The Impacts of a Community-Based Health Education and Nutritional Support Program on Birth Outcomes Among Migrant Workers in Maesot, Thailand: A Retrospective Review

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Cover Page Footnote

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on Birth Outcomes Among Migrant Workers in Maesot, Thailand:

A Retrospective Review

Infant and maternal mortality remain significant problems throughout the developing world. The United Nations' third sustainable development goal (good health and wellbeing) includes the reduction of the global maternal mortality ratio to less than 70 per 100,000 live births, and ending preventable deaths of newborns and children under five years of age.[1] These objectives are often challenged by structural problems, including prolonged conflict, a lack of infrastructure, and social instability caused by factors such as migration or lack of state capacity. Myanmar faces significant challenges in meeting these goals. At the time of this study, it ranked 148 of 189 on the United Nations Human Development Index.[2] Regarding infant and maternal mortality specifically, the maternal mortality rate is estimated at 250 in 100,000 (number 42 globally), while the infant mortality rate is 31.7 in 1,000 (number 50 globally).[3]

This underperformance is due to numerous historical and structural factors, such as long-running internal conflicts, a history of isolationism resulting in underdevelopment, and political and social instability, which poses challenges to greater investment in economic and social development. Expenditure on healthcare alone is estimated at 4.7 percent of Myanmar's GDP as of 2017.[4]

Due to relatively higher levels of development and economic opportunity, a significant number of people migrate to neighboring countries in search of employment. Myanmar is the largest regional source of migrants with the majority (as many as three million) living in Thailand.[5] The city of Maesot, located in Tak Province of Thailand, is a major port of entry for

migrant workers from Myanmar. It is also a major destination due to investment in the Maesot

Special Economic Zone, which provides numerous employment opportunities.[6]

The migrant population in Maesot, however, faces several challenges to stability and

human security, including linguistic barriers, lack of access to the Thai legal system, systemic

prejudice, and poverty. This population is also difficult to study because many migrant workers

cross between Thailand and Myanmar or migrate farther into Thailand depending on changing

economic opportunities. While accounting for the difficulty in defining and analyzing the

migrant population, family stability is inferred to be a major concern due to the prevalence of

orphanages in the area.[7] Estimates based on interviews conducted with children housed in

seventeen orphanage-type institutions in Thailand's Songkhlaburi district, which also shares a

border crossing with Myanmar, indicate approximately 90 percent of these children had at least

one living parent.[8] More widely generalizable estimates for the larger migrant population at the

national level are confounded by a lack of further research. However, the existing analysis

indicates at least a majority of institutionalized migrant children are likely not true orphans

meaning the death of both parents. Rather, institutionalization is more likely due to poverty,

abuse, and other factors negatively impacting family stability. Institutionalization of children

may provide critical protection in the absence of other competent family members to serve as

guardians or in cases of abuse. However, beyond such extreme circumstances,

institutionalization fails to address the deeper factors of human insecurity that influence the

decisions of at-risk families to place children in such institutions.

A primary goal of the Charis Project, a US registered 501(c)(3) charity, is the protection

of children in the Myanmar migrant community of Maesot by strengthening at-risk families. In

2017, The Charis Project established Shade Tree Foundation, which is registered under the Thai

Department of Social Development and Welfare and serves as The Charis Project's implementing partner managing all Thailand-based programs. Since 2014, The Charis Project and later Shade Tree Foundation have been conducting community-based interventions focusing on nutritional support and education for pregnant and nursing mothers to alleviate immediate human security threats and encourage family stability. The purpose of this paper is to analyze the effectiveness of the first iteration of interventions from 2014 to 2017 in meeting the objectives of increased human security and family stability.

Research Question

What were the impacts of the Charis Project's community-based interventions on promoting family stability as measured by positive birth outcomes? This study answers this question by analyzing the communities supported, types of support provided, and comparing our outcomes to available statistics for similar populations in Myanmar.

The answer to this question is important for developing a community-based family stability centric model of development and human security. Strong positive results from community-based interventions of the type conducted by the Charis Project have significant potential both in the context of the migrant community, and more broadly, as a low cost and potentially high reward intervention in other development contexts.

A review of the literature must begin with analyzing the key threats to positive birth outcomes in the developing world, and the effectiveness of community-based interventions broadly, as well as a review of the available literature covering the threats and interventions in the context of the Myanmar migrant community.

Literature Review

The World Health Organization estimates 75 percent of infant and maternal deaths during childbirth are due to preventable causes, which include severe bleeding, infection, high blood pressure, complications from delivery, and unsafe abortions.[9] These causes of morbidity during delivery are most often due to a lack of adequate health care.[10] However, prenatal, delivery, and postnatal health are impacted by several additional factors that can be more readily mitigated at the community level.

Low birth weight in particular is a major contributing factor to infant mortality and present in as much as 80 percent of cases.[11] Preterm birth, as well as constraints in utero, were identified as the main direct causes of low birth weight.[12] Other studies have identified multidimensional factors associated with low birth weight, such as the age of the mother, exposure to passive smoking, and educational level, depending on the specific context.[13] However, the most significant and widespread indirect contributing factor to low birth weight and later antenatal underdevelopment remains maternal malnutrition.[14]

An additional factor impacting birth and early childhood development is trauma due to intimate partner violence.[15] However, the precise impact and causal mechanism remains case-specific and appears to interact with cultural and environmental variables.[16] In the case of Myanmar, 21 percent of ever-married women have experienced domestic or sexual violence based on recent surveys.[17] This reporting was based on randomly selected households throughout the country, and found higher rates of domestic violence in less stable areas such as Rakhine and Kayin State, which are both the sites of ongoing conflict between armed ethnic groups and the central government. Additionally, this study found reported heavy alcohol use on the part of the husband as well as low levels of education on the part of the wife to correlate with reported

violence.[18] Although these statistics are not directly representative of the migrant population, they are reviewed here as a baseline for the social background of the Myanmar migrant community.

The potential psychological and physiological stress inducers of poverty, malnutrition, and violence are also associated with some birth defects.[19] Additionally, economic stress and instability have been associated with a higher prevalence of child trafficking.[20] These factors not only impact immediate birth outcomes, but long-term family stability and child development.[21]

Malnutrition has been targeted by several low-cost community-based interventions focused on key nutritional support and education throughout the developing world with significant positive effects.[22] In particular, exclusive breastfeeding for the first six months has been shown to strongly support early childhood development and mitigate several causes of morbidity.[23] Additionally, studies have demonstrated the benefits of community-based groups for providing psychological support for pregnant women and young mothers in several contexts.[24]

In the case of the Myanmar migrant community, population instability renders this group difficult to analyze. However, recent analysis of refugee camp residents and some migrant communities indicates a relatively high rate of pregnancy among very young women and underage girls, which is linked to several negative outcomes.[25] Additionally, the available data on the rate of exclusive breastfeeding within the migrant community indicates a low prevalence of this practice at 37 percent–with poorer, and less-educated women engaging less.[26] Analysis also indicates that a significant portion of the migrant population suffers from employment-related stress and negative psychological disorders.[27]

Previous studies on improving birth outcomes in this community have focused on mid-to-long range variables, such as better access to healthcare and the positive role of the mothers'

level of literacy.[28] However, there is limited documentation for shorter-term interventions with women who are already pregnant or new mothers. This study intends to add to the literature concerning shorter-term community-based interventions to better inform future policy and development practice. The natural starting place is the Charis Project's Family Engagement Program as it existed in 2014-2017.

Family Engagement Program (FEN)

The Charis Project's *Family Engagement* (FEN) evolved to incorporate new information and best practices, and consisted of: 1) women's health education; 2) nutrition supplements, and 3) family visitation.

1) Women's Health: The women's health course consisted of a twelve-week course with twelve modules.[29] Each birth class typically had between fifteen and twenty participants, with approximately two to five of the participants being men.

2) Nutrition supplement: The program provided nutrition supplements for an average of thirty-five weeks. Each week, each family received twelve eggs and an assorted package of 5 kg of dark green leafy vegetables, carrots, pumpkins, morning glory, eggplants, parsnips, tomatoes, green beans, and additional seasonal fruit and vegetables. A bag of dried beans was added to the package beginning in 2017. In 2014, the FEN program combined the women's health class and nutritional supplements. After that, nutritional supplements began based on the participant's pregnancy stage and family needs. As a result, nutrition supplements were given to families with pregnant women, other families with small children, and families with disabled children or elderly members in serious need of assistance.

3) Family Visitation: All FEN participants received an average of thirty-five weekly visits. Some began after the women's health course for those who participated. For those

participants who had nursing children but did not participate in the course, education and nursing assistance were provided on a case-by-case basis. FEN visitation provided encouragement, counseling, education, medical care/transport, and the food support described above. FEN case-workers reported that family visitations often provided the only stability in these families' lives.

FEN Demographics

In 2014, organizers recruited the first set of participants through the women's health course taught at the New Society Learning Center in the middle of Maesot, Tak, Thailand. The first few of these courses only had women in attendance and only the pregnant women in the course joined the FEN program.

Recruitment quickly expanded beyond the birth classes. Pregnant women in the birth classes received the FEN food supplements, and when the birth classes ended, the FEN program brought food to people's homes. Participants in the community then explained the program to other pregnant women in their villages and communities, and several of those community members joined the program, as well as several other groups including families with young children, disabled children, and elderly in need of basic support.
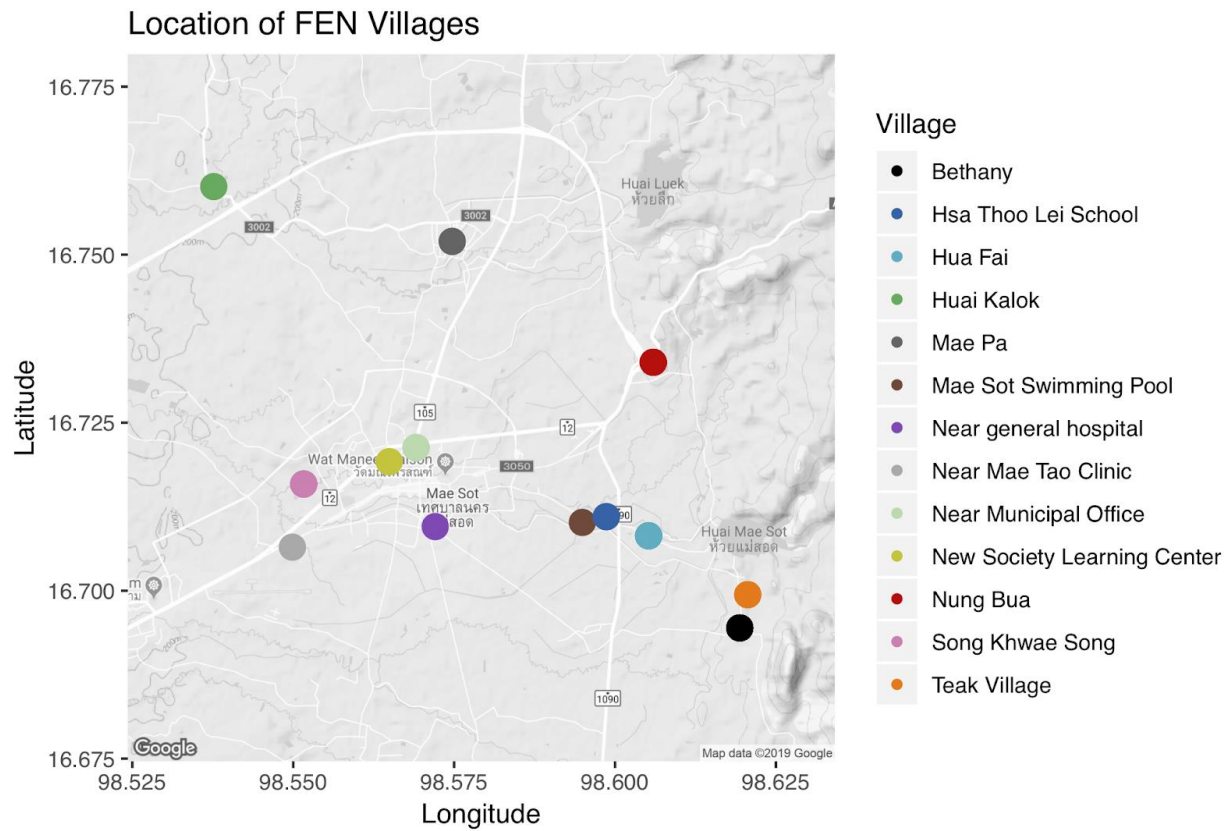
Figure 1: Locations and names of FEN participant community, overlaid on a Google terrain map[30]

Detailed information exists for the thirty-nine families who participated in the FEN

nutrition supplement program during a minimum of one pregnancy. Twenty-eight of the women

attended the women's health class during their pregnancy, one joined after her child was born,

while the other ten received direct one-on-one women's health education outside the course.

The mothers in these families had an average (mean) age of 25.7 years (standard deviation [SD] 6.8 years). Thirty-four of the women were married to migrant laborers, living in a migrant laborer community, with the remainder living in isolated areas, exchanging inexpensive housing for looking after the safety and integrity of farming plots. The thirty-four known fathers had a mean age of 29.5 years (SD=7.4 years). Participants lived in one of thirteen villages, as shown in Figure 1.

Village descriptions

The villages in this project's catchment area almost always existed as a form of "permitted squatting." A wealthier land-owner would have a well-constructed house, with the land behind it where employees and people they allowed on the property would live. Roads consisted of narrow paths and open gray-water drainage. Even in villages that had access to garbage disposal, trash accumulated underfoot. However, in villages without garbage disposal, there was at least one prominent trash heap and occasional trash burning. Houses consisted of one central room for family living and open sleeping, with one small room in the back for cooking and bathing. Most houses had woven bamboo walls and raised floors supported by stilts. A few families had cement houses with private toilets and front doors that closed and locked. In the case of company housing, the land-owner would pre-build the houses, often to a slightly higher standard than typical, and in return, employees would have their rents deducted before they received their pay.

Hua Fai was a suburban community containing brick and concrete houses normally occupied by Thai citizens interspersed with small groups of bamboo houses normally occupied by Burmese migrants. The migrant community is in this area was predominantly employed in

agriculture and construction. Hua Fai was accessible by paved roads ringing the village. It had

minimal but accessible sanitation, electricity, and access to garbage disposal.

In 2014, *Maesot Swimming Pool* Village had a total of sixteen cement and wood row

houses with tin roofs. The outside roads were in disrepair. Sanitation consisted of an available

public toilet with at least two stalls. This community had access to electricity but no access to

garbage disposal.

Nung Bua community sat on a shipping company's land, and all the people in the village

were employees or relatives of employees. Therefore, all housing depended upon the husband's

employment. There were approximately twelve housing units. The village consisted of relatively

large row houses with concrete floors and painted bamboo walls, and padlocked front doors.

Sanitation consisted of a public toilet with three stalls. Nung Bua had access to electricity, but no

access to garbage disposal.

Bethany was a largely mono-ethnic Bamar Christian community originating from the

Pagu division of Myanmar. In 2014, Bethany Village consisted of approximately fifteen bamboo

houses, some with tin and many with teak-leaf roofs. Most of the houses were on stilts, with a

couple having cement foundations. Bethany village had one public toilet, no electricity, and

intermittent water. Houses had no doors. By 2017, the village had improved to three toilets,

electricity, and running water with water storage and water filtration through foreign donations

given to the local church.

Mae Pa was a suburban community with Thai citizens generally occupying brick and

concrete houses and Burmese migrants living in wood, bamboo, and corrugated metal structures

distributed throughout the neighborhood. The primary work in the area was agricultural labor, as

well as some textile factory labor and petty commerce. Burmese migrant workers generally had access to some running water sources, public toilets, and electricity, as well as garbage disposal.

Song Khwae Song is a collection of tiny villages located behind and within sight of the large developments on the main highway, but surrounded by rice fields. Almost everyone lived in bamboo houses on stilts. It was possible to drive to the village entrance on an older but intact cement road. Villagers had access to some public and private toilets, electricity, and running water. The village had access to garbage disposal.

Hsa Thoo Lei School Village was located on a 74 by 63-meter lot next to the Hsa Thoo Lei migrant school and was comprised of approximately twenty wood, bamboo, and corrugated metal structures. This was a majority Karen ethnic community with many of the members engaged in construction day labor and petty commerce. The community was accessible by a paved road leading to the entrance. However, drainage on the lot was poor and the area routinely floods during heavy rains. Running water and electricity were minimal, but accessible, and residents had access to public toilets. There was consistently a large amount of garbage throughout the area although garbage disposal is accessible on the main road a few meters away.

The village near the *New Society Learning Center* was company housing consisting of bamboo row houses with solid wood floors on stilts. There were about thirty houses. A few at one end of the village were ground-level on concrete. The village had beautiful trees throughout. Across from the houses were rows of concrete piping and cement structures, which the landowner's business manufactures. The village was accessible only via a narrow dirt road. Some of the houses had toilets. The village had access to electricity and garbage disposal.

Teak village was secluded, approximately twenty houses, accessible via dirt path from the main road. The houses were built on stilts, of bamboo, with teak-leaf roofs and bamboo

floors. Water was obtained from two cement-ring collection points where people also showered. The village had electricity, but no access to garbage removal, with village paths worn through piles of trash, and no toilet access.

The village near the municipal office was large and consisted of perhaps forty to fifty houses. It is company housing, behind a shipping company loading center. Houses are on stilts with wood floors, usually particleboard, and bamboo walls. Houses have doors. There is no access to garbage removal, the entrance to the village has a giant trash heap where all villagers leave their trash. In the rainy season, the village floods and turns swampy. Villagers build makeshift paths to their houses with packing pallets and old tires.

The village near *Mae Tao Clinic* was mainly on a small open lot with other residents living interspersed with the Thai population similar to Hua Fai and Mae Pa. The residents were mostly Burmese and employed in the construction of the Maesot airport expansion, as well as some petty commerce. The structures in the main village were primarily wood and corrugated metal. The area had poor drainage and became inundated during heavy rain. There was limited access to running water, electricity, and sanitation, as well as garbage disposal. *Huai Kalok* is nearly identical to Mae Pa in terms of geographic and demographic characteristics.

The area near the Maesot General Hospital had a significant Muslim population comprised of ethnic Burmese, Rohingyas, Bangalis, and Pakistanis engaged in diverse occupations, such as woodworking, shop keeping, and other petty commerce. It was an urban community, accessible by paved roads, and with access to running water, electricity, sanitation, and garbage disposal. However, there was a significant amount of garbage in the area.

Demographics and Timeline

Ten of the families participated in 2014, nine in 2015, fifteen in 2016, and five in 2017; their times and places of participation can be seen in Figure 2. Two of the mothers had two pregnancies in the FEN program, the rest had one pregnancy.

Thirty-one of the mothers were ethnically Bamar (from the Karen, Mon, and Pagu divisions), six were Karen, one Rakhine, and one mixed Bamar and Karen. Of the fathers, twenty-six were known to be Bamar, four were Karen, one Lisu, and one from a Muslim minority in Burma, leaving two of unknown heritage.
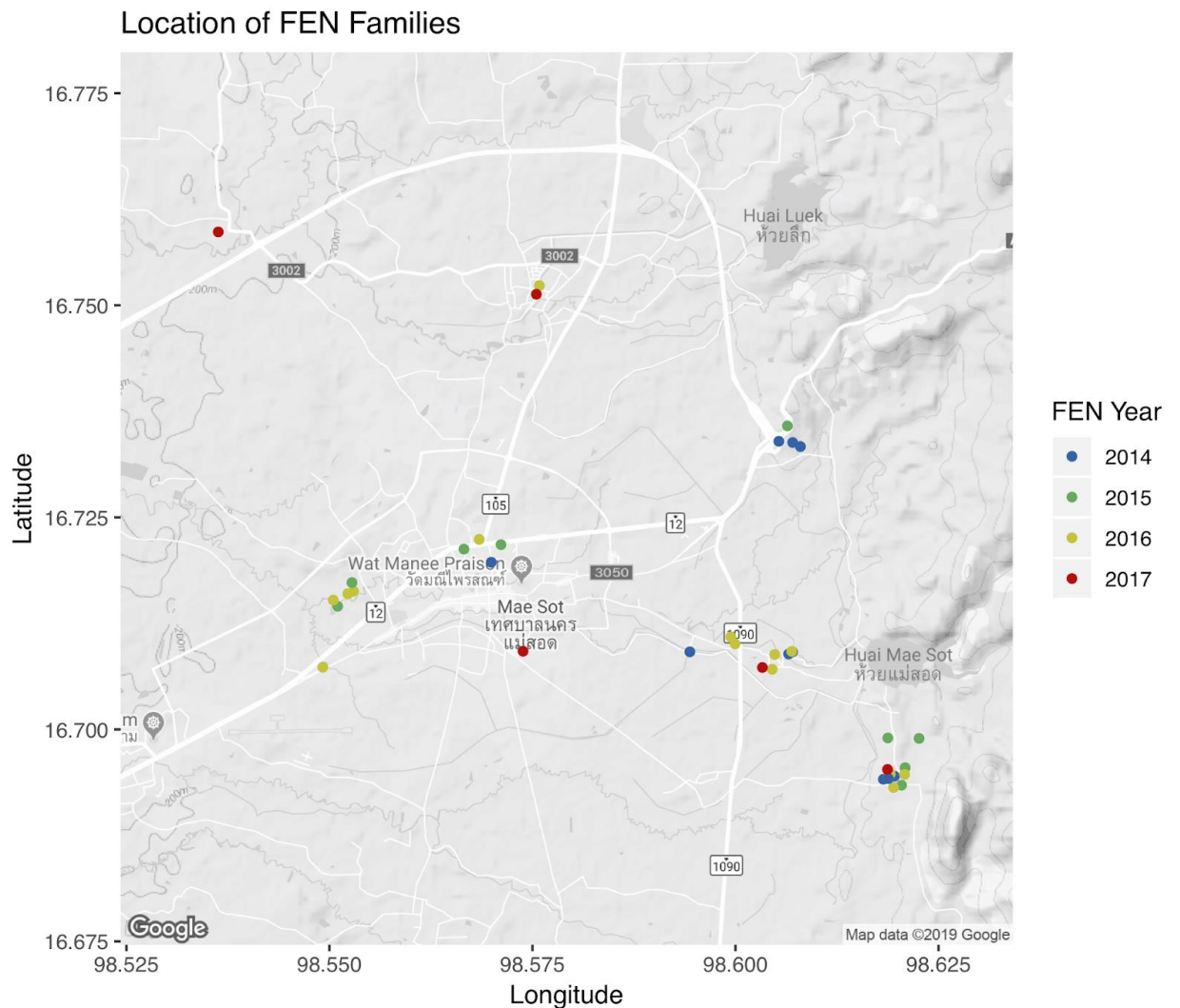
Figure 2: Jitter-plot of participant location by year of participation, overlaid on a Google terrain map [31]

Twenty-two of the mothers could read well, seven had some reading skills, and eight

were illiterate. All the mothers could speak Burmese, five could also speak Karen, six could

speak some Thai, and one could speak Rakhine. Thirty-seven of the mothers were largely

healthy, one had TB, and another had severe high blood pressure. However, the families all lived

in poverty, and many had difficult lives, with twenty mothers having one or more significant

known stressors. Five of the women did not have husbands, three more had previously broken families, three had a husband living far away, and one had a gravely ill husband. In addition, three women had husbands who were alcoholic, one very seriously, and two more had a failing marriage. Three families had severe debts that caused them to move often. Two families had just had a child die just before joining FEN. Two of the mothers endured under-employment, one due to a sick husband, such that their children needed to work to support the family. One mother had multiple difficulties with partners, debts, under-employment, and children with disabilities.

Of the forty unborn children in the program, thirty-seven came to term and were born healthy, without birth defects, and normal weight; and were all still alive as of early 2019. For the three children who did not survive, one died of spontaneous abortion before twelve weeks gestation, and two died shortly after birth—one because they were born prematurely and died due to lung development issues, and the other was born late-term, dying shortly after birth due to a congenital birth defect.

Comparison

To provide context to the outcomes for our beneficiaries, this study compares the frequency of key negative indicators, including neonatal mortality, low birth weight, and exclusive breastfeeding for the first six months of life to the available statistics from the Myanmar Ministry of Health and Sports 2015-2016 Demographics and Health Survey (2016).[32] The comparison between Myanmar national statistics and this program's beneficiaries is not one to one. Reliable statistics for the migrant population within Maesot were not available at the time of writing. Therefore, this study uses available statistics for populations in Myanmar to provide a limited comparative context for our results. The key confounds for this comparison are the differences in social development and security between Maesot, Thailand, and much of

Myanmar. Although our beneficiaries are culturally similar to respondents to the Ministry of Health and Sports Survey, key environmental differences persist. All the beneficiaries are relatively impoverished and live in semi-permanent settlements at best. However, residence in Maesot may provide certain benefits not applicable to those living in Myanmar, particularly regarding maternity care. Access to the Mae Tao Clinic, established by Dr. Cynthia Maung to serve the migrant community, is free and provides access to health services not readily available throughout Myanmar. However, most women in the FEN program did not access these services before they were in the third trimester. Additionally, ongoing conflicts and resulting insecurity in many areas in Myanmar is not a factor in Maesot, but migrant workers do encounter insecurity caused by surprise police raids on migrant communities looking for undocumented workers, arrests at checkpoints if they cannot produce the proper identification, high extortion fees to pay for their release from jail, and deportation.

Furthermore, our comparison cases represent a relatively small convenience sample of beneficiaries who joined the program between 2014 and 2017. There is potential selection bias in that some beneficiaries may have already been sufficiently concerned with personal and family health to seek additional assistance. However, the following comparison represents an initial attempt to contextualize the effects of the FEN program for our beneficiaries.

Additionally, since some participants would share food with disabled and elderly neighbors, thereby reducing the effectiveness of nutritional supplements, the FEN program also provided emergency relief for families whose disabled child requires constant care, single mothers, families where a parent is struggling with a severe illness, and families who have elderly members to take care of; all of which tax the family's meager resources. This resulted in

some families receiving more than the normal level of engagement and support. Therefore, the actual treatment across all forty cases was not uniform.

In the context of the Ministry of Health and Sports report, neonatal mortality is defined as the probability of death in the first month of life.[33] Low birth weight is defined as the percentage of births with a reported birth weight below 2.5 kilograms regardless of gestational age.[34] The same standards are applied to our cases for comparison. Additionally, the Ministry of Health and Sports report divides respondents into quintiles based on wealth. Comparing both to the average and to the lowest two wealth quintiles provides context for the general population and for our beneficiaries who were all relatively to extremely poor.

Myanmar National Statistics

Neonatal mortality has decreased at the national level, but remains relatively high by global standards. Average neonatal mortality in Myanmar was 18 per 1,000 for urban and 36 per 1,000 for rural populations.[35] For birth weight, there is variation depending on the age of the mother at birth, with a higher probability of low birth weight for younger mothers. The majority of mothers in the FEN program were in their twenties so the Ministry of Health and Sports statistics for mothers age 20-34 for are the comparison group. In this group 83.9 percent of newborns were recorded as average weight, leaving 10.6 percent below average or very low weight, and 3.8 were not recorded.[36] On average for the lowest wealth quintile, 81.3 percent of births were of average weight, with 14.3 percent below average or very low weight, and 4.5 percent unrecorded.[37]

Kayin State Statistics

There is significant variation in all health statistics by region due to varying degrees of infrastructure, economic development, and conflict. The majority of FEN participants came from

Kayin State directly across the border. Therefore, statistics from Kayin State are presented here for additional comparison. Kayin State is relatively underdeveloped compared to urban centers such as Yangon and Mandalay. Additionally, this region harbors ongoing conflict between various ethnic armed groups and the central government.

The underdevelopment of the region corresponds to lower than national average birth outcome statistics. For Kayin State, the average neonatal mortality rate was 33 per 1,000.[38] As for birth weight, there is also a deviation from the national average. 70.7 percent of births were average, with 25.6 percent below average or low weight, and 3.7 percent not recorded.[39]

FEN Outcomes

For FEN neonatal mortality, there were not improved outcomes for our limited sample compared to the national and regional statistics in Myanmar. Excluding the first trimester miscarriage, there were two cases of neonatal mortality in a population of 39, meaning 5.1 percent. This outcome is less favorable than 1.8 percent neonatal mortality for urban and 3.6 percent for rural populations at the national level, and 3.5 percent for Kayin State. Both neonatal fatalities in the FEN program were the result of complications beyond the ability of our interventions to influence. However, they are included due to the lack of detail in the comparison statistics for the prevalence of congenital defects as a cause of neonatal mortality.

As for birth weights, all thirty-seven surviving cases were average weight. This represents a significant improvement when compared to both the national and regional statistics and accounting for the low social and economic status of our beneficiaries. Furthermore, all surviving cases were still alive and healthy as of early 2019, indicating the potential positive impact of the FEN program on reducing child mortality through prenatal intervention.

Discussion

The FEN program had a quantifiable positive impact on the thirty-seven families with mothers who delivered healthy babies between 2014 and 2017 as demonstrated by the absence of below-average or very low birth weights. As birth weight is a key indicator of neonatal health, reduced morbidity, and future development, the success of the FEN program and our beneficiaries is noteworthy. Additionally, the continued health and development of the thirty-seven children who survived the neonatal period indicates a potential continued positive effect of the FEN program prenatal interventions on reducing early childhood mortality defined as age zero to five, which is 51 to 1,000 live births in Myanmar.[40] Healthy children remove key stressors, such as the need to access medical care, which often requires time off from work in addition to the financial cost, as well as relieving the emotional burden of caring for sick children. This study posits that successful birth outcomes are important for overall family health and stability, which in turn contributes to greater economic and social opportunities. As one village elder in a community where FEN runs programs noted, "The babies that have been born to mothers in your programs are the strongest, healthiest, and happiest babies we have ever had born in our village."

During the 2014-2017 period, families expecting a new baby comprised the bulk of FEN's engagement. These families faced surviving on a single income while the mother recovers and cares for the new baby, and many cannot afford it.

This critical point can have the most impact on a child's future health and development. Working with the mother to make sure she is educated and properly nourished helps prevent physical deformities in her baby. An educated mother also can better care for her children's hygiene, nutrition, and mental and emotional development.

As the FEN team gained additional experience, modifications were made to the duration of support, such as continuing food deliveries and home visits until well after birth. The continued provision of nutrition packages until the baby reaches six months old, conditional on the mother choosing to breastfeed the baby, helps to encourage attachment and strengthens the bonds that foster cohesion in the family unit. Shade Tree Foundation has made approximately 4000 home visits since this project's inception in 2014.

The FEN program is an example of low-cost, decentralized, and community-based intervention that may produce disproportionate benefits in terms of more healthy pregnancies and births, as well as increased family, and in turn community stability and development. The model implemented by Charis Project and Shade Tree Foundation through the FEN program can be refined, adapted, and improved to serve the Myanmar migrant community and potentially numerous other development contexts. This model has potential for humanitarian and social welfare focused NGOs, as well as government agencies interested in or responsible for engaging poor, and marginalized communities.

The initial implementation of the FEN program had demonstrated positive impacts for its beneficiaries. These were not only for contributing to healthy pregnancies and births, but also for improving overall family stability and broader social and economic opportunity. However, these results are preliminary and limited due to the small sample size and lack of comparative data from the surrounding population to validate statistical significance. Further research is needed to better document the process and impacts of low-cost community-based interventions, such as FEN, both qualitatively and quantitatively. Additionally, further research is needed to document health, social, and other trends in the Myanmar migrant community to validate the impact of aid and relief projects targeted towards them.

ENDNOTES

[1] "About Sustainable Development Goals" United Nations Sustainable Development Goals, Accessed 9 March 2020, https://www.un.org/sustainabledevelopment/sustainable-development-goals

[2] United Nations Development Report. 2018. 2018 Statistical Annex. http://hdr.undp.org/en/composite/HDI

[3] "Population and Society: BURMA", Central Intelligence Agency World Fact Book, Updated 4 March 2020, https://www.cia.gov/library/publications/the-world-factbook/geos/bm.html

[4] "Population and Society: BURMA", Central Intelligence Agency World Fact Book, Updated 1 July 2020, https://www.cia.gov/library/publications/the-world-factbook/geos/bm.html

[5] "Myanmar", International Organization for Migration, Accessed 10 January 2019, https://www.iom.int/countries/myanmar.

[6] "Progress Monitored In Mae Sot Special Economic Zone", Ministry of Labor, accessed 10 January 2019, http://www.mol.go.th/en/content/59108/1493050621.

[7] United Nations Development Report. 2015. 2015 Statistical Annex. 76, hdr.undp.org/sites/default/files/hdr 2015 statistical annex.pdf.

[8] Better Care Thailand. 2014. Eploring the "Orphan Myth" in Thailand. https://alternativecarethailand.com/wp-content/uploads/2019/03/Exploring-the-Orphan-Myth-In-Thailand-English.pdf

[9] "Maternal Mortality", World Health Organization, Accessed 208 March 2019, https://www.who.int/news-room/fact-sheets/detail/maternal-mortality

[10] "Maternal Mortality", World Health Organization.

[11] Lawn, Joy, Simon Cousens, Jelka Zupan. 2005. "Neonatal Survival 1: 4 Million Neonatal deaths: When? Where? Why?". *Lancet* 365, No 9462:891–900, 895. DOI: 10.1016/S0140-6736(05)71048-5

[12] Lawn, Cousens, Zupan, 895.

[13] Metgud, Chandra, Vijaya Naik, Maheshwar Mallapur. 2012. "Factors Affecting Birth Weight of a Newborn – A Community Based Study in Rural Karnataka, India". *PLoS ONE* 7, No 7: e40040. https://doi.org/10.1371/journal.pone.0040040

[14] Imdad, Aemer, Zulfiqar A Bhutta. 2013. "Nutritional Management of the Low Birth Weight/Preterm Infant in Community Settings: A Perspective FFrom the Developing World". *The Journal of pediatrics* 162, No 3:S107–S114. DOI: 10.1016/j.jpeds.2012.11.060

[15] Rico, Emily, Bridget Fenn, Tanya Abramsky, Charlotte Watts. 2011. Associations Between Maternal Experiences of Intimate Partner Violence and Child Nutrition and Mortality: Findings from Demographic and Health Surveys in Egypt, Honduras, Kenya, Malawi and Rwanda. *Community Health* 65:360-367. DOI:10.1136/jech.2008.081810

[16] Rico, Emily, Bridget Fenn, Tanya Abramsky, Charlotte Watts. 2011. Associations Between Maternal Experiences of Intimate Partner Violence and Child Nutrition and Mortality: Findings from Demographic and Health Surveys in Egypt, Honduras, Kenya, Malawi and Rwanda. *Community Health* 65:360-367. DOI: 10.1136/jech.2008.081810

[17] Ministry of Health and Sports, Myanmar. 2016. "Myanmar Demographic and Health Survey", 265, https://dhsprogram.com/pubs/pdf/FR324/FR324.

[18] Ministry of Health and Sports, Myanmar, 277-278.

[19] Carmichael, Suzan, Gary Shaw, Wei Yang, Barbara Abrams, and Edward Lammer. 2007. "Maternal Stressful Life Events and Risks of Birth Defects". *Epidemiology* 18, No 3:356–361. DOI: 10.1097/01.ede.0000259986.85239.87

[20] Ali, Syed Rashid and Muhammad Niaz. 2014. "The Economic Position of Family and its Relationship with Child Trafficking: A Study from the Perspective of Policy Analysts and Experts". *Pakistan Journal of Criminology* 6, No 1:81–96. http://www.pjcriminology.com/publications/the-economic-position-of-family-and-its-relationship-with-child-trafficking-a-study-from-the-perspective-of-policy-analysts-and-experts/

[21] Sandstrom, Heather and Sandra Huerta. 2013. "The Negative Effects of Instability on Child Development: A Research Synthesis". The Urban Institute. Low-Income Working Families Discussion Paper 3. https://www.urban.org/research/publication/negative-effects-instability-child-development-research-synthesis

[22] Imdad, Aemer, Zulfiqar A Bhutta. 2013. "Nutritional Management of the Low Birth Weight/Preterm Infant in Community Settings: A Perspective FFrom the Developing World". *The Journal of pediatrics* 162, No 3:S107–S114. DOI: 10.1016/j.jpeds.2012.11.060

[23] Beasley, Annette and Lisa Amir. 2007. "Infant Feeding, Poverty and Human Development". *International Breastfeeding Journal* 2, No 14: https://doi.org/10.1186/1746-4358-2-14

24 Owens, Collette, Justine Dandy, and Peter Hancock. 2016. "Perceptions of Pregnancy Experiences When Using a Community-Based Antenatal Service: A Qualitative Study of Refugee and Migrant Women in Perth, Western Australia". *Women and Birth* 29:128–137. DOI: 10.1016/j.wombi.2015.09.003 & Tripathy, Prasanta, Nirmala Nair, Sarah Barnett, Rajendra Mahapatra, Josephine Borghi, Shibanand Rath, Suchitra Rath, Rajkumar Gope, Dipthnat Mahto, Rajesh Sinha, Rashmi Lakshminarayana, Vikram Patel, Christina Pagel, Audrey Prost, and Anthony Costello. 2010. "Effect of a Participatory Intervention with Women's Groups on Birth Outcomes and Maternal Depression in Jharkhand and Orissa, India: a Cluster-Randomised Controlled Trial". *Lancet* 375:1182–1192. DOI: 10.1016/S0140-6736(09)62042-0

[25] Parker, Amber, Daniel Parker, Blooming Night Zan, Aung Myat Min, Mary Gilder, Maxime Ringringulu, Elsi Win, Jacher Wiladphaingern, Prakaykaew Charunwatthana, François Nosten, Sue Lee, and Rose McGready. 2018. "Trends and Birth Outcomes in Adolescent Refugees and Migrants on the Thailand-Myanmar Border, 1986-2016: an observational study". *Wellcome Open Research* 3, No 62:1–15. DOI: 10.12688/wellcomeopenres.14613.1

[26] Supachai Pitikultang, Supachai, May May Khin, Sukhontha Siri and Pimsurang Taechaboonsermsak. 2017. "Six- Month Exclusive Breastfeeding Among Myanmar Migrants in Samut Sakhon province, Thailand". *Southeast Asian Journal of Tropical Medicine and Public Health* 48, No 3:662–673. https://www.ph.mahidol.ac.th/phep/Sukhontha5_2017.pdf

[27] Meyer, Sarah, Michele Decker, Weitse Tol, Nada Abshir, Aye Aye Mar, and Courtland Robinson. 2015. "Workplace and Security Stressors and Mental Health Among Migrant Workers on the Thailand–Myanmar Border". *Social Psychiatry and Psychiatric Epidemiology* 51:713–723. DOI: 10.1007/s00127-015-1162-7

[28] Carrara, Verna, Celia Hogan, Cecilia De Pree, Francois Nosten, and Rose McGready. 2011. "Improved Pregnancy Outcome in Refugees and Migrants Despite Low Literacy on the Thai-Burmese Border: Results of Three Cross-Sectional Surveys". *BMC Pregnancy and Childbirth* 11:45. https://bmcpregnancychildbirth.biomedcentral.com/articles/10.1186/1471-2393-11-45 & Muenning, Peter, Prairie Boulmier-Darden, Noor Khouzam, Wenyi Zhu, and Paul Hancock, P. 2015. "Predictors of Health Among Refugee Adults from Myanmar and the Development of

Their Children". *Journal of Migrant and Minority Health* 17, No 5 (October):1385-90 DOI: 10.1007/s10903-014-0093-9

[29] Blue, Carrien. 2020. Women's Health Curriculum. https://thecharisproject.org/womens-health-curriculum/?fbclid=IwAR3qcwZB4Va8FzPAYZvnqKpB6hMJ6uZmZl6ouL1MuYYHE0MjI6H-fYol9Ps

[30] Kahle, David and Hadley Wickham. 2013. "ggmap: Spatial Visualization With ggplot2". *The R Journal* 5, No 1:144-161. DOI: 10.32614/RJ-2013-014 & R Development Core Team. 2018. R: A Language and Environment for Statistical Computing. R Foundation for Statistical Computing, Vienna, Austria. ISBN 3-900051-07-0

[31] Kahle and Wickham & R Development Core Team.

[32] Ministry of Health and Sports, Myanmar.

[33] Ibid., 112.

[34] Ibid., 141.

[35] Ibid., 116.

[36] Ibid., 150.

[37] Ibid., Myanmar, 150.

[38] Ibid., Myanmar, 116.

[39] Ibid., Myanmar, 155.

[40] Ibid., 111.