Johnson-Grass, 2015). In the long term, breastfeeding reduces a mother's risk of breast cancer, ovarian cancer, heart disease, and osteoporosis (Cordeiro, 2014). Research has shown that for every twelve months a mother breastfeeds, her risk of breast cancer is reduced by four and a half percent. (Cordeiro, 2014).

Breastfeeding Law in Indonesia

The Indonesian government has recognized the benefit associated with breastfeeding; therefore several Indonesian laws protect women's right to breastfeed/breast pump. Yet the lack of concise writing and enforcement render these laws ineffective. The Constitution of the Republic of Indonesia was created in 1945 (Indonesia, 2012). It included the right for every citizen to work and the right for every child to live, grow, and develop. It wasn't until 1999 that

laws were added to protect women's rights in the workplace. That year Law No. 49 on Human Rights was created. It entitles women to "special protection in the undertaking of work or a profession that can threaten their safety and/or reproductive health". Under Law No. 13 of 2003, women are to a paid three months period of rest (one and a half months before and after birth). In 2009, Health Law No. 36 was enacted and called for every baby to be breastfed for the first six months of life, unless medically unable (Indonesia, 2012). The law also calls for full support from the family, government, workplace, and community to the mother's infant by providing time and special facilities. This includes support to breastpump in the workplace. Lastly, this law states that any person who hinders a child from being breastfed for the first six months of life is subject to imprisonment up to one year as well as fines up to \$11,000 USD (Better Work Indonesia, 2012).

The ambiguity of these laws has led to poor interpretation and implementation. For example, in Law No. 49 of 1999, women are entitled to "special protection" from employers to ensure on-the-job safety (Better Work Indonesia, 2012). However, "special protection" is never defined and is left to employer interpretation. The same problem occurs with Law No. 13 of 2003 (Better Work Indonesia, 2012). The law makes it mandatory for employers to allow women to breastfeed, but only "if it must be done during work hours." This allows the employer to determine when breastfeeding is a "must" (Better Work Indonesia, 2012). Once again this happens with Law No. 36 of 2009. An inability to breast-pump at work forces a mother to use formula. In this case, the factory is indirectly responsible for a child not receiving breast milk. However, it is the mother who is directly breaking the law and is subject to punishment.

In 2012, new laws sought to clarify some of these ambiguities. Article 34 states that employers must provide opportunities to breastfeed while at work with no contingencies (Better Work Indonesia, 2012). Article 35 states that employers must implement company policy that supports exclusive breastfeeding (Better Work Indonesia, 2012). These laws place specific responsibility on the employer of a workplace. Article 33 states health facilities must support exclusive breastfeeding, based on the "10 Steps to Successful Breastfeeding" (see Appendix C). These steps outline specific responsibilities for the employer with the goal of ensuring women have the ability to breastfeed and breast pump at work.

Despite this effort, health experts conclude that law enforcement is poor. It has also been reported that employees receive partial, if any, information about breastfeeding in their training.

According to the 2012 Indonesian Demographic Health Survey, rates of exclusive breastfeeding in babies younger than six months increased from 32% in 2007 to 42% in 2012 (Shetty 2014). These figures, however, reflect an inability for the government to enforce its exclusive breastfeeding law. In the absence of enforcement, formula companies continue to provide incentive programs to health care workers who push their product while advising mothers. In return, mothers are misinformed about this topic and often resort to expensive formula. Formula can also be a health-risk to infants if mixed with unsafe drinking water (Shetty, 2014). A lack of information, support, and time in the workplace is directly related to the reported low rates of breastfeeding. In order to increase these rates, employers need to comply with these laws and women must be educated.

Lack of Access to Information on Breastfeeding

There is evidence that suggests women are misinformed about the importance of breast milk. Health professionals are a key source of information to mothers. Dr. Alison Stuebe studies the effects of breastfeeding at the University of North Carolina. She suggests “health professionals receive mixed, if any education about breastfeeding during their training”(Shetty, 2014). In return, mothers do not receive the proper information and instruction. Stuebe also claims formula companies influence the integrity of health professionals (Shetty, 2014). Formula companies incentivize health professionals who sell their products. As a result, mothers are using formula instead of breast milk. Although infant formula can be an excellent alternative to breast milk, in Indonesia, formula use has led to malnourishment due to watering down formula to save money, as well as infectious disease due to the challenge of preparing a hygienic bottle in areas with shortages in clean water, utensils, and storage facilities (“Food and Nutrition Bulletin,” 1981). Mothers need to be well informed of their responsibilities and rights. Without the right information, breastfeeding rates will remain low wherever educational resources about breastfeeding are not readily available.

Indonesian Garment Factory Work Conditions

A breastfeeding mother who must work away from her child can express breast milk and store it for her child. A woman’s breasts supply milk in response to demand. If unable to express milk regularly, a mother’s milk production decreases. While at work this rate can reduce

significantly. Indonesian factory workers work between 8 and 12 hours a day (Better Work Indonesia, 2012).. However, it is suggested that a woman should express milk by pumping every 2-3 hours to keep up with her child's demand. A breast pump can be used to maintain a healthy, plentiful supply of milk while at work (Murphy, 2014). The pumped milk can be stored for later use. While at work, other caretakers can feed the child breast milk. This allows for figures like fathers and other family members to develop a bond through feeding. Although the same can be done with formula, the baby will not receive the same health benefits and can be at risk for malnourishment and infectious disease if prepared in areas with shortages in clean water, utensils, and storage facilities ("Food and Nutrition Bulletin," 1981). Although electric breast pumps or hand expression can be efficient solutions to provide breast milk to infants while their mothers at work, Indonesian garment factories are not well suited for expressing breast milk safely and comfortably.

The Indonesian garment industry is known for unsanitary, unhealthy, hazardous work conditions and a disregard for women's rights in the workplace. Of the approximately 500,000 workers in the garment industry of Indonesia, 78% are women and 80.3% are between the ages of 21 and 35 (International Labour Office, 2012). A primary concern for these workers is basic occupational safety and health (OSH). Concerns stem from the number of cases of companies that violate Indonesia's OSH regulations. In 2011, 3,848 violated the regulations, 7,468 received verbal warnings, and 1,472 received strong warning letters (International Labour Office, 2012). There is also an alarming rate of reported workplace accidents. There were 98,711 accidents reported in 2010 and 48,515 reported in the first six months of 2011 (International Labour Office, 2012). The primary causes included being knocked, slashed, or cut by sharp objects and falls involving engines, lifting equipment, and hand tools. More than fifty percent of workers are sewing machine operators that work in tight quarters. These conditions make the workplace an unsafe environment for women to safely and comfortably express breast milk.

Severe thirst serves as a prime example of poor conditions. More than half of workers reported experiencing severe thirst often or everyday (International Labour Office, 2012). Many of these women do not have the time for a water break or refuse to take a break in order to maintain production to meet a quota. Intense heat also contributes to thirst. One-fourth of employees complain about high temperatures (International Labour Office, 2012). Law, however, requires factories to have sufficient artificial and/or natural ventilation. Without the

proper hydration, symptoms such as muscle cramps, fatigue, and dizziness can occur. These symptoms create dangerous working conditions; dehydration reduces the amount of milk a mother can produce, and the expression of milk under these conditions can further dehydrate women (International Labour Office, 2012). Additionally, the heat creates an environment that is unsafe to store breast milk in.

Nearly two thirds of workers in Indonesian factories reported concerns with dusty or polluted air with bad chemical smells. This could stem from illegal, improper ventilation. Most often women did receive personal protective equipment such as masks, but did not use the equipment because it was either outdated or they did not know how to use it (International Labour Office, 2012). This is a cause for concern due to the fact that the polluted air could contaminate the breast milk via the breast pump's exhaust system or by settling on the milk as it is hand expressed into an open container (International Labour Office, 2012).

In Indonesian garment factories, work hours are long and compensation is minimal. Most employees work between 7 A.M. and 5 P.M., Monday through Friday. More than a third of employees also worked on Saturdays. These long, grueling hours are compounded by the thirty-two percent of workers that choose not to eat dinner. By law, employers are required to provide at least a half hour of rest for every four hours worked (International Labour Office, 2012). Only a third of workers, however, reported taking a half hour break. This is large in part to the majority of workers who are required to meet a daily quota set by the employer. Employees also avoid breaks to increase hours and bring home larger paychecks. This can be problematic for lactating women who have higher caloric needs (Jelliffe, 1978).

Complaints about wages and pay occur frequently (International Labour Office, 2012). Complaints include broken punch clocks, confusion about rates and hours, low wages, deductions, and late payments. These workers make between \$100 and \$200 USD per month (International Labour Office, 2012). These wages are extremely low, relative to factory workers in neighboring countries. In perspective, the average one bedroom apartment outside of an Indonesian city costs between \$75 and \$250 a month (Cost of Living in Indonesia, 2016). With these types of wages, it becomes difficult for a mother to purchase her own personal breast pump and any additional accessories.

Lack of respect between supervisors and workers is a common theme in Indonesian garment factories. A staggering eighty-five percent of workers have reported sexual harassment

(International Labour Office, 2012). In addition, eighty percent of employees were concerned about verbal abuse such as shouting or vulgar language, and nearly ninety percent with physical abuse, such as striking or pushing. Although Indonesian Criminal Code addresses crimes against decency, it does not specifically mention the term “sexual harassment.” This leads to very few repercussions for supervisors. Without the proper protection of women against harassment, it remains hard for a mother to comfortably perform such a personal act as breastfeeding or expressing breast milk in the workplace.

Between unsanitary, unhealthy, hazardous work conditions and a disregard for rights of women in the workplace, Indonesian garment factories are often not safe or healthy environments for women to breastfeed or express breast milk. In order to create this environment for workers to breastfeed or express milk, company policy and procedure must be reformed.

Methodology:

The goal of our project is to understand the challenges that women working in factories in Indonesia face in providing breast milk to their infants. To accomplish our goal we had four objectives. The first objective was to identify the conditions of factories in Indonesia that influence the ability of women to safely and comfortably express breast milk. Our second objective was to evaluate breast pump designs to determine what pump features meet the needs of women who work in factories in Indonesia. The third objective was to analyze breast milk and breast pumping policies; both at the Indonesian national level and the factory level that impact a woman's ability to provide breast milk for her infant. Our fourth objective was to analyze breast milk and breast pumping educational resources (or lack there of) in Indonesia that impact a woman's ability to provide breast milk for her infant. We used purposive and snowball sampling to gather interview participants. This project received Worcester Polytechnic Institute's Institutional Review Board approval to conduct interviews, focus groups, and surveys. Each participant in our project research has signed an informed consent form to ensure ethical practices.

Methodology to Meet Objective 1: Identify the conditions of factories in Indonesia that influence the ability of women to safely and comfortably pump breast milk.

To meet this objective, we conducted semi-structured interviews with people who are knowledgeable about the garment factory conditions in Indonesia, factory employee and employer relationships, and potential modifications to factory spaces to increase women's access to lactation rooms. We covered the following topics: 1) air pollutants that may enter the pump exhaust system and threaten the safety of the pumped milk, 2) the temperature in the factories that may impact the ability to store the pumped milk out of a refrigerated area for multiple hours, 3) access to private spaces for expressing milk, 4) time to express milk, 5) ability to stay hydrated and use the bathroom, 6) time for breaks to eat and rest. See Appendix A & B for relevant interview questions. Secondary data was collected from published reports, surveys, and studies that included detailed information about factory conditions in Indonesia (and other relevant cases), with a focus on how they impact women's ability to safely express breast milk.

Methodology to Meet Objective 2: Evaluate breast pump designs to determine what pump features meet the needs of women who work in factories in Indonesia.

To meet this objective, we conducted semi-structured interviews with people who are knowledgeable about breast pump use and design as well as breast pump innovation. Questions covered the following topics: 1) costs to producers and consumers, 2) types of pumps and associated features, 3) ease of methods for sanitization, 4) effectiveness depending on user, 5) recent innovations. See Appendices B, C, & D for relative interview questions.

We also collected data through reading and analyzing evaluations by experts of different commercial pumps and their various features. These evaluations were produced by lactation consultants, companies who produce these pumps, and a group of graduate students from the Massachusetts Institute of Technology in Cambridge, MA who evaluated pumps for working women in more developed countries during a breast pump design competition in 2015. The topics that were covered in these evaluations included: 1) basic design, 2) necessary features, 3) functionality of each feature, 4) room for improvement, and 5) social, economic, and policy influences on the design, and 6) the function of particular features in the context of Indonesian garment factory conditions. See Appendix F for related questions. Secondary data for this objective included the review of breastpumps and comparisons of features and function conducted by the breastpump industry.

Methodology to Meet Objective 3: Analyze breast milk and breast pumping policies, both at the Indonesian national level and the factory level that impact a woman's ability to provide breast milk for her infant.

To meet this objective, we conducted semi-structured interviews with people are knowledgeable about breast pumping policy in Indonesia, culture around breastfeeding in Indonesia, breast pumping globally and all. Questions will cover the following topics: 1) intention of law, 2) how it is employed, 3) success of law and how it is measured, 4) negative impacts of law and how they are measured, 5) impacts on women, 6) impacts on employers, 7) insight on how to address shortcomings, and 8) room for improvement. See Appendix A & B for relevant interview questions. We also interviewed someone involved in the Indonesian Breastfeeding Mothers Association to further understand the conditions in Indonesia within factories that enable employers to not comply with policy. See Appendix H for relevant

interview questions. Secondary data was collected by reviewing documentation of Indonesian law and court cases related to national level and factory level breast milk and breast pumping policies/law.

Methodology to Meet Objective 4: Analyze breast milk and breast pumping educational resources (or lack there of) in Indonesia that impact a woman’s ability to provide breast milk for her infant.

To meet this objective, we conducted semi-structured interviews with people knowledgeable about Indonesian public education regarding breastfeeding, pumping, and milk, particularly for women working in factories as well as the programs currently available to these mothers. Questions covered the following topics: 1) existing information available to women and families, 2) how that information is shared, 3) accuracy of information, 4) barriers to education, 5) culturally appropriate ways to share this type of information, and 6) effective ways of delivering information. See Appendix A & B for relevant interview questions and Appendix E for the survey questions. We also interviewed an organization that provides educational programs for mothers in different regions of Indonesia about breastfeeding and breast milk. Questions covered the following topics: 1) methods they use to relay breastfeeding educational materials, 2) how the women become aware of these programs, and 3) the effect culture in Indonesia has on the breastfeeding rates. See Appendix H for relevant interview questions. Secondary data was collected by reviewing existing programs in Indonesian and other countries that increase women’s educational resources about providing breast milk for their infant.

In support of the organization in Indonesia that provides educational programs for mothers about breastfeeding and breast milk, we created a fundraising campaign. We conducted research in four areas to ensure the most effective fundraiser including: 1) fundraising platforms 2) tips for a successful fundraising campaign 3) fundraiser videos and 4) effective ways to raise awareness of the fundraiser. In order to spread awareness of our cause we used purposive sampling to share our fundraising campaign with a number of individuals and groups with an avid interest in supporting mothers and breastfeeding. Our primary methods of contact with said groups were through direct email contact and social media. After targeting a specific individual or group, our team sent out an email detailing our project and fundraiser as well as asking to raise awareness about our campaign and donate to our cause. Additionally, we have personally

shared our fundraising campaign page through social media outlets and have asked our interview participants and organizations to share the campaign on social media as well.

Results:

The goal of our project was to understand the challenges that women working in factories in Indonesia face in providing breast milk to their infants. In this section, we will discuss our findings under each project objective.

Objective 1: Identify the conditions of the factories in Indonesia that influence the ability of women to safely and comfortably express breast milk.

Our first objective was to evaluate the conditions of the factory that influence the ability of women to safely and comfortably express breast milk. There are many predictors as to whether or not women will strive to express breast milk after returning to work. These include the perception female employees have regarding the amount of support provided to them by their employers in regards to breast milk expression, as well as knowledge of the benefits of breastfeeding for her infant (Tsai, 2014). As a result, some companies in Indonesia receive funding from their country's Department of Health to establish lactation rooms (Tsai, 2014). This has led to an increase in the number of companies in Indonesia providing lactation rooms and breast pumping breaks for women. Some companies will even provide hospital-grade breast pumps for all of their employees to use, or breast pumps for individual employees (AIMI Representative, Informal Conversation, March 21, 2017). The presence of these support methods may imply support for breast milk expression in the workplace; however, it is uncertain whether this increases the percentage of mothers who choose to express breast milk upon returning to work. While some employers will provide these rooms and breast pumps, and allow for breaks, many will not outwardly encourage or support women in their use. This could be for one or more of the following reasons: 1) the employer is unaware of the benefits for worker productivity (Micaela Collins, Informal Conversation, October 5, 2016), 2) the employer believes this practice will create inefficiencies in production, or 3) the employer is uncomfortable with the topic of breast milk expression (Tsai, 2014). Employers who support breastfeeding and breast milk expression among their female employees see higher productivity and retention rates (Micaela Collins, Informal Conversation, October 5, 2016). However, if employers fail to understand how supporting breast milk expression can benefit their production, they may not create a culture of support at work, which could reduce the likelihood that women will express breast milk while at work in Indonesia. Women in Indonesia are more likely to utilize breast

milk expression breaks after returning to work if they are 1) aware of the breaks, 2) encouraged by colleagues to use the breast pumping breaks, and 3) are knowledgeable about the benefits of breastfeeding. Researchers predict that if factory employers in Indonesia and elsewhere provided employees with education on the benefits of breastfeeding, there would be an increase in the rate of mothers who express breast milk upon returning to work (Tsai, 2014).

In order to increase the rate of women who express breast milk at work, it is important that changes to factory conditions are expressed as a benefit to the employer, not just the employee (Micaela Collins, Informal Conversation, October 5, 2016). One way this can be done in an Indonesian factory is to share statistics from studies that show that improved workplace conditions lead to better morale, decreased turnover rate, and increased line work production. The expressed benefits could be focused around company growth as a whole, rather than on individual employees (Micaela Collins, Informal Conversation, October 5, 2016)

Objective 2: Evaluate breast pump designs to determine what pump features meet the needs of these women who work in factories in Indonesia.

Our second objective was to evaluate breast pump designs to determine what pump features meet the needs of Indonesian mothers working in garment factories. To meet this objective, we conducted research and interviews with professionals familiar with breast pumps. From this, we had three major findings: 1) breast pumps are expensive, 2) individualization is difficult to achieve for both breast pump users and manufacturers, 3) hand compression/expression is preferred and encouraged over breast pumping in Indonesia.

Breast Pumps Are Expensive Simple Machines

Breast pumps, while very expensive, are rather simple machines (Catherine D'Ignazio, Informal Conversation, December 2, 2016). Upon taking breast pumps apart at a Massachusetts Institute for Technology workshop in 2015, engineers found that the individual components do not justify the high costs of the pumps for consumers. Instead, the high costs of breast pumps come from two main sources: 1) cost of production and 2) regulatory costs in the healthcare system. Breast pumps are medical devices. They must comply with many health regulations, which increases the cost to produce a pump due to required components and testing (Catherine D'Ignazio, Informal Conversation, December 2, 2016). In Indonesia, income for the average

garment factory worker is very low, and women do not have the money to spend on personal pumps. However, if a pump were to be made of which the price reflected strictly the cost of the parts, they would be more affordable.

The cost of pumps is also impacted by health care. Many insurance companies have contracts with breast pump companies. Therefore, consumers with insurance see a lower out-of-pocket cost for breast pumps. Breast pumps are even more expensive outside of the United States. Many people will bring back multiple breast pumps after visiting the United States to sell at a more reasonable cost (Leith Greenslade, Interview, January, 26, 2017). Under the Affordable Care Act in the United States, every woman is given a breast pump upon giving birth (Catherine D'Ignazio, Informal Conversation, December 2, 2016). A similar system could be implemented in Indonesia, making breast pumps free to all new mothers. This system would be put in place and enforced by the government, to alleviate the fiscal burden placed on mothers. The burden of breast pump costs could also be taken off of the shoulders of mothers by a rental market. If a hospital or nonprofit organization were to purchase breast pumps, mothers could rent them for the duration of the time they will be expressing breast milk (Susan Thompson, Interview, February 2, 2017).

Problems with Pump Individualization

When a base model breast pump is purchased, it does not include aspects that make it conducive to all women. This proves to be source of difficulty when providing a limited number of breast pumps for a large group of Indonesian factory workers (Micaela Collins, Informal Conversation, October 5, 2016). Breasts vary in size and shape from woman to woman, but base breast pump models do not. For example, one “average” flange is provided. The flange is the cone portion of the breast pump that sits on the breast, as depicted in Figure 1.

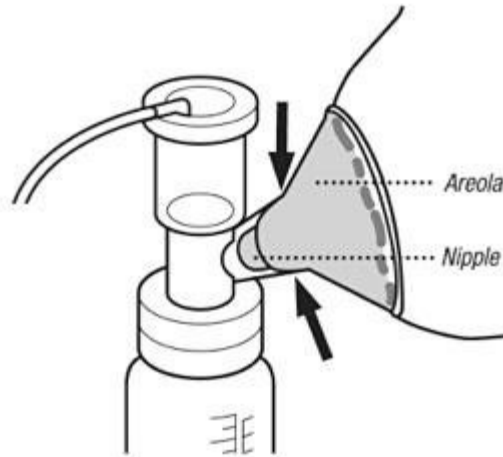


Figure 1. Breast pump flange and proper use.

What determines breast flange size, and whether or not the flange fits properly, is the width of its opening. For a good fit the nipple should move freely in the breast flange tunnel. Additionally, not much of the areola should be drawn into the tunnel. If the flange is too small, the nipple will rub against the sides of the breast flange tunnel. Conversely, if the flange is too big, more of the areola will be drawn into the flange tunnel (Ameda, n.d.). An ill-fitting flange is very uncomfortable and ineffective, reducing the amount of milk a mother is able to express. As a result, her infant will receive less breast milk, and the mother will begin to produce less milk because the improper flange fit inhibits the pump from simulating the demand of her infant.

Improper flange use can also clog the milk ducts of a breast, causing a red, painful area on the affected breast and flu-like symptoms (“Mastitis While Breastfeeding-Symptoms,” n.d.). This would not only hinder a garment factory worker from being able to breastfeed, but also decrease her productivity when in pain. Because there is no adjustable flange available, this is only rectified by buying additional flanges after purchase, which is inconvenient and expensive. These results suggest the need for either an adjustable flange to come standard with breast pump models, or for multiple flange sizes to come standard with breast pump models.

The Benefits of Compression Expression of Breast milk

Breast pumps operate using one of two methods for extraction: 1) vacuum or 2) compression. Vacuums provide a strong suction that extracts breast milk from the nipple, but are not ideal in every setting. Electric vacuum breast pumps are loud and large and require electricity, which is not always available for women in developing countries like Indonesia. In

addition, vacuum breast pumps have multiple small parts that are difficult to disassemble, and therefore are rarely cleaned. Bacteria will build up in these small parts and transfer to breast milk as it is pumped. Compression-based breast pumps act like a blood pressure cuff, providing pressure at the top and squeezing down the breast. This type of pump is typically made with fewer parts. As a result, compression-based pumps are less expensive and easier to clean. While the suction of compression-based breast pumps does not surpass that of vacuum pumps, they provide a low-cost, high-efficiency option for mothers (Susan Thompson, February 2, 2017). Despite the effectiveness of these pumps, groups that support Indonesian women are encourage using a simpler, yet equally effective method to reduce breast pump cost and contamination: hand expression.

In Indonesia, women are being taught how to hand express breast milk in an effort to avoid the difficulties of using a breast pump. Hand expression works the same way as compression based pumps. The mother uses compression created by her hands around her breast to express her own milk. This method takes less time, eliminates the cost, and alleviates the cleanup associated with using a breast pump (AIMI Representative, Informal Conversation, March 21, 2017).

Objective 3: Analyze breast milk and breast pumping policies, both at the Indonesian national level and the factory level, that impact a woman’s ability to provide breast milk for her infant.

Our third objective was to evaluate breast milk and breast pumping policies in Indonesia that impact a woman’s ability to provide breast milk for her infant. These policies were considered both at the national level and at the factory level. This section discusses and analyzes these policies.

National Policies

At the national level, Indonesia’s breastfeeding law, created to enforce a breast milk-exclusive diet for infants, aims to support women. The law stipulates that all babies should be breastfed for the first six months of life, and anyone who prevents a mother from doing so--such as a company, coworker, or family member--can face up to a year in jail and \$11,000 in fines (Wise, 2011). The law also prohibits formula companies from promoting their products to mothers of babies who are less than a year old. However, Minarto, director of nutrition for the

Indonesian Ministry of Health, does not intend to lock up mothers who don't breastfeed. In addition, he claims "Women should be able to breastfeed in public areas [such as] in an airport, an office. [Business] owners should provide [lactation] rooms for the mothers." When asked if the choice to breastfeed was left to the mothers, Minarto said, "We provide them with knowledge and in the end, we hope they make the right choice," (Wise, 2011).

Despite Minarto's statements, many individuals and groups called for revisions to the law to make it more mother-friendly. In order to combat the extraordinary rates of infant mortality in Indonesia at a national level, a number of alliances, organizations, and campaigns have been launched to promote exclusive breastfeeding. In 2007, the nonprofit organization Asosiasi Ibu Menyusui Indonesia (AIMI), the Indonesian Breastfeeding Mothers' Association, was founded by mothers who know breast milk expression comes with many challenges (AIMI Representative, Informal Discussion, March 21, 2017). In 2015, World Breastfeeding Week was celebrated in Indonesia. This resulted in the launch of the Global Alliance for Improved Nutrition (GAIN) campaign, entitled "Breast milk is enough". The campaign aims to raise awareness about the benefits of exclusive breastfeeding by working with the Indonesian Ministry of Health to share the campaign through social media channels with emphasis on Facebook (Nutrition, 2015).

In 2012, the Indonesian government requested the help of AIMI to make revisions to the legislation (AIMI Representative, Informal Conversation, March 21, 2017). These revisions included guaranteeing a child has the right to breast milk for six months, and clarifying the requirements of factories and public facilities in regards to breast milk expression (Indonesia, 2012). Suzanne Barston, author of the breastfeeding politics blog BOTTLED UP, claims a specific clause excluding mothers from prosecution would stop the current law from being used against mothers, even if that was not the original intention of those who wrote and promoted the law (Barston, 2012). Danielle Rigg, co-founder of Best for Babes, a non-profit committed to eliminating barriers to breastfeeding, suggests instituting a national law that would provide breastfeeding moms protection from harassment, humiliation and discrimination for nursing in public and at work (Rochman, 2012). As more attention is brought to changing the law, the discussion of another potential revision could make its way to the Indonesian government.

Factory Policies

Many factories do not comply with the national law to enable the expression of breast milk, and therefore breast milk expression at the workplace is limited. One factory-level component focused on is how the employment of mothers outside the home, and the lack of support for breastfeeding at the workplace level, negatively influence a mother's intention to breastfeed. In a report by the Indonesian Better Work Program, 12 out of 67 garment factories surveyed in the Greater Jakarta Area, provided facilities, policies, or procedures for breastfeeding breaks (Nutrition, 2015). Reasons for low compliance were due to most of the factory owners not being aware of the policy or of the increased productivity associated with supporting breast milk expression (Nutrition, 2015). Factory compliance is also low due to scheduling conflicts, as it is difficult to keep a process line running smoothly when multiple mothers have to stop to express breast milk (AIMI Representative, Informal Conversation, March 21, 2017). Mothers who are able to easily provide breast milk and continue to work are more likely to stay at their current job and continue expressing breast milk after having a baby (AIMI Representative, Informal Conversation, March 21, 2017).

Objective 4: Analyze breast milk and breast pumping educational resources (or lack thereof) in Indonesia that impact a woman's ability to provide breast milk for her infant.

The fourth objective was to evaluate breast milk and breast pumping educational resources--or lack thereof--that impact a woman's ability to provide breast milk for her infant. Even when women are given positive education regarding breast milk expression, they may not understand or follow it (Micaela Collins, Informal Conversation, October 5, 2016). In many cases, women would like to continue to provide breast milk, but become overwhelmed with challenges (AIMI, Informal Conversation, March 21, 2017). For instance, in a factory where a breast-pumping program was implemented in Bangladesh, women were pumping during the workday, but not breastfeeding or breast pumping while at home. With the help of the program at work, women felt comfortable using a breast pump because they had assistance readily available to them. After returning home, uncertainty and a lack of education about proper breastfeeding techniques would hinder the mother's intention to breastfeed. When women do this it causes clogged milk ducts and further issues with breast pumping and breastfeeding (Micaela Collins, Informal Conversation, October 5, 2016). This is due to the increase in releasing milk followed

by the sudden stop. For women who do not have the resources or support to express breast milk at work, breastfeeding at home can be just as difficult, as they do not have any educational resources provided to them. In order to properly provide breast milk for her infant, a mother must be confident in her education about how to express and handle her breast milk in and out of the home. AIMI works with the goal of spreading these educational resources to mothers. Support from a woman's partner and family also plays a key role in successful breast milk expression (AIMI Representative, Informal Conversation, March 21, 2017).

Bad press and misconceptions compromise a mother's education about breastfeeding. Formula company advertisements play a major role in hindering universally exclusive breastfeeding. Dr. Utami Roesli, a senior pediatrician and cofounder of the Indonesian Breastfeeding Center in Jakarta, claims "The information that mothers get here in Indonesia about breastfeeding is very, very little compared to what they get about formula because the formula companies are so powerful" (Post, 2010). In order to rid of these misconceptions, women must have more access to unbiased, accurate information about breastfeeding and about the pros and cons of formula from a trusted source. AIMI operates with the goal of extending this information to mothers. AIMI uses many platforms to spread important information about the expression of breast milk. Each branch supports lactation counselors and holds classes and presentations. Home visits are also available for mothers who would prefer a more private session. AIMI uses social media as a vessel for communication with mothers throughout Indonesia, spreading information about healthy breastfeeding practices to increase the number of breastfeeding mothers (AIMI Representative, Informal Conversation, March 21, 2017).

In an effort to support AIMI's continued efforts, our team created a GoFundMe page to raise funds for their organization. Our team began the fundraising process by setting up and participating in an informal conversation with James Monaco, the Senior Instructional Media Specialist at the Academic Technology Center of Worcester Polytechnic Institute. As a result of this conversation and our research on fundraising campaigns, we created a fundraiser page through the crowd funding platform GoFundMe (Appendix I). A short animated video, created by our team with the video editing software Camtasia, can be seen on the GoFundMe page. The video establishes the problem and proposed solution for the type of viewer who retains information visually rather than by reading a summary. Correspondingly, the page also includes an overview of our project along with a detailed explanation of how the donated funds will be

used. The GoFundMe page can be accessed using the following link (<https://www.gofundme.com/supportbreastfeeding>).

Recommendations

The goal of our project was to understand the challenges that women working in factories in Indonesia face in providing breast milk to their infants. Following research, we have three recommendations: 1) create a program to encourage employers to follow breastfeeding regulations, 2) provide additional educational opportunities, and 3) increase awareness surrounding hand expression in Indonesia. These recommendations were developed after thorough research on relevant published literature and interviews with professionals with breastfeeding-related experience. These professionals included: lactation consultants, a professor at Holy Cross who specializes in Indonesian studies, founders of organizations that help spread education about breastfeeding to mothers, and professors that created the Breast Pump Hackathon at MIT.

1. Program for Employers

Our first recommendation is to create a program to encourage employers to follow breastfeeding regulations under Indonesia's 2009, Health Law No. 36, which calls for every baby to be breastfed for the first six months of life, unless medically unable (Better Work Indonesia, 2012). In order to express breast milk, a mother must leave her position on the factory line, either putting her work on another employee or decreasing line efficiency. A woman must express breast milk approximately every three hours. This means she must leave her place on the manufacturing line up to six times during her shift. When multiple mothers need to express breast milk, balancing their needs and the factory schedule becomes even more difficult (AIMI Representative, Informal Conversation, March 21, 2017).

We recommend creating an employer-focused program to be used in factories to encourage employers to give mothers the opportunity to express breast milk while at work. Micaela Collins and her partners at Mother's Milk Bangladesh implemented a similar program at a factory in Bangladesh. While the factory owners were hesitant at first, they soon realized that providing for their employees would in turn increase efficiency (Micaela Collins, Informal Conversation, October 5, 2016). Mother's Milk Bangladesh began the program by providing employees with snacks, incentivizing the expression of breast milk. This soon turned into the factory providing these incentives, once the factory saw the positive aspects of supporting the expression of breast milk. Employees were happier and more productive because they felt they were be taken care of. This led to fewer women quitting after giving birth, meaning the factory

did not have to train as many new employees (Micaela Collins, Informal Conversation, October 5, 2016).

Our team recommends implementing a similar program to that used by Micaela Collins and her team in Bangladesh. We recommend this program includes using incentives as a way to encourage breast milk expression and introduces a system for employers to create schedules more cohesive with the needs of their workers who need breaks to express breast milk. With further research, our team would recommend developing a scheduling program that could be used by factories in Indonesia that support breastfeeding mothers.

2. Educational Resources for Mothers

Our second recommendation is to provide additional educational resources for breastfeeding mothers. Indonesian mothers are bombarded with advertisements about baby formula regularly (Post, 2010). This, along with the challenges mothers face when trying to express breast milk at work and at home, make it very easy to want to switch to formula. While formula may be an easy alternative, there are many risks associated with it. Formula use can lead to malnourishment due to watering down formula to save money. Also there is a risk of infectious disease due to the challenge of preparing a hygienic bottle in areas with shortages in clean water, utensils, and storage facilities (“Food and Nutrition Bulletin,” 1981). Breast milk, unlike formula, also combats malnutrition and diseases later in life (U.S. Department of Health and Human Services, 2014). Therefore, substituting breast milk with formula in Indonesia can be detrimental to an infant’s current and future health.

Our team recommends providing mothers with more information on breast milk expression before giving birth and as soon as her baby is born. The less discouragement a mother is met with when she attempts to express breast milk, the more likely she is to stick with it. We recommend that these additional educational resources outline the different options for breast milk expression and the different challenges specific to each method. Our team recommends working with a large spectrum of demographics when creating this resource, creating a community for new mothers. This diversity would also show that all mothers, regardless of their personal background, face these challenges. We would start by working with lactation consultants with different backgrounds to determine the most common challenges associated with each method of breast milk expression. We would also ask them about any common signs of poor success associated with individual methods of breast milk expression. Next, we would

consult mothers, either independently or through their lactation consultant. We would ask these mothers about their personal experiences with expression breast milk, both good and bad. This information would go in these resources as a source of knowledge and inspiration. By including personal stories, this resource will show mothers what difficulties to look out for, and show them that difficulty expressing breast milk is common and not something to be discouraged by. These resources would be available to mothers as a pamphlet and on a website for easy access. They would also be available at hospitals so that when mothers give birth they are not pushed to use formula but understand other options.

3. Increase Awareness of Hand Expression

Our third recommendation is to increase the awareness surrounding hand expression as a form of breast milk expression in Indonesia. The Indonesian Breastfeeding Mothers' Association, AIMI, encourages hand expression as the primary form of breast milk expression because of the difficulties that come with using a breast pump, including the time it takes to use one and the small parts that need to be cleaned.

Hand expression alleviates many of the difficulties associated with using a breast pump, specifically the cost (AIMI Representative, Informal Conversation, March 21, 2017). Hand expression also eliminates the need for a power source or a method to sterilize the pump. Because of these positive attributes of hand expression, our group recommends increasing awareness for hand expression. In order to increase the awareness surrounding hand expression, our group

Based on the research and interviews conducted during this project, we believe that these recommendations will have a large impact on the breastfeeding culture in Indonesia. We plan to continue supporting this cause through fundraising for AIMI.

Conclusion

The goal of our project was to understand the challenges that women working in factories in Indonesia face when providing breast milk to their infants. These challenges facilitate low rates of breast milk expression among mothers in Indonesia. The need for this project encompasses these low rates, which in turn lead to poor infant health. The challenges faced by mothers working in factories can often be traced back to factories not following regulations and mothers lacking access to education regarding breast milk expression. We collected data through interviews with lactation consultants and experts on Indonesian culture and analyzed published research in order to further understand the challenges Indonesian mothers working in factories are facing.

Although our project examined the influences causing low breastfeeding rates among Indonesia mothers working in urban factories, we considered data about working mothers in similar contexts in other countries, including Bangladesh and the United States of America. Many of our recommendations can be adapted and modified appropriately for other contexts where 1) the use of breast pumps is not feasible, 2) employers do not create a workplace environment or workplace policies that support women who need to breastfeed or express breast milk, and/or 3) families struggle to provide breast milk for their newborns due to lack of educational resources. Our research showed that policies in effect and access to education are the two largest inhibitors of breast milk expression in Indonesia. Therefore, we came up with the following three recommendations: 1) create a program for employers that will aid them with scheduling breaks for breastfeeding mothers and incentivize women to express breast milk while at work, 2) provide further educational materials and opportunities through organizations like AIMI, and 3) increase awareness surrounding hand expression for women working in factories in urban settings in Indonesia.

The Indonesian Breastfeeding Mothers' Association (AIMI) is an organization that has been critical in increasing the rate of breast milk expression in Indonesia through educational awareness campaigns, community breastfeeding support networks, pro-bono individualized family counseling, employer education, and workplace support for nursing mothers. Our team has partnered with AIMI in order to raise money to support their programs through our fundraising campaign: <https://www.gofundme.com/supportbreastfeeding>. Areas for further research include improving on the current breast pump for women who prefer breast pumping

over hand expression, and revising the policies in Indonesia regarding breast milk to further clarify the requirements and expectations.

References:

- Ameda. (n.d.). Good Breast Flange Fit. Retrieved December 15, 2016, from <http://www.ameda.com/breast-pumping/getting-started/flange-fit>
- Barston, S. (2012, February 2). Don't be fooled: Indonesia's breastfeeding law isn't something to admire. Retrieved December 15, 2016, from <http://www.fearlessformulafeeder.com/2012/02/dont-be-fooled-indonesias-breastfeeding-law-isnt-somethingto-admire/>
- Bearnot, E. (2013). Bangladesh: A Labor Paradox. Retrieved October 11, 2016, from <http://www.worldpolicy.org/journal/fall2013/Bangladesh-Labor-Paradox>
- Better Work Indonesia (2012). Law and Regulations on Breastfeeding. Retrieved October 3, 2016, from <http://betterwork.org/indonesia/>
- Boswell-Penc, M., & Kate, B. (2007). Expressing Anxiety? Breast pump usage in American wage workplaces. *Gender, Place and Culture: A Journal of Feminist Geography*, 14(5), 551–567.
- Burke, J. (2015, April 22). Bangladesh garment workers suffer poor conditions two years after reform vows. Retrieved October 11, 2016, from <http://www.theguardian.com/world/2015/apr/22/garment-workers-in-bangladesh-still-suffering-two-years-after-factory-collapse>
- Cordeiro, B. (2014, October). Breastfeeding lowers your breast cancer risk. Retrieved October 3, 2016, from <https://www.mdanderson.org/publications/focused-on-health/october-2014/Breastfeeding-breast-cancer-prevention.html>
- Cost of Living in Indonesia. (2016). Retrieved October 3, 2016, from https://www.numbeo.com/cost-of-living/country_result.jsp?country=Indonesia
- Food and Nutrition Bulletin. (1981, April). Retrieved May 20, 2017, from <http://archive.unu.edu/unupress/food/8F032e/8F032E05.htm>
- International Labour Office. (2012). Better Work Indonesia: Garment Industry Baseline Report : Worker Perspectives from the Factory and Beyond.
- Jelliffe, D. B., & Jelliffe, E. F. (1978). The volume and composition of human milk in poorly nourished communities: a review. *American Journal of Clinical Nutrition*, 31(3), 492-515.

Johnson-Grass, A. (2015, March 3). 15 Cool Facts about Breastfeeding. Retrieved October 3, 2016, from <http://www.health-foundations.com/blog/2013/11/19/15-cool-facts-about-breastfeeding>

Lepore, J. (2009, January 19). Baby Food - The New Yorker. Retrieved October 11, 2016, from <http://www.newyorker.com/magazine/2009/01/19/baby-food>

Mastitis While Breastfeeding-Symptoms. (n.d.). Retrieved December 15, 2016, from <http://www.webmd.com/parenting/baby/tc/mastitis-while-breast-feeding-symptoms>

Murphy, P. K. (2014). Reaching Full Milk Production with a Breast Pump. Retrieved October 11, 2016, from <http://www.ameda.com/docs/default-source/pdfs/reaching-full-milk-production-with-a-breast-pump.pdf?sfvrsn=4>

Natural Therapy Pages (2016). article: Benefits of Breast Milk. Retrieved October 3, 2016, from http://www.naturaltherapypages.co.uk/article/Benefits_of_Breast_Milk

Nutrition, S. U. (2015, August 12). Indonesia launches “Breast milk is enough” campaign with GAIN during WBW2015. Retrieved December 15, 2016, from <http://scalingupnutrition.org/news/insights-into-indonesias-breast-laws-and-regulations-during-wbw201/>

Post, H. (2011, September 1). Which Countries Work The Longest Days? Retrieved October 3, 2016, from http://www.huffingtonpost.com/2011/09/01/countries-work-day-longest-shorter_n_945709.html

Post, T. J. (2010, September 3). Myth: Mothers refusing to breast-feed can be prosecuted. Retrieved December 15, 2016, from <http://www.thejakartapost.com/news/2010/09/03/myth-mothers-refusing-breastfeed-can-be-prosecuted.html>

Rochman, B. (2012, February 1). What the U.S. Can Learn from Indonesia About Breastfeeding | TIME.com. Retrieved December 15, 2016, from <http://healthland.time.com/2012/02/01/what-the-u-s-can-learn-from-indonesia-about-breastfeeding/>

Shetty, P. (2014). Indonesia’s breastfeeding challenge is echoed the world over, 92(4). Retrieved from <http://www.who.int/bulletin/volumes/92/4/14-020414/en/>

Sweatshops in Bangladesh. (2015, June 23). Retrieved October 11, 2016, from <http://www.waronwant.org/sweatshops-bangladesh>

Solomon, S. (1981). The Controversy Over Infant Formula. The New York Times. Retrieved from <http://www.nytimes.com/1981/12/06/magazine/the-controversy-over-infant-formula.html>

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: The Official Journal of the Academy of Breastfeeding Medicine*, 9(1), 16–23.

U.S. Department of Health and Human Services. (2014, July 21). Breastfeeding. Retrieved April 9, 2017, from <https://www.womenshealth.gov/breastfeeding/breastfeeding-benefits.html>

Wilkinson, R. B., & Scherl, F. B. (2006). Psychological health, maternal attachment and attachment style in breast- and formula-feeding mothers: a preliminary study. *Journal of Reproductive and Infant Psychology*, 24(1), 5–19.

Wise, B. Y. C. (2011). New Indonesia Law: Allow Breastfeeding, or Face Punishment. Retrieved December 15, 2016, from <http://www.pbs.org/newshour/rundown/in-indonesia-allow-breast-feeding-or-face-pu>

Appendix A

Micaela Collins Interview Questions

1. What problems do women face when breast pumping at work?
2. What made your project “Mother's milk pasteurization for Bangladesh garment workers” work well?
3. What are some features/issues with breast pumps?
4. What have you observed in regards to breastfeeding/ pumping and education?
5. How do you suggest we find a way to implement this in Indonesia?
6. What standards are there in place in when designing breastpumps, such as the WHO Code?
7. Did the women understand the importance of breast milk and the mother child bond?
8. What kind of steps do you think we can make to get our project going?

Appendix B

Leith Greenslade Interview Questions

1. What led you to create the Breastfeeding Innovations Team?
2. What are the main reasons that you see for why there are low breastfeeding rates, particularly in developing countries like Indonesia?
3. Based on your knowledge and experience, what barriers do working women in developing countries face in being able to express breast milk when they are at work?
4. We are considering how manual or electric breast pumps might be better designed to meet the needs and environment of women working in factories in Indonesia. For example, having shared pumps meet the needs of women with different breast and nipple shapes and sizes, as well as pumps that can function safely in an environment with poor air quality. Do you have any thoughts on whether or how breast pumps could be better designed and used to increase access and use to working women in developing countries?
5. How might education programs and policies improve breastfeeding rates?
6. What are the challenges that you've seen with women expressing breast milk in the workplace in developing countries? Have you seen workplace models in developing countries that are particularly successful?
7. For our project, we've looked into various forms of technology to communicate education. What forms of technology are most accessible and best received in these situations?
8. Do you believe that education plays a part in women not breastfeeding?
9. Our project is based in Indonesian garment factories, in your research and with Breastfeeding Innovations team have you had any feedback on either garment factories or Indonesia? Can you recommend any contacts that might be able to provide insight into the challenges and opportunities to increase breastfeeding rates for women working in factories in Indonesia?

Appendix C

Susan Thompson Interview Questions

1. How was your compression-based breast pump project originated? Who is your target audience?
2. What are the reasons you chose compression based technology over other types of technology?
3. Is the pump you are working on now suitable for all women? If not, what groups of women are you missing?
4. Is the compression-based pump easier to clean because it doesn't use a vacuum? How many components is the pump made up of?
5. What is the target MSRP of the compression-based pump?
6. What is the cost of materials vs. retail price? Where do most of the added costs on breast pumps arise from?
7. Do you believe compression-based technology trumps all other breast pump technologies? Does it depend on the environment the breast pump is being used in?
8. Have you thought about the impact compression-based pumps could have on working women in developing countries? Does your pump meet these essential criteria: Easy to clean? Discrete? Compact?
9. Are there any essential features that are neglected in your current design? If not, are there any features that could be simplified further to reduce cost?

Appendix D

Catherine D' Ignazio

1. Since you had sponsors like Medela for the Hackathon, are companies willing to change their breast pump designs to meet mothers' needs?
2. From reading the research paper "A Feminist HCI Approach to Designing Postpartum Technologies" there was a list of top improvements mothers desired (mobility, comfort, easy cleaning, and discretion). How were these incorporated into the Hackathon?
3. Which types/brands of breast pumps were analyzed at the Hackathon and why?
4. What features of different breast pumps did you see were most necessary to its function?
5. What aspects of the breast pump did you see makes them more expensive?
6. Is it easy to modify the breast pump to meet specific needs?
7. What difficulties/barriers did you meet with designing a new improved breast pump? Where there aspects that you could not change/hard to change?
8. Our project is aiming to modify breast pumps for women working in garment factories in Indonesia. Some of the issues faced by these women; are poor air quality, extreme temperatures, unsanitary, lack of time away from their work station. Are there any suggestions you have regarding modifications that can be made to the breast pump to address these issues?
9. What kind of diversity was in your group you interview in regards to race, class, sexual orientation, cultural background, and ethnicity? Did you think these factors played a role in the experience with breast pumps?
10. Do you think these factors played a role in the level of education of the importance of breast milk and knowledge around breast pumping and policies that protect breastfeeding and breast pumping women?

Appendix E

Hope Foundation Survey Questions

1 - What information is being communicated about breastfeeding in these programs to help these women care for newborns in communities?

2 - How are these programs made available to the women of these villages?

3 - In your opinion, what is the most important thing mothers in these demographics should be taught about breastfeeding and/or expressing breast milk?

4 - Do women express milk while at work?

Yes

No

If the answer to the previous question was yes, how do they express milk while at work?

Breast Pump Hand Expression Other _____

5 - Do women have access to breast pumps?

Yes

No

If the answer to the previous question was yes, what breast pumps do they use?

6 - Do women have misconceptions about breastfeeding?

Yes

No

If the answer to the previous question was yes, what are those misconceptions? Where do they come from?

7 - Are women able to express milk while at work?

Yes

No

If the answer to the previous question was yes, how is that facilitated?

8 - Is breastfeeding or expressing breast milk at work difficult ?

Yes

No

If the answer to the previous question was yes, why ?

Appendix F

Jeanette Frem Focus Group Questions

1. How many children do you have? How many have boys? Girls?
2. How many of you have had a child in the past year?
3. Who has used a breast pump? Used multiple pumps? Exclusively pumped?
4. How comfortable are the pumps you have used? What made them comfortable?
5. How important is privacy to you when you are pumping? If it is important, how do you attain privacy while around other people?
6. How hard is maintaining your pump? Is it easy to clean? Has is ever required maintenance? Have you ever dropped your pump? Did it maintain efficiency over time?
7. How expensive is your pump? Was it hard to find an efficient pump in your price range?
8. What features do you like about the pumps you use? Pumps on the market? What features do you not like about the pumps you use? Pumps on the market? What features do you wish your pump had? Pumps on the market had?
9. *Describe project* Based upon the questions we have already asked you and the information about our project, what features would you suggest we incorporate in our breast pump design

Appendix G

Susan Rogers Interview Questions

1. Can you tell us about your research experience in Indonesia? Who did you work with? Where did you work? Why were you there? What did you learn?
2. How has Indonesia changed since your last visit? (in regards to culture and politics)
3. Can you tell us more about the role minority literature plays in politics?
4. In what ways does literature give authors and readers a voice in speaking back to state power?
5. Does this still apply today?
6. Is literature and art still the best way for individuals to gain a voice in state politics?
7. What other platforms do people have to make a change in government?
8. What type of access to technology do people have?
9. What communication platforms are most often used?
10. What is the workday like in Indonesia? What are the hours? Where do people work?
11. Do you have any insight into the life of a working mother in Indonesia?
12. Do you have any insight into the working conditions of garment factories in Indonesia? If yes, can you please describe the environment?

Appendix H

Indonesian Breastfeeding Mothers Association Interview Questions

1. Why was this organization created?
2. Can you tell us about the specific programs you provide for women?
3. How do you deliver your education materials?
4. How do the women in Indonesia become aware of your organization and its programs?
5. What are the current gaps in your ability to deliver educational materials and support for breastfeeding women? Our group is looking for a way to support education efforts. For example...website, fundraising, etc. How might we help support your organization and/or women you support?
6. We learned from x that breastfeeding is taboo in certain areas, etc.....In the areas of Indonesia you have been working with, what are the cultural views surrounding breastfeeding and breast pumping in the areas you've worked with in Indonesia? How do you think education, policies, or other tools might help to change the culture or support women within this culture?
7. In the areas of Indonesia you have been working with, what have you seen as the cause for mothers not breastfeeding?
8. **We are looking into educational programs as well as the implementation of an innovative breastpump for working women.** Do you think that increased access to breast pumps would help these women provide breast milk for their child?
9. Based on your knowledge and experience, what barriers do women working in factories in Indonesia face in being able to express breast milk when they are at work?
10. **Explain our research about factories not providing areas and time to pump...** Why are the workplaces in Indonesia not providing facilities to breast pump?
11. Talk about what you have learned about factory conditions. Ask what type of pump and pump features do they see as being most suitable in these conditions. Electric pump, manual pump, individual pumps, shared pumps, issues of storage and cleanliness, etc.
12. **I noticed the post on Changemakers website with a budget of \$1,000-\$10,000. As a part of our project we were looking to explore all avenues to help the women facing the issues you have spoken about. We wanted to know if fundraising for your organization could help provide these women with the support and education about breast milk that they need?* What do you use your organization's budget to pay for?
13. From interviews that we have conducted we can see that access to breast pumps is limited, do you agree? We were looking to possibly fundraise for breast pumps to send to an organization that could provide the pumps to women. Is that something that you think would be helpful?
14. We understand this policy that has been made, how does this affect your organization and the women you work with?

Appendix I

GoFundMe Campaign Page



Support Breastfeeding Mothers

Share Tweet Be the first to share

About Our Cause

The nonprofit organization Asosiasi Ibu Menyusui Indonesia (AIMI), also known as the Indonesian Breastfeeding Mothers' Association, was created in 2007 by mothers who understand the many challenges that come with providing breastmilk. Although, many mothers want to breastfeed their child, they do not have the proper education on how to do so. Long work days with extremely limited breaks exacerbate the difficulty to provide breastmilk on a consistent basis. AIMI works to increase the percent of breastfed babies in Indonesia by creating home and workplace communities that support mothers and families in their efforts to provide breast milk.

- A **\$5 donation** from you can help provide underprivileged families with a breastfeeding counseling session.
- A **\$10 donation** from you can help raise awareness about AMAI breastfeeding classes to one local community.
- A **\$15 donation** from you can bring breastfeeding education and support into factories that currently offer little to no breastfeeding support.

We greatly appreciate any donation for this cause. "It takes a village to breastfeed".

Did You Know?

A lack of exclusive breastfeeding for an infant's first six months of life contributes to the **deaths of 800,000 children** under five years of age **each year**.

Breastmilk is the perfect balance of required fats, proteins, vitamins, and carbohydrates for a newborn

Manage your campaign

\$1,000 goal
Campaign created 4 days ago
Donate Now
Share on Facebook

Created April 23, 2017
WPI IQP Group Charity WORCESTER, MA

Donations
No donations yet. Help launch this campaign and become the first donor.