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AN OVERVIEW OF PERINATAL HEALTH AND CHILDHOOD DEVELOPMENT IN
HONDURAS

A MASTER'S THESIS SUBMITTED TO THE GRADUATE FACULTY
GRADUATE SCHOOL BETHEL UNIVERSITY

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Chapter 1: Introduction

Honduras is a country with great healthcare needs. Within health care, the largest percentage of mortality is due to conditions occurring in the perinatal period, including prenatal and maternal health, delivery and postnatal care (Pan American Health Organization [PAHO], 2017a). Additionally, malnutrition continues to affect infants as they grow throughout their childhood (Gray, Cossman, & Powers, 2006). Through the following analysis of previous research surrounding perinatal mortality and childhood malnutrition, a background will be given regarding the necessity of prevention, education, and action-oriented interventions to be done during a missions trip to Honduras in May 2018. This introduction will give insight into the issues of perinatal mortality and childhood malnutrition, as it pertains to a needs assessment conducted with Project Hope Clinic in El Cacao, Honduras.

Background to the Problem

Honduras is the second poorest country in Central America. According to the Central Intelligence Agency (CIA), one-third of the Honduran population is underemployed, and the per capita GDP is \$5,300 (CIA, 2017). In addition to the widespread poverty in Honduras, the high concentration of people in two main city centers, Tegucigalpa and San Pedro Sula, has led to Honduras having the highest murder rate and being labeled as the most dangerous country in the world (CIA, 2017). Despite the high murder rates, perinatal conditions are the leading cause of death in Honduras, accounting for almost 20% of all reported deaths (PAHO, 2017a).

In addition to perinatal conditions, non-communicable diseases and malnutrition greatly impact the burden of disease and mortality rates in Honduras. Most of these diseases do not get reported, so there is no accurate way of knowing how many people are affected (PAHO, 2017a). The lack of reporting and communication has been a consistent issue in Honduras between health

sectors and has led to ineffective health care (PAHO, 2017a). In recent years, the government has made strides through their national health plan to unite the healthcare system and steer it in a direction that will increase efficiency and efficacy (PAHO, 2017a). These national health plans have also prioritized the education and promotion of preventative health and nutrition for the mother and baby, as preventative healthcare is a significant need in Honduras (PAHO, 2017a).

In Honduras, 14% of women ages 15-19 have already given birth, and many more in that age group are sexually active (Samandari & Speizer, 2010). Mortality of mothers in this age group is over twice that of mothers 20 years old and above (Samandari & Speizer, 2010). Becoming a mother at such a young age increases health risks for mother and child and is correlated with malnutrition, poverty, and developmental delays in children (Samandari & Speizer, 2010). Education is a crucial factor when trying to prevent early or unwanted pregnancy, as higher rates of education are correlated with later rates of first births (Samandari & Spieler, 2010). Education, including sexual and reproductive health, is a great need in Honduras.

Education allows women to make decisions autonomously. It is a strong influencing factor in sexual and maternal health, affecting a woman's ability to make independent decisions. Studies show that much of sexual and reproductive decision making in Honduran societies is male dominated (Speizer, Whittle, & Carter, 2005). According to the Sustainable Development Goals (SDG) report, Honduras struggled to meet their goal of reducing national gender inequalities (Sachs, Schmidt-Traub, Kroll, Durand-Delacre, & Teksoz, 2016). Empowering women to take authority over their own sexual health is not an easy task; societal norms are deeply rooted and take time and unified effort to change (Speizer et al., 2005). Women who are able to make independent reproductive decisions are found to be more likely to use modern contraception and to express their fertility desires (Speizer et al., 2005). Freedom to use

contraception can decrease unwanted pregnancy, and contraceptive use has increased in the past years in Honduras (World Health Organization, 2015). However, contraceptive resources are still not available to all who desire them. In 2011-2012, 75.9% of unmarried, sexually active adolescent girls admitted they did not want to become pregnant in the next two years, but only 46.2% of them were currently using any method to prevent pregnancy (World Health Organization, 2012). Adolescent pregnancy rates are still high in Honduras, and pregnancy complications are the second leading cause of death for girls ages 15-19 (Every Woman Every Child, 2015). Many of these complications occur during delivery, but some can be prevented through sufficient prenatal care (Graham et al., 2006).

Prenatal care in Honduras is improving, but it is still a challenging aspect of perinatal care, in which discrepancies can have negative ramifications for mothers and children. Poverty, distance from a healthcare center, and lack of education play a role in the likelihood of a Honduran woman in seeking prenatal health care (Price & Asgary, 2011). In contrast to the pattern of gaping disparities among Honduran perinatal care, 96% of women in Honduras attend at least one skilled or unskilled prenatal health care visit, which is impressive in contrast to neighboring countries (Dansereau et al., 2016). That being said, women in developed countries typically attend seven to twelve prenatal care visits, which highlights the need for increasing prenatal care visits in Honduras (Zolotor & Carlough, 2014). One consequence of a lack of consistent counsel from a healthcare provider is the occurrence of neural tube defects (Blencowe et al., 2010). Only 73% of women who attended a prenatal care visit were instructed to take prenatal vitamins, and only 68.6% of women had heard of folic acid (Milla, Flores, Umaña, Mayes, & Rosenthal, 2007). Overall, the research showed that a lack of consistent prenatal

healthcare visits can lead to misinformation and insufficient care, resulting in perinatal complications.

The next area of intervention required to reduce perinatal morbidity and mortality in Honduras is the process of birth and delivery. In the healthcare setting, unskilled delivery attendants and lack of resources constitute the major medical factors leading to high mortality and morbidity of the child and mother at the time of delivery (Graham et al., 2006). The most common factor contributing to maternal death around the time of delivery is postpartum hemorrhage and is mainly due to lack of oxytocin and blood transfusions, as well as inadequacy of healthcare workers in managing and preventing postpartum hemorrhage (Low, Bailey, Sacks, Medina, & Piñeda, 2008). Sepsis is a common delivery complication of both the mother and child; low birth weight and asphyxia are additional factors leading to neonatal mortality (Graham et al., 2006). In addition to factors within the healthcare setting, many delivery complications can be attributed to the fact that women in Honduras often do not seek medical care at birth because they cannot afford transportation or do not believe delivery in a birth facility is necessary (Arps, 2009; Montagu, Yamey, Visconti, Harding, & Yoong, 2011). Overall, perinatal outcomes at the time of delivery in Honduras could be augmented by the institution of patient education regarding the importance of medical care, sustainable donations to healthcare facilities, and more stringent medical training of Honduran medical providers.

After addressing the complications related to delivery, the postnatal care of women and their babies must be addressed through the administration of vaccinations. As one of the most important aspects of disease prevention, vaccination coverage is a crucial indicator of both maternal and infant outcomes. With a vaccination coverage of over 90%, Honduras has been free from polio since 1981 and measles since 1989 (Januzs, 2015). Hepatitis B and Bacillus Calmette-

Guein (BCG) are to be administered within 24 hours of birth, and polio, diphtheria/tetanus/pertussis (DTaP), *Haemophilus influenza B*, pneumococcal pneumonia, and measles/mumps/rubella (MMR) are all vaccinated against within the first 48 months (Januzs, 2015). In addition, Honduras was recognized for their excellence in administration of the rotavirus vaccine, as 98% coverage was achieved within two years (Janusz, 2015). As of 2011, full immunization of a child up to the age of one cost \$132, and \$32.5 million were spent annually in Honduras for routine vaccinations (Januzs, 2015).

After the initial postnatal period, other issues must be addressed in order to prevent the underdevelopment prevalent among children in Honduras. Almost a quarter of children under the age of five show stunted growth due to malnutrition (WHO, UNICEF, & World Bank Group, 2016). Adequate nutrition is crucial for each aspect of childhood development: physical, cognitive, emotional, and psychological (Walker et al., 2007). Many families do not have access to primary health care due to distance and socioeconomic status, limiting childhood immunizations and treatments for common illnesses (Walker et al., 2007). Honduras does not have enough skilled healthcare workers to meet a child's primary care needs, a factor which greatly contributes to poor childhood health and development (CDC, 2017b). Ninety-three percent of Honduran families report some form of food insecurity (Ben-Davies, Kinlaw, Estrada del Campo, Bently, & Siega-Riz, 2014). Food insecurity was found to be associated with stunting in growth of school-aged children (Gray, Cossman, & Powers, 2006).

Parental behaviors were shown to be associated with compromised child development. Intimate partner violence between the mother and father, including physical, sexual, and emotional abuse, was found to be associated with child growth stunting in Honduras (Rico, Fenn, Abramsky, and Watts, 2001). Also, there is a high prevalence of adult metabolic syndrome in

Honduras. The children of adults with metabolic syndrome were shown to have a higher risk for developing childhood metabolic syndrome (Villamor, Finan, Ramirez-Zea, Roman, 2016).

Quality of childhood health can carry significant consequences not only for children but for the present and future health of Honduran people.

Problem Statement

The leading cause of death in Honduras is perinatal conditions such as hemorrhage, maternal sepsis, eclampsia, obstructed labor, unsafe abortion, low birth weight, birth asphyxia, and neonatal infection. These conditions lead to morbidity and mortality of both the mother and the child (PAHO, 2017a). Many of these conditions are preventable, and analysis of research regarding these conditions will direct the focus of goals in improving these conditions.

Ramifications of perinatal conditions impede childhood health. Therefore, reviewing and addressing child health and nutrition is relevant and beneficial in addressing perinatal health concerns in Honduras (Samandari & Speizer, 2010).

Needs Assessment

The partnering organization in this project, Adventure In Missions, describes their mission as the following:

“The organization Adventure In Missions is a non-denominational Christian ministry dedicated to bridging the gap between North Americans and the needy and neglected of Honduras. Adventure In Missions is committed to serving the poorest of the poor through preaching, teaching, building, and healing.” (AIM, 2017)

AIM was founded 15 years ago by Florence and Gary Mayerle, Canadian natives with a heart for the Honduran population. The mission is located in the small town of El Cacao on the north coast of Honduras in the Atlantida region. The organization serves the surrounding

community through medical care, education, building sustainable infrastructure, and sharing the gospel message (AIM, 2017). Through communication with AIM and the organization's representative, several areas of need of the community were identified, the major ones being prenatal education as well as sexual/reproductive education. AIM has also recently started a feeding program for children in the community, providing one hot meal a day for each child. Needs of this program include a child development assessment to evaluate continuing needs of the children and the impacts of the program, funding for continuation of the program, and nutritional education for children (K. Mayerle, personal communication, October 11, 2017).

Significance of the Problem as it Relates to the Health Care System

To meet the United Nations' sustainable development goal, Honduras must decrease maternal mortality by 59 births per 100,000 by 2030 (WHO, 2016). This will increase pressure on their healthcare system to provide wider access to care, more skilled workers, and increased funding. Improved maternal health would lead to a reduction in morbidity and mortality of the child and better perinatal outcomes and psychosocial factors that affect the child, leading to improved health throughout development. Improved childhood nutrition would help provide sustainable health for children and adults long term. Helping Honduras to meet their healthcare needs would significantly improve the lives of the Honduran people.

Purpose

Based on the Project Hope Clinic needs assessment, the project goal is to partner with the clinic to make an impact in the community and reduce pregnancy risks, which is currently a leading cause of preventable death in Honduras (PAHO, 2017a). In addition, the project aims to positively impact childhood development in the community by improving childhood nutrition. Project Hope Clinic currently provides consistent care for women and mothers, including

providing birth control, pap smears, prenatal vitamins, and pregnancy counseling (K. Mayerle, personal communication, October 11, 2017). The project aims to provide further resources as well as education on reducing risks during pregnancy through nutrition and safe sexual practice, as well as to provide education for parents and children regarding childhood nutrition.

Definitions of Terms

The following terms are defined for the purposes of our study:

- *Woman* refers to a female of childbearing age.
- *Neonate* is a period of infancy referring to the first four weeks of life (Merriam-Webster, 2017a).
- *Perinatal* is defined as “occurring in, concerned with, or being in the period around the time of birth” (Merriam-Webster, 2017b).
- *Prenatal* is defined as “occurring, existing, performed, or used before birth,” or “providing or receiving prenatal medical care” (Merriam-Webster, 2017c).
- *Teenager* refers to an adolescent over the age of 12.

Summary

Considered a developing country by the United Nations, many challenges face Honduras including poverty, inadequate access to health care, and increased mortality rates (UN, 2012). Many high-mortality perinatal conditions surrounding pregnancy are preventable, leading to a great need for preventative care and education regarding women’s and children’s health in Honduras (PAHO, 2017a). Analysis of disparities is the first step in providing more affordable and accessible health care. The next chapter, the literature review, begins by providing an overview of Honduras with its history, economy, culture, and current healthcare system. Evaluation of preconception sexual health, fertility and maternal vaccinations will be followed

by a discussion of prenatal norms and status, delivery and complications, and childhood development.

Chapter 2: Literature Review

Background of Honduras

For an informed perspective on Honduras, it is important to understand an overview of its history, geography, economy, and people. Honduras is a Central American country bordering Guatemala, El Salvador, and Nicaragua, and situated between the Pacific Ocean and Caribbean Sea. Once a Spanish colony, Honduras gained independence in 1821; however, it was not until 1982 that a freely elected civilian government gained power in Honduras (CIA, 2017). Economic relations between the US and Honduras have existed since the late 1800s due to banana exportation (Global Edge, 2017). Since 2003, a free trade agreement (CAFTA) has existed between the US and Honduras, Guatemala, El Salvador and Nicaragua. In 2014, the US increased its aid to Honduras with the aim of combating gang violence (Global Edge, 2017).

Honduras has a wide range of climates and geography with temperatures, rainfall, and seasons varying greatly depending on the location within the country. The inland, mountainous regions are generally more temperate with longer rainy seasons, while the coastal flatlands are tropical with more heat and humidity (Moncada, Woodward, & Clegern, 2017). Located between the Pacific and Atlantic oceans, Honduras is very susceptible to natural disasters such as frequent, mild earthquakes, severe hurricanes, and extensive flooding on both coastlines (CIA, 2017).

While this geographic diversity presents difficulties, it also allows Honduras to produce and export a variety of products including bananas, coffee, citrus fruit, shrimp, sugar, clothing, and extensive natural resources such as timber, gold, silver, copper, lead, zinc, and other

minerals (CIA, 2017). Heavily dependent on US trade, economic difficulties including unequal distribution of income and an underemployment rate of 33% have led to Honduras being the second poorest country in Central America (CIA, 2017). Statistically, the country's total gross domestic product (GDP) was \$43 billion in 2016 and \$5,300 per capita (CIA, 2017).

With a population of approximately 9 million people, the Mestizo ethnic group (mixed Amerindian and European) makes up 90% of the population while only 7% of Honduras' population is indigenous (Amerindian) (CIA, 2017). With almost 2 million people living in the major city centers of Tegucigalpa and San Pedro Sula alone, 55.9% reside in urban areas (CIA, 2017). With the growth of these city centers, the rates of crime and prevalence of extensive drug and gang activity have grown, leading to Honduras having the highest murder rate of any country (CIA, 2017). While crime and gang activity dominate urban centers, other factors such as lack of work opportunities, infrastructure, education, and health care contribute to the fact that 65% of Honduras' population is below the poverty line (PAHO, 2017a). Half of the population lives in extreme poverty, and most of those in poverty live in rural areas (USAID, 2016).

Mortality in Honduras

Honduras' impoverished status results in considerable morbidity and mortality. Due to a lack of policy for national road safety, other than a ban on intoxicated driving and driving without a seatbelt, car accident related deaths are increasing with a prevalence of 14.7 per 100,000 in 2010 (PAHO, 2012). Homicide accounted for 6,239 deaths in 2010 (77.5 deaths per 100,000 population), which is over twice as many homicidal deaths recorded in 2006. The country's susceptibility to natural disasters also has a significant impact on non-disease related mortality (CIA, 2017).

Disease related mortality in Honduras can be broken down into non-communicable diseases, nutritional diseases, and communicable diseases. Non-communicable diseases such as cancer, COPD, and diabetes have a huge impact on the burden of disease in Honduras, but it cannot be accurately measured due to underreporting and the lack of coordination between the different health sectors (PAHO, 2012). Malnutrition has a significant effect on the Honduran population, especially in rural Honduras, with an estimated 40.2% of people ages 12 to 59 having some form of anemia (PAHO, 2012). Infectious diseases including dengue, malaria, Chagas disease, tuberculosis, and HIV/AIDS are widespread throughout Honduras (PAHO, 2012).

The leading cause of death in Honduras is perinatal conditions, approaching 20% of all reported deaths (PAHO, 2017a). In 2012, the infant mortality rate was reported at 24 deaths per 1,000 live births, and maternal mortality was reported at 86 deaths per 100,000 live births (PAHO, 2017a). It is important to remember that these are only the reported numbers. Maternal mortality is twenty times more prevalent in developing countries compared to developed countries (WHO, 2016). Since the poorest people in Honduras live in rural communities, health-related morbidity and mortality are likely more prevalent than what is reported (USAID, 2016).

Healthcare System

According to the Pan American Health Organization (PAHO), health services are divided between three major departments: the Ministry of Health, the Honduran Institute of Social Security (IHSS), and the private sector (PAHO, 2012). The Ministry of Health, which is the public sector, provides care for about 60% of Hondurans through hospitals, family violence counseling centers, and maternal, child, rural and peripheral emergency clinics (PAHO, 2012). IHSS provides health care for about 15% of the working population and their families with the

private sector providing for about 10% (PAHO, 2012). All three sectors primarily focus on curative care instead of preventative care (PAHO, 2012).

Historically, the healthcare system has been profoundly inefficient, and poor coordination between these three major sectors has led to underreporting and ineffective care. However, due to the Framework Law on Social Protection passed in 2015, there has been a push for increased organization, the start of a nationwide agency to oversee the country's health, and for the IHSS to become the insurer of the national health system (PAHO, 2017a). The Honduran government is trying to promote and build multi-sectoral partnerships in the health system, and they are working to provide evidence for a more holistic approach to medicine, especially when it comes to noncommunicable diseases and injuries (PAHO, 2017a).

Preconception Health

Sexual Health. Sexual health is a significant part of analysis of the overall health of a country. It encompasses sexual education, sexual views and practices, prevention and treatment of sexually transmitted infections (STIs), and family planning/contraception. In comparison with other countries in Latin America, Honduras has a high rate of young motherhood (Samandari and Speizer, 2010). While there are many aspects to sexual health, average age of first reproduction is a valuable indicator of a country's reproductive health because it gives insight into other factors that can affect sexual health such as poverty levels, access to reproductive care, and social behaviors. In Honduras, the likelihood that a female has engaged in sexual activity has risen over time, and 14% of 15-19-year-olds have given birth by age 19 (Samandari & Speizer, 2010). An even higher number have engaged in sexual activity without resulting in pregnancy. Mortality of mothers in the age group of 15-19 is over twice that of mothers age 20 and older, and becoming a mother at such a young age increases child mortality and health risks

(Samandari & Speizer, 2010). Young mothers suffer increased rates of malnutrition, poor education, and poverty, while their children have a higher risk of developmental delay (Samandari & Speizer, 2010).

Education is a crucial factor when trying to prevent early and often unwanted pregnancy, as higher rates of education are correlated with later rates of first sexual intercourse and first births. (Samandari & Speizer, 2010). Even beginning at a young age, education is valuable to promote healthy sexual views and practice. In reality, many adolescents are not taught safe sex practices in schools (WHO, 2010). Most sexual knowledge comes informally from families and friends. Correlated with poor education is poverty; with lower incomes women are statistically less likely to access sexual and reproductive health information, as well as less likely to use preventative methods (WHO, 2010).

The relationship between socioeconomic status and sexual health is not straightforward and can be complicated and nuanced. Playing into the equation is a woman's ability to make independent and autonomous sexual and reproductive decisions. Authors Speizer, Whittle, and Carter explore this relationship in *Gender Relations and Reproductive Decision Making in Honduras*. In this 2005 study, men and women in Honduras were surveyed independently in order to determine which gender was more likely to make reproductive decisions. The study showed that 25% of women and 28% of males responded with the opinion that men should be solely responsible for at least one reproductive decision (Speizer et al., 2005). Women with low income, having less than a secondary education, and living in a rural area were more likely to agree with male-centered decision making. Males with lower education levels were also more likely to agree with male-centered decision making (Speizer et al., 2005).

According to the Sustainable Development Goals (SDG) report, Honduras was far from achieving its SDGs (Sachs et al., 2016). The country was furthest from meeting the goal of reducing national inequalities in comparison with other goals (Sachs et al., 2016). There are 17 sustainable development goals including no hunger, no poverty, accessible clean water, health and wellbeing, accessible quality education, industry and infrastructure, and sustainable communities (Sachs et al., 2016). Among others, Honduras did not meet the goal of gender equality (Sachs et al., 2016). This is apparent in societies with male-centered views that affect reproductive decision making, and Speizer et al. (2005) address this challenge in their report. Reducing gender inequalities can create better communication between women and their partners, unifying sexual health and reproductive decisions, as well as reducing sexual violence. Gender equality can increase men and women's likelihood of seeking sexual health treatment and preventative services, including STI screens and use of contraception. Women using modern contraception were found to make significantly more independent reproductive decisions and were more likely to express their fertility desires (Speizer et al., 2005).

The opposing side to this aspect of female empowerment in decision making is male dominance. When women in an unsafe relationship choose to use contraception or make any independent reproductive decisions covertly, they risk putting themselves in compromising and violent confrontations with partners if they are exposed. These women are also more likely to undergo at-home or risky abortions (Speizer et al., 2005). There is no simple solution to increase women's empowerment to make healthy sexual decisions as gender relations are deeply rooted in society and take time and unified effort to change societal norms (Speizer et al., 2005). Programs that have been shown to be effective have the following in common: they target the men in a society, encouraging men to communicate well with their partners, include partners in

decision making, and value them as equal contributors (Speizer et al., 2005). Encouraging and educating men about healthy relationships is increasingly necessary at a young age, as the average age of first sexual intercourse for Honduran boys is 15.7 years old (WHO, 2012).

Access to health services varies depending on region and economic status in Honduras, but in general, the use of modern contraceptives has increased in past years. In adolescents, reported use of contraceptives increased from 25% to 62% from 1992 to 2006 (EWEC, 2015). The survey asked if adolescents had ever used contraceptives; however, it did not indicate whether they were used correctly or consistently. Adolescent pregnancy rates are still high in Honduras, and pregnancy complications are the second leading cause of death for girls ages 15-19 (EWEC, 2015). Though contraceptive use is increasing, many women still do not have access to birth control, especially sexually active, unmarried adolescents (EWEC, 2015).

According to data from la Encuesta Nacional de Salud y Demografía de Republica de Honduras (ENDESAH), in 2011-2012, 75.9% of unmarried, sexually active adolescent girls admitted they didn't want to become pregnant in the next two years, but only 46.2% of adolescent girls were currently using any method to prevent pregnancy. The percentage of women who used contraception increased within married women, but still not all married women have access to birth control (WHO, 2012). Educating young women and creating an open and empowering environment to choose contraception is equally as important as making contraception options available at health centers. Women need to feel they have decision making power in their sexual and reproductive lives in order to have healthy sexual practice.

Complications of Young Motherhood. The literature previously discussed how giving birth at a young age can lead to higher health risks and mortality for mothers and children (Samandari & Speizer, 2010). Maternal mortality rates are high in Honduras, higher than the

Latin American average by over two times. One of the United Nations' Sustainable Development Goals is to reduce the maternal mortality to less than 70 in 100,000 births by 2030 (WHO, 2016). Honduras currently has a rate of 129 per 100,000 births. This rate is improving, and has decreased dramatically since 1990, when it was 272 per 100,000 births (WHO, 2015). Maternal deaths are almost always preventable, and most occur due to lack of health resources and from complications during and following pregnancy and childbirth. Skilled workers, increased healthcare funding, and improved access to care are needs in Honduras that have been addressed in their sustainable development goals and are being integrated into their national plan (Sachs et al., 2016).

Infectious Disease Transmission. One of the most important aspects of preventative health in regards to perinatal care is the prevention and treatment of sexually transmitted infections, such as HIV and syphilis. According to the Pan American Health Organization (PAHO), 12 million new infections of syphilis occur every year, with 3 million cases in Latin America and the Caribbean alone, and over 164,000 children are born with congenital syphilis (Gonzalez, 2010). In regards to HIV, 6,400 children are diagnosed annually, a majority via mother-to-child transmission (Gonzalez, 2010). Specifically in Honduras, the burden of HIV/AIDS is exhibited in the estimated 18,000 children orphaned due to AIDS and 32,300 HIV-positive individuals between 14 and 49 years old, with only 9,884 (0.3%) reported to be receiving antiretroviral therapy (CDC, 2017a). In 2010, the PAHO released a document with guidelines in order to improve the treatment gap and prevent transmission through low-cost, effective, and available interventions.

In 2010, the PAHO stated goals to reduce mother-to-child transmission of HIV to less than 2% and the incidence of syphilis to less than 0.5 cases per 1,000 live births (PAHO, 2012).

Goals for 2020 include less than 26,000 new infections of HIV (79% reduction compared to the 2014 baseline), less than 19,000 AIDS-related deaths (62% reduction from 2014), and less than 79,000 new cases of cervical cancer (5% reduction from 2014). These goals are all in order to “accelerate the progress towards the end of AIDS and STI epidemics as public health problems by 2030 in the region of the Americas” (PAHO, 2016, p. 19).

To meet the aforementioned goals, the updated PAHO plan of action states four strategies, including: 1) strengthened planning and stewardship, 2) strengthened processes for diagnosis, treatment and prevention, 3) expanded access to services, and 4) increased financing and sustainability of resources (PAHO, 2016). This strengthened stewardship and governance response to HIV and STIs must take place through the establishment and coordination among national and subnational levels (PAHO, 2016). In order to ensure effectiveness of these measures, longitudinal monitoring of HIV/STIs must be put in place, as well as the identification of transmission “hot spots,” with regular reporting guidelines to ensure the accountability and accuracy of data collection (PAHO, 2016).

Secondly, normative frameworks for the diagnosis, prevention, care, and treatment of HIV/STIs must be strengthened or updated to reflect current WHO recommendations (PAHO, 2016). Examples of strengthening this structure include standards for ARV-based therapies for pre- and post-HIV-exposure prophylaxis, sexual and reproductive health education, communication strategies and resources, STI screening and treatment, HIV testing, and harm reduction services for drug and alcohol dependency (PAHO, 2016). In three Honduran cities, the implementation of an HIV/STI prevention program of regular examinations and STI testing for female sex workers lead to a significant decline in the prevalence of syphilis from 2.3% to 0.0% and chlamydia from 6.1% to 3.3% as well as an increase in condom use from 93.8% to 98.8%

over a two-year time period (Tinajeros et al., 2012). Building upon these already effective interventions include specific recommendations such as early detection in identified “hot spots,” a universal treatment approach for initial antiretroviral administration, and combined management of co-infections such as TB, HPV, and hepatitis (PAHO, 2016).

Thirdly, the 2016 PAHO recommendations include expanded access to quality care via the perspectives of human rights, public health, and intercultural competence. The strategies are the integration of maternal and child health services with other clinical and psychosocial needs, such as addressing key population disparities and gender-based violence. Training curriculums should be updated for sustainability measures as well as expanded laboratory capacities to guarantee effective and accurate diagnoses and clinical monitoring of HIV viral loads and CD4+ counts (PAHO, 2016). Specific output goals of these measures include testing both pregnant women and exposed infants for HIV and syphilis, as well as treatment of HIV-positive women with ARVs and syphilis-positive women with antibiotics (Gonzalez, 2010).

Finally, the last line of action includes sustainability of resources through both funding of HIV/STI centers as well as medications and treatment options (PAHO, 2016). In Honduras specifically, the CDC implemented program of Vigilancia Centinela de las Infecciones de Transmisión Sexual (VICITS) have been working alongside the PAHO in their commitment to decrease transmission of HIV/STIs for the bettering of perinatal care and maternal outcome (CDC, 2017a).

Maternal Vaccinations. Vaccination is an important preventative measure in maternal health. Completion of recommended vaccinations should be promoted and accomplished preconception, during pregnancy, and postpartum. Regarding the formulation recommendations, the Regional Immunization Action Plan (RIAP), a subset of the Global Vaccine Action Plan, put

forth a general vaccination roadmap that was reaffirmed by the PAHO's Technical Advisory Group as beneficial for maternal and neonatal health (PAHO, 2017b).

In the preconception period, recommendations include a review of records to ensure the mother is up to date on all immunizations, especially the MMR vaccine (PAHO, 2017b). Timing of vaccinations is pertinent, with warnings against conception one month after any live vaccine (PAHO, 2017b). The human papilloma virus (HPV) vaccination is increasingly necessary as cervical cancer is the leading cause of cancer death among Latin American women (Perkins, Langrish, Cotton, & Simon, 2011).

Limiting the spread of HPV has tremendous potential to reduce cervical cancer rates, but up until recently, the HPV vaccine was not administered widely in Honduras due to lack of funding (Perkins et. al, 2011). In 2016, Gavi, a global vaccine alliance founded by the Bill and Melinda Gates foundation, granted funding towards administration of the HPV vaccine in government vaccination programs in Honduras (Gavi Vaccine Alliance, 2017). This has helped to reduce costs of vaccines in the country, allowing more people to receive the vaccine. Since girls and boys are recommended to receive the vaccine at a young age, gaining parental understanding of HPV and cervical cancer has been crucial to promote acceptance of the vaccine. Encouragingly, one study found that after education, 91% of 632 Honduran mothers surveyed said they would approve the HPV vaccination for their 9-year-old daughter (Perkins et. al, 2011). This positive reception is promising, and with adequate funding and education, the HPV vaccine has immense potential to decrease the rates of cervical cancer in Honduras (Perkins et. al, 2011).

During pregnancy, mothers are to receive the inactivated influenza vaccine, as well as the tetanus/diphtheria/pertussis vaccine if they were not vaccinated pre-pregnancy (PAHO, 2017b).

If community outbreaks of infectious diseases occur during pregnancy, women should be immunized for hepatitis A and B, yellow fever, inactivated polio vaccine (IPV)/oral polio vaccine (OPV), meningococcus conjugate, meningococcus polysaccharide (MPSV4), and a rabies vaccine after a high-risk exposure (PAHO, 2017b). Regarding follow up care, proper vaccination training should be given to postpartum and lactation health personnel, as education for the new mother and her infant is of extreme importance (PAHO, 2017b). Women who gave birth in non-institutional settings should be targeted, as they are at risk for not receiving proper follow up care (PAHO, 2017b).

Prenatal Care

An essential aspect of a healthy pregnancy is appropriate prenatal care (PNC). Maternal and neonatal health depend on a variety of screenings, assessments, and interventions. Modern evidenced-based medicine has led to detailed standards of care including, but not limited to, regular clinic visits with counseling and nutritional guidelines (Zolotor & Carlough, 2014). Honduran medicine has yet to adopt some of the practices of modern prenatal medicine, resulting in a higher rate of infant and maternal complications and mortalities (Milla, et al., 2007).

In *Disease Control Priorities in Developing Countries* (2006), Graham et al. discuss eight major conditions that affect maternal and perinatal deaths including hemorrhage, maternal sepsis, eclampsia, obstructed labor, unsafe abortion, low birth weight, birth asphyxia, and neonatal infection. Of these conditions, sepsis, eclampsia, low birth weight, and infection were risks associated with inadequate prenatal care (Graham et al., 2006). Although these perinatal complications are not specific to Honduras, this study gives a broad overview of common women's health disparities found in developing countries.

Neural tube defects are types of CNS malformations, commonly resulting from a lack of prenatal folic acid supplementation. In developing countries, neural tube defects (NTDs) are considerable factors for both childhood disability and mortality, causing 17-70% of neonatal deaths from birth defects (Blencowe, et al., 2010). A study found that of women who attended a PNC visit, 72.6% said a doctor had instructed prenatal vitamin usage; however, when specifically asked about folic acid, 68.6% of women had heard of it, but 44.5% reported that they had not received any (Milla, et al., 2007). Spiritual and superstitious practices played a role in perception of birth defects, as 23% of women who birthed an infant with a NTD reported that the cause was related to superstitious or mythical beliefs “such as watching an eclipse, laughing at people with disabilities, or the will of God” (Milla, et al., 2007, p. 343).

Researchers Price and Asgary (2011) assessed a variety of health indicators in women in Yamaranguila, Honduras. In the rural and resource-poor area, less than 60% of families have access to drinkable water. While most women attended primary school, 11% had no education at all. Of Yamaranguilan women, 94% reported a prenatal care visit at a local health center, and 70% reported that the PNC visit was in the first trimester. Eighty-five percent of women had four or more PNC visits. It was found that frequency of PNC visits was correlated with proximity to the health center. Therefore, the primary disparity noted by Price and Asgary (2011) concerning prenatal care was accessibility to care and proximity to medical help.

To a new mother, the extensive list of prenatal responsibilities and potential pregnancy complications is difficult to master without the consistent guidance of a health provider. Dansereau et al. (2016) interviewed 8,366 women across six Latin American countries, including Honduras. Demographic information including age, marital status, occupation, education, and income was collected as well as obstetric histories with 28% of women stating that their

pregnancies were unwanted. Thirty-four percent of women live within 15 minutes of a healthcare facility, but 22% live at least an hour away (Dansereau et al., 2016). One percent of women are insured. Compared to other Latin American countries, Honduran attendance of PNC visits was more consistent. The study found that 96% of women had attended at least 1 skilled or unskilled PNC visit, while 39% of women attended seven or more skilled PNC visits (Dansereau et al., 2016). In developed countries, women have 7 to 12 prenatal visits (Zolotor & Carlough, 2014). While most Honduran women are receiving some level of care prenatally, no research was found on the efficacy of a single visit, or the quality of education within that visit.

In contrast to numerous shortcomings, 96% of Honduran women are seen prenatally at least once in a medical context, a higher rate than its Latin American neighboring countries (Dansereau et al., 2016). However, Honduras still falls short in many arenas, specifically in frequency of prenatal care visits, leading to misinformation and inadequate care. Disparities in prenatal care in Honduran pregnancies plays a significant role in perinatal complication and deaths.

Delivery

It is estimated that in developing countries, two-thirds of maternal perinatal deaths and an even higher proportion of perinatal deaths of the child occur from the onset of labor to 48 hours postpartum (Graham et al., 2006). In the mother, hemorrhage and sepsis are the main causes of perinatal mortality and morbidity around the time of delivery. Low birth weight, asphyxia, and sepsis are some of the common causes of early neonatal mortality (Graham et al., 2006). In addition, poverty and inadequate access to health care likely contribute to poor labor and delivery outcomes in Honduran communities (Arps, 2009).

Postpartum hemorrhage is the number one cause of maternal death worldwide (Low et al., 2008). In fatal cases, death occurs within an average time-frame of two hours (Graham et al., 2006). Lack of resources appears to be the main contributor (Low et al., 2008). The administration of oxytocin post-delivery is universally recommended for third-stage labor management, and a study in a rural Honduran birth center demonstrated that oxytocin does reduce postpartum blood loss (Low et al., 2008). However, the clinic in this study did not have the funds to supply oxytocin regularly and was relying on oxytocin donations to adhere to the labor management guidelines (Low et al., 2008). Lack of blood transfusions is another factor contributing to postpartum hemorrhage mortalities in developing countries (Graham et al., 2006). The study by Low et al. (2008) demonstrated inadequate skills by the nursing staff in managing postpartum hemorrhage. Skills that were lacking included estimation of blood loss, bimanual compression, uterine massage, and inspection of the placenta. Lack of education and training are potential factors contributing to postpartum hemorrhage mortalities in Honduran care facilities.

While the direct factors leading to morbidity and mortality of both the mother and child at birth differ, lack of resources, education, and unskilled delivery attendants lie at the root of the cause (Graham et al., 2006). The high incidence of child and maternal sepsis is due to inadequate hygiene practices during delivery and insufficient knowledge about the warning signs of infection (WHO, 2016). Lack of access to intravenous antibiotics and the prevalence of congenital HIV infections are also significant factors (Graham et al., 2006). Birth asphyxia commonly occurs due to lack of fetal monitoring, poorly conducted labor, and the absence of neonatal resuscitation facilities (Graham et al., 2006).

More delivery complications occur as a result of births occurring outside of a healthcare facility (Graham et al., 2006). Not seeking medical care at the time of delivery is mainly linked

to poverty and perceptions about health care (Arps, 2009; WHO, 2016). One study demonstrates that in Latin America and the Caribbean, 50% of low income women give birth in their own homes (Montagu et al., 2011). In the poorest communities worldwide, the proportion rises to 90% (Montagu et al., 2011). When asked about reasons for not attending a birth facility, 68% of the women responded that it was “not necessary” (Montagu et al., 2011). Another group of researchers interviewed members of a community in Honduras to determine their perceptions of factors leading to maternal death at childbirth (Arps, 2009). Women complained about an unwillingness of healthcare providers in the community to help when complications arise. Many women perceived sorcery and witchcraft as the main factors influencing maternal mortality (Arps, 2009). These factors discourage women from seeking medical care during birth, resulting in many home births, often without a midwife (Arps, 2009). Poverty further contributes to home deliveries because many of the women who desire medical care at birth lack affordable transportation, live too far from a birth facility, or cannot afford health care (Arps, 2009; WHO, 2016).

Postnatal Care

Postnatally, vaccination of all children, including newborns, is crucial in the prevention of infectious disease and epidemics. In targeted risk groups, primarily children under the age of five, Honduras has a sustained vaccination coverage of over 90%, with freedom from polio since 1981 and measles from 1989 (Januzs, 2015). The Honduran Ministry of Health administers over 90% of all vaccinations. Vaccinations are primarily delivered in hospitals and in government-subsidized health centers in urban and rural areas (Januzs, 2015).

In the first 24 hours after birth, hepatitis B and BCG should be administered, in conjunction with a dosage of vitamin K (Janusz, 2015). At two, four, and six months of age,

children should be given doses of oral polio (OPV), pneumococcal conjugate 13-valent (PCV13), and Pentavalent. Pentavalent is a five-in-one vaccine including *Haemophilus influenzae* type B, hepatitis B, diphtheria, tetanus, and pertussis. At 18 months, children should receive MMR and DTaP, and boosters of OPV and PCV13. DTaP booster is given at 48 months (Janusz, 2015). Gavi also recognized Honduras for its excellence in achieving 98% coverage with the rotavirus vaccine within two years of its introduction at 2 and 4 months old (Janusz, 2015). In 2011, the total cost of these routine immunizations was \$32.5 million with the cost of one fully immunized child up to the age of one adding up to \$132 (Janusz, 2015).

Childhood Development

In low and middle-income countries, 43% of children do not fully develop physically, cognitively, psychologically, and emotionally (WHO, UNICEF, & World Bank Group, 2016). Underlying these developmental delays are causes such as poor health, malnutrition, insufficient medical care, and poverty (EWEC, 2015). Since factors influencing childhood development begin before conception, interventions to benefit childhood development must begin at family planning and periconceptional nutrition and persist to the child's school age years (WHO, UNICEF, & World Bank Group, 2016).

Current data shows that 23% of Honduran children under five experience stunted growth due to malnutrition (USAID, 2016). This proportion is greatly influenced by natural disasters such as droughts and flooding because the Honduran people are highly dependent on agriculture for sustenance. One and a half million face hunger at some point during each year (USAID, 2016), malnutrition is a serious hindrance to childhood development. One study demonstrates that stunting by the age of two or three results in cognitive deficits beginning at 9-24 months, lower school achievements, and more dropouts through age 18 (Walker et al., 2007). These

children showed decreased motor, social, and emotional development (Walker et al., 2007). Iron deficiency anemia due to malnutrition also influences cognitive childhood development and has a 29% prevalence in Honduran children under five (Walker et al., 2007; USAID, 2016).

According to the World Health Organization in 2017, there are not enough healthcare workers in Honduras to sufficiently meet the population's primary health care needs. Distance to a healthcare facility and socioeconomic status are the two main factors preventing children from receiving primary health care in Honduras (CDC, 2017b). Most health facilities are located in the developed cities, while the poorest people live in rural areas (CDC, 2017b, & USAID, 2016). Poverty and distance limit access to childhood immunizations and treatments of common illnesses such as otitis media, which can lead to chronic and life-threatening complications if left untreated (Walker et al., 2007). Even for those who can obtain access to health care, limited resources and skills of medical caregivers become a factor (Walker et al., 2007). Infections such as HIV, malaria, and helminth infections are common in underdeveloped countries and, without proper treatment, can lead to severe neurological impairments and developmental delays (Walker et al., 2007).

Childhood Nutrition

In Honduras, approximately 60% of the population lives on less than \$2 per day, resulting in food insecurity (Ben-Davies, et al., 2014). Food insecurity is defined as a "limited access to food or limited availability of food to promote a healthy and productive life." Associated risk factors include household size, maternal age, education status, and social support (Ben-Davies et al., 2017). Ben-Davies et al. surveyed caregivers in the state of Intibucá in rural Honduras, classifying each family by the severity of food insecurity as mild, moderate, or severe. With only 7% of participants reporting food security, 13% responded with mild food insecurity defined as

uncertain feelings and worry about the ability to satisfy familial dietary needs (Ben-Davies et al., 2017). Forty-two percent responded with moderate food insecurity (compromised dietary quantity and quality but sustained meal frequency), and 37% responded with severe food insecurity (interrupted eating patterns and socially unacceptable methods for obtaining food) (Ben-Davies et al., 2017). Of the 93% of families with some form of food insecurity, the most significant risk factor was shown to be maternal education, more specifically completion of primary school (Ben-Davies et al., 2017).

Food insecurity has been associated with growth stunting in school aged children, so addressing limited accessibility is a crucial step in addressing the severity of stunting in Honduras (Gray, Cossman, & Powers, 2006). With 38% of children in Honduras between ages one and six stunted in growth, Honduras is one of the most malnourished countries in the Western hemisphere (Morris, Flores, & Zúniga, 2000). School height censuses prove to be a valuable tool in identifying stunted growth patterns of children in communities, and the Honduran government now collects first-graders' height as an assessment of this problem (Morris & Flores, 2002). Using the most recent census as a baseline to statistically evaluate the potential outcomes of a nutritional intervention, researchers found that a geographically targeted intervention could help improve the severity of growth stunting (Morris & Flores, 2002).

A study by Rico, et al. (2001) researched associations between intimate partner violence (IPV) and childhood nutrition and mortality in several low-income countries, including Honduras. Intimate partner violence includes physical aggression, sexual coercion, verbal abuse, and controlling behavior with the impact of these behaviors altering childcare practices, child health, and family finances (Rico et al., 2001). Through surveys, researchers identified that 15.5% of Honduran women over the age of 15 had been victim to physical and sexual violence

(Rico et al., 2001). With data collected on children using the WHO child growth standards, authors concluded that there may be a relationship between IPV and child growth stunting in Honduras (Rico et al., 2001).

While widespread food insecurity is prevalent in Honduras, a contrasting problem is the increasing prevalence of metabolic syndrome (Villamor, et al., 2016). In 2016, Villamor et al. studied how adult metabolic syndrome in Latin American countries impacts school-aged children. Two hundred and forty families among eight different Latin American countries were surveyed and assessed for metabolic syndrome with the following measurements: waist circumference, fasting blood glucose, blood pressure, HDL cholesterol, and triglyceride levels. Metabolic syndrome was prevalent in approximately 38% of women and 34% of men. There was found to be a positive association between child metabolic risk score and metabolic syndrome diagnosed parents (Villamor et al., 2016). Not only can childhood malnutrition refer to caloric insufficiencies, but also unhealthy macronutrient proportions resulting in obesity and its comorbidities. These two extremes both contribute negatively to the health of the Honduran population and are opportunities for improvement.

Conclusion

The status of perinatal health care in Honduras is complex and multifaceted. Honduras has a unique history and culture, with a healthcare system different from that of the United States. Preconception education, preventative health, prenatal care, delivery, and childhood development are all important aspects contributing to perinatal health. While there is still room for growth, literature shows that within these categories significant improvements have been made. Continuing studies and research, as well as providing hands-on service, will help to improve health care and quality of life in Honduras. An outline of this research process and

design of materials intended to address perinatal health issues, including childhood nutrition, will be presented in Chapter 3.

Chapter 3: Methods

Introduction

As discussed prior, the leading cause of death in Honduras is perinatal conditions, defined by a lack of prenatal care, complications during birth, and inadequate postpartum care (PAHO, 2017a). Ramifications of perinatal complications impede both long-term childhood health and maternal health by increasing morbidity and mortality. Literature has shown positive outcomes associated with the provision of sexual health education including pregnancy and STI prevention, maternal health education regarding prenatal and postpartum care, and childhood health education regarding nutrition. In aligning with the literature, a needs assessment of Project Hope Clinic in El Cacao revealed the desire for the creation and distribution of educational materials.

A *Sexual Health* curriculum will be provided in powerpoint form to male and female teenagers ages 13-19, a *Maternal Health* curriculum will be provided in pamphlet form to pregnant women and current mothers, and a *Childhood Nutrition* curriculum will be provided via lesson plans to children ages 12 and under and in pamphlet form to current parents. As all three of these specific populations receive care at Project Hope Clinic, the goal of these curriculums is to address the underlying leading cause of mortality (perinatal conditions) from three different angles of prevention. This section will further address rationale for these resources, the specific populations targeted, the project plan and implementation, and educational tools created for Project Hope Clinic, as well as potential barriers to these three interventions.

Rationale for Project

The population of El Cacao, Honduras is not spared from the perinatal complications and disparities that are affecting the health of the entire country. Kaitlyn Mayerle, a representative of Adventure in Mission (AIM) helped outline the needs of the population and direct the rationale for our project. Kaitlyn is the daughter of Florence Mayerle, the founder of the organization. Kaitlyn has grown up in the El Cacao community and served in Project Hope Clinic since she was young. She highlighted some major areas of need in the community, some of them being education for pregnant women on safe and healthy pregnancy and education for teenagers about healthy relationships, safe sexual practice, and pregnancy prevention. We discussed the importance of targeting the teenage population with sexual education and the impact it can have on improving pregnancy outcomes. Safe sexual practice and emotional support through healthy relationships are important factors in healthy pregnancies. Since many in El Cacao become parents while still in their teenage years, it is important not to neglect the adolescent population. Through our teen education materials, we aim to raise awareness of safe sexual practice and the importance of healthy relationships in the outcome of mother and child health.

Kaitlyn also mentioned the need for support in their new feeding program to improve childhood nutrition. Specifically, by providing an educational curriculum for the community's weekly children's program, our goal is to provide a fun, interactive tool for the kids to learn more about health and nutrition.

Our community service project will focus on sexual education, family planning, pre- and postnatal care, and childhood nutrition in the community of El Cacao, Honduras. Through the distribution of educational resources, we hope to have a lasting effect on the community by

improving awareness of harmful perinatal conditions and how they can be prevented, as well as by improving the community's knowledge regarding childhood nutrition.

Population

The Project Hope Clinic is a branch of a non-denominational Christian ministry called Adventure in Missions (AIM). The goal of AIM is to “bridge the gap between North Americans and the needy and neglected of Honduras,” through “preaching, teaching, building, and healing” (Our Mission, n.d.). Project Hope Clinic specifically serves the Spanish-speaking community of El Cacao, Honduras. While the rural town of El Cacao has no existing data concerning socioeconomic demographics, Kaitlyn Mayerle of AIM states that a majority of the population lives below the poverty line. Many have unhealthy relationships or unsafe sexual practices accompanied by a lack of quality prenatal care. The lack of financial means and inconsistent contact with a healthcare provider can result in a plethora of health issues for mothers and children.

Education materials will be targeted towards patients that attend Project Hope Clinic and children and parents present during the education sessions in the schools. Specifically, the materials are targeted towards pregnant women, male and female teenagers over the age of 12, and children 12 and under as well as their parents. No other inclusion or exclusion criteria will be used. Any patient entering Project Hope Clinic or at the education sessions that would like to receive information on prenatal health, sexual education, or childhood nutrition will be able to receive that information. Although this information will not be withheld from any individual requesting it, those who do not visit the Project Hope Clinic, do not attend the education sessions, or whose children do not attend the education sessions at the schools will not receive the educational materials.

Project Plan and Implementation

The project plan is the provision of educational materials for three specific groups of people: teenagers, pregnant women, and children under the age of 12. These populations in the community of El Cacao, Honduras were identified through a needs assessment to be both accessible and receptive. All materials were prepared through collection of relevant literature reviews and discussion with local missionaries for culturally relevant information. The curriculum was prepared in both brochure and powerpoint form for a variety of potential presentation styles, seminar-style or individualized, to be available for use at the clinic.

Based on extensive research discussed in our literature review, Honduras has a high rate of young motherhood in comparison to other Latin American countries which has been correlated to increased maternal and child mortality and health risks. Education for teenagers in El Cacao will take place through a curriculum entitled *Sexual Education*, which addresses healthy sexual practices, pregnancy prevention, and decision-making. Due to underlying societal issues of male dominance in sexual decision making, literature has shown that men must be targeted to promote gender equality and allow for open communication between partners (Speizer et al., 2005). To further empower women, we provided information regarding contraceptive methods and available prenatal and sexual health services at Project Hope Clinic.

We created a curriculum for pregnant women and mothers regarding preconception, prenatal, and postnatal care to reduce mortality and complications of the perinatal period. Specific goals have been created by the Pan American Health Organization regarding strengthened processes for diagnosis, treatment, and prevention of sexually transmitted diseases as well as expanded access to services. In adhering to these guidelines, our *Maternal Health* curriculum for pregnant women in El Cacao focuses on sexually transmitted disease education,

vaccination sequences, proper nutrition, and appropriate clinical visit timing. With continued accessibility to these materials and services at Project Hope Clinic, women will be empowered through education regarding best care for their bodies and potential future pregnancies.

Due to relevant research in the literature linking physical, cognitive, psychological, and emotional developmental delays to malnutrition, we designed the *Childhood Nutrition* educational materials to address this problem among Honduran children. Because of the younger age of the children attending the clinic's children's program (4-12 years old), these materials were presented in a way that was both fun and informative, in the form of small lessons and educational games. With an increasing prevalence of metabolic syndrome, the curriculum focuses on increasing fruit and vegetable consumption and healthy decision making. An informational pamphlet emphasizing health needs of various age groups, ranging from infancy to adolescence, was distributed to the children at the children's program to give to their parents.

While specifically targeting these three populations, all resources created are currently and will continue to be available to Project Hope Clinic for any individual who may be interested in *Sexual Education, Maternal Health, or Childhood Nutrition*. Any visiting groups serving at Project Hope have access to present these materials as needed.

Project Tools

Several educational tools were created after consideration of the community's needs in conjunction with review of relevant literature. Materials were written in Spanish and proofread by Florence and Kaitlyn Mayerle, both proficient in Spanish grammar and construction. They confirmed that our materials will be easily understood by the educators who will be teaching the material and by the population in El Cacao who will be receiving it.

A sexual health powerpoint (Tool 1) was created to be presented to both male and female participants in the schools for 5-8 graders. This tool focuses on healthy relationships, equality in decision making, and basic reproductive education. It also outlines methods of pregnancy prevention and touches on STIs. This tool was designed to be a resource that can be presented either by classroom teachers or by volunteers from Project Hope Clinic. AIM has access to a computer and projector that can be used by volunteers or staff at the school to present powerpoint presentations.

A maternal health pamphlet (Tool 2) was created to be given to any women who comes into clinic either pregnant or seeking to become pregnant. The pamphlet walks through different recommendations for care before conception, during pregnancy, and after delivery. Serving as a basic outline, this pamphlet will be supplemented by further discussion with clinic staff, leaving room to answer questions and create individualized care.

In regard to children's nutrition, a lesson plan was created with the intention for implementation at neighboring schools and the clinic's children's program. This lesson plan includes a variety of games that are fun and related to nutrition, followed by a short teaching on how children can make healthier choices. Upon their departure, a pamphlet in Spanish will be provided for the children's parents that outlines basic health needs for a variety of age groups, along with contact information for the Project Hope Clinic. The lesson plan (Tool 3) and the pamphlet (Tool 4) are attached.

The attached tools are available for use by the Project Hope Clinic staff to provide information on sexual health, maternal health, and childhood nutrition. Specifically, the maternal health and childhood nutrition pamphlets can be used to provide education to in-clinic patients that either have children or are planning on having children. Project Hope Clinic has many

missions groups and volunteers that come along-side of them to serve the community throughout the year. These groups will be able to use the sexual health powerpoint and the childhood nutrition lesson plan to educate the community on these important issues. Although there is no scheduled educational sessions set in place, the clinic and its volunteers will be able to use these resources at their convenience. Our hope is that the education and resources we provide will serve as building blocks in improving the long-term well-being of those in the community.

Potential Barriers to the Project

A significant limitation to our project was the language barrier, which presented the biggest challenge when it came to designing educational materials because of the translation process. With the language barrier comes the potential for miscommunication if our materials were not adequately translated from English to Spanish. It is possible that the intended messages took on a different meaning once they were translated, and were misconstrued by the intended population.

The cultural barrier also presents as a limitation to our project. While we have identified multiple factors that contribute to health disparities in Honduras, we must consider cultural factors in order to make a difference. For example, many women attribute superstitious beliefs as reasons for birth defects (Milla, Flores, Mayes, & Rosenthal, 2007, p. 343). These beliefs are inconsistent with the etiologies of our education, which points to health factors such as nutrition and prenatal vitamins as preventing defects. We are not personally familiar with all of the cultural pressures contributing to women becoming pregnant in their teenage years, yet our project aims to prevent teenage pregnancy. In some aspects, our curriculum might be portrayed as insensitive and be ineffective given that our interventions are for a group of people who do not possess the same worldview and cultural experience.

Another potential problem involves the sustainability of the educational curriculums. We are aware that making a lasting change is difficult without the ability to follow up and encourage the recipients long-term. Unfortunately, much of the sustainability of our curriculum is out of our control. It depends on how it is utilized by the clinic and to what extent it may change views and behaviors in the community.

Conclusion

Through the analysis of literature and communication with Project Hope Clinic regarding population needs, educational interventions were formulated to address the morbidity and mortality surrounding pregnancy in Honduras. Specifically, the creation of these educational materials was done for three populations: teenagers regarding pregnancy and STI prevention, pregnant women and mothers regarding maternal health and prenatal care, and children 12 and under regarding nutrition. The implementation of these materials was carried out by both visiting teams and Project Hope Clinic staff, with the following chapter discussing this specific process and its outcomes.

Chapter 4: Discussion

Summary of Results

Both literature review and needs assessment demonstrated evidence of health disparities that exist in the areas of perinatal care and childhood nutrition in Honduras. Lack of prenatal health care, birth complications, and lack of postnatal care leave room for maternal and infantile illness with many of these conditions being preventable (Graham et al., 2006). Children can also experience malnourishment due to lack of food security and lack of knowledge on proper diet (Ben-Davies et al., 2017). Research also demonstrated the ability of education to improve perinatal conditions and childhood malnutrition (Perkins et al., 2011).

In a needs assessment with Kaitlyn Mayerle, a doctor and team member of Project Hope Clinic, she stated that in the targeted population many women become mothers at a young age. Research identified that young maternal age, lower economic status, limited access to healthcare, and lack of prenatal education are all risk factors that increases a mother's chance of pregnancy complications for the mother and the neonate (Samandari & Speizer, 2010). Through reviewing the literature, it became apparent that a positive correlation exists between healthy pregnancies and healthy sexual relationships (Speizer et al., 2005), specifically, when women are given the ability to make reproductive decisions in these relationships, less unwanted pregnancies occur (Speizer et al., 2005). This research collaborated with Kaitlyn's identification of a lack in the quality of sexual health education in Honduran schools, deeming necessary the development of a sexual health curriculum.

Kaitlyn also described the need for other educational interventions regarding nutrition in the town of El Cacao. She has observed first-hand the negative impact of health disparities among the people in her community. For example, a young patient and friend of the clinic, Jenny, is extremely small for her age and behind on her growth curve. As the family does not always have the money for food, Jenny's health suffers--a finding consistent with the food insecurity prevalent among in the El Cacao community. Our research also indicated that children in Honduras are at an increased risk for stunted growth due to malnutrition (USAID, 2016). While the economic aspect of food insecurity could not be addressed through our project, educating parents on the importance of childhood nutrition can effectively address one facet of the problem (Perkins et al. 2011).

This project focused on bridging the educational gaps that existed in the community of El Cacao regarding perinatal conditions, sexual health, and childhood nutrition. Educational

materials were created for implementation by Project Hope Clinic and distributed by volunteers from Minnesota who traveled to Honduras. Due to the educational nature of this project, no tangible data could be collected to quantify results; however, preliminary results are discussed below from the observational experience of volunteers and Project Hope staff. Although confirmed that resources were received and education was given, we cannot validate their long term effects on the population as the distribution took place over a one week period of time. Discussion below includes resource implementation and summarized results for the three targeted populations.

Maternal Health. A maternal health pamphlet in Spanish was created highlighting recommendations for a healthy pregnancy. Two-hundred and fifty copies were printed and given to Project Hope Clinic in a reading level accessible to the majority of patients who visit for care. A digital copy was left for future distribution as needed. Regarding efficacy of materials, one volunteer was able to conduct a prenatal visit with Kaitlyn for a first-time mother. The patient was educated on proper prenatal nutrition and vaccinations, and was encouraged to come back for following prenatal visits. The information was presented using a teach-back method, affirming that she understood further recommendations for a healthy pregnancy. As she left the clinic, she was given the maternal health pamphlet to summarize the points of education and encourage follow up. The patient confirmed that she understood the pamphlet she received, and that she would return to the clinic for further visits. This visit was noted as successful and can hopefully serve as an accurate model of future perinatal care that will continue at the clinic.

Sexual Health. A sexual health educational tool was prepared and distributed to the clinic in powerpoint format, highlighting the basics of sexual health for 5th-8th graders. Two gender-specific resources were created in Spanish and distributed to the clinic in powerpoint

form for sustainability and continued use. For the most culturally sensitive presentation, these tools were presented by clinic workers familiar with the area in local schools to conduct a sexual health program. Kaitlyn Mayerle reported a successful presentation through utilization of the powerpoint presentation, and described student receptiveness to the information that she believes will have a lasting effect.

Childhood Nutrition. A childhood nutrition lesson plan was developed with three games appropriate for ages 5-11 with the goal of highlighting unhealthy and healthy food and lifestyle choices. The lesson plan, as well as materials to execute the games properly, was distributed to the clinic for use in local schools. While in Honduras, the volunteers working with Project Hope Clinic conducted the childhood nutrition program three times at three different schools with both educational games and brief discussion. A childhood nutrition pamphlet was also created to increase awareness for children and parents on proper food intake throughout the lifespan. The pamphlet was created using information from peer-reviewed literature. It was edited by Florence and Kaitlyn Mayerle, associates of Project Hope who are fluent in both Spanish and English, as well as familiar with the culture of our target population. Two-hundred and fifty pamphlets were printed and given to the clinic with a digital copy for future use. After implementation of the lesson plan, each student was given a pamphlet to take home.

Through student knowledge before and after games were played, efficacy of nutritional education was observed by volunteers. For example, during one of the games, “Would You Rather?” kids were lined up in the middle of a field and asked to run to the side that correlated with their favorite of the two given options. With each of the choices (i.e. Coca-Cola vs. milk, tortillas vs. rice, watching TV vs. playing soccer), there was a specific health-related outcome in mind to discuss. After each round, the implications of the choices were discussed, as well as the

nutritional or physical benefits from healthy decisions. A closing discussion allowed for a summary of nutrition information and final questions regarding healthy versus unhealthy foods. While difficult to fully understand how much of this knowledge will affect behavior, volunteer observations indicated a stark difference in initial preference compared to end knowledge. After the nutrition lesson, at a youth event it was noted that several children turned down Coca-Cola, stating it was not healthy.

Findings Related to the Literature

Through volunteer experience and action in El Cacao, observational data showed how the literature studied was evident in the community. In general, a lack of healthcare access was noted; many patients travel hours by foot to visit Project Hope Clinic. The non-profit makes services available at such a low fee that cost is rarely a barrier. It is meeting a great need in a country that often leaves rural areas such as Cacao without any healthcare access. This pointed to what was found in the literature: Honduras has an inefficient system that focuses on curative rather than preventative care, often at costs many people cannot pay (PAHO, 2012).

In interacting with the clinic staff and patients, it was found that most women in the community give birth in their homes and never access healthcare during their pregnancy. This raises risk of perinatal conditions significantly. This concurred with literature findings, and supported the prevalence of perinatal conditions as the leading cause of death in the country (PAHO, 2017a). Of the perinatal conditions, sepsis, eclampsia, low birth weight, and infection were risks associated with inadequate prenatal care (Graham et al., 2006), making it evident that prenatal care is a crucial part of preventing maternal mortality, and is lacking in Honduras. This was confirmed at the clinic, as few women access recommended prenatal care.

Education is a crucial factor when trying to prevent perinatal conditions. Our project focused heavily on education, and observations in El Cacao supported the need for quality learning. Two of seven days during the trip, classes at the local school were canceled because of failure of teachers to arrive. The sexual education program that was conducted was the first sexual education that the cohort had ever received. These findings supported the great need for improved education, especially because of the correlation that education has with mother and child health (Speizer et al., 2005).

Observations by volunteers were consistent with much of the literature on childhood nutrition. As previously mentioned, the clinic is frequented by an eight-year-old girl, Jenny. The clinic has observed that she is stunted in growth, and it is suspected that this is due to her family's food insecurity. Research showed that growth stunting due to food insecurity is a problem in Honduras (Gray, Cossman, & Powers, 2006). However, because of either limited resources or problem-focused visits, volunteers did not assess growth in the clinic setting. Remote clinics did not have the tools to measure height. Additionally, there were no children presenting for well-child visits, which is when growth assessments take place. Most pediatric visits were due to infectious disease. Due to a lack of growth curve data in-clinic, the volunteers only witnessed evidence of growth stunting by observation.

Another observation that was addressed in the research was the increasing prevalence of metabolic syndrome and diabetes in Honduras that begins in childhood (Villamor et al., 2016). Many patients that were seen in clinic had symptoms of advanced and uncontrolled diabetes. The clinic runs a full time wound care office due to a high incidence of diabetic ulcers in the community. The dietary factors that lead to lifelong health issues like diabetes were addressed through the childhood nutrition program.

Limitations

One of the biggest limitations of the project is whether the materials will reach the intended population. The volunteers handed the child nutrition pamphlets out at the schools after the program and instructed them to give the pamphlets to their parents. Some of the children were too young to read and process the information contained in the pamphlets, so in order for the health education to be effective, their parents must receive the pamphlets. Ideally, the volunteers would have been able to give the pamphlets directly to the children's parents, but most parents were not present with their children at the school, so they had to trust that the children would give them to their parents. Getting the childhood nutrition pamphlets to the parents has great potential to impact the health of the community because if they are able to learn what foods are good for their children, they can intervene by making better choices regarding the food served within their homes.

Another limitation to the project involves the varying ways the educational materials may be presented and received by the intended population. It is encouraging that many different volunteers do work with the clinic in El Cacao, however education outcomes may vary from intended objectives based on the volunteers who are presenting. The hope is that variations in presentation style and interaction with the population are not significant enough to change the intended goals of the education programs; however, whether or not this will occur remains uncertain. If the volunteers follow the curriculums and teaching points laid out in the powerpoints and lesson plans, the education received by the population has the potential to greatly impact the health of the community.

A major limitation of this project deals with the consideration that lack of education is only one facet of these health disparities in Honduras. While our educational materials are able to

have a significant impact on the health of the community, they do not address other factors leading to morbidity and mortality such as financial concerns or physical barriers to healthcare access. For example, volunteers taught the children the necessity of eating more fruits and vegetables. However, many families only have enough money to eat corn tortillas and beans, and they could not purchase the foods recommended to them even if they wanted to. In addition, prenatal care encouraged in the maternal health pamphlet may be difficult for mothers who live far from the clinic and do not have a means of transportation. For these reasons, education materials were targeted for the circumstances of the majority of the people in the community, with volunteers offering practical ways for the population to make the intended health interventions.

Further Projects

Regarding the future application and modification of this project, evaluation of both limitations and successes is important to determine areas of improvement. Limitations have been discussed previously, including access to materials, community reception to the materials, and the ability to only address one aspect of the multifaceted disparities in perinatal care and childhood nutrition. The volunteers who presented the information noted that the materials were successful in addressing the lack of education regarding nutrition, perinatal care, and sexual health. The ease of presenting and widespread applicability allowed for important educational outcomes to be met.

For future application, this project is fairly transferable to different cultural populations with only a few specific changes. Although these materials were created specifically for Project Hope Clinic in El Cacao, similar health disparities exist not only across Honduras but across other cultural boundaries as well. In transferring these materials to other populations, it would be

important to coordinate with partner clinics--specifically in regards to prenatal care--in order to provide the most accurate information for access to care and recommended visits. Regarding nutrition, it would be necessary to identify culturally-specific access to food and nutritional concerns in other populations. For the sexual health information, it would be necessary to communicate with the individuals who would be presenting in order to determine both the age and accessibility to resources of the population.

In the future, it could be beneficial to make further resources for specific age groups within the childhood nutrition program. While the brochure was targeted for ages 0-18, the games and presentation were targeted towards elementary-aged children. In the future, this presentation could be expanded to provide further educational outcomes to parents of toddlers and older children. Further dividing these areas would allow for greater conversation, not only regarding malnutrition but also regarding the importance of age-group specific exercise.

After feedback from the volunteers who delivered the materials, continuation of this project is fairly simple as Project Hope Clinic now has access to all of the materials. The sexual health information is able to be continually presented in schools as opportunity presents. The prenatal brochures were left at the clinic to be distributed during preconception and prenatal visits, with the clinic having the ability to make copies from the digital file. The childhood nutrition program brochures and resources were left at the clinic for continued presentation if other groups of volunteers visit the clinic. With these considerations in mind, there is exciting potential regarding the reception of these resources thus far at Project Hope Clinic and in continuation and expansion of this project.

Conclusion

Honduras is a developing country with the leading cause of mortality being perinatal conditions (PAHO, 2017a). Evident in the literature, several contributing factors to this high mortality rate include lack of resources, an inadequate healthcare system, and lack of education on the importance of perinatal care. Although many of the perinatal conditions are preventable, the current healthcare system is highly focused on curative treatment rather than preventative care.

After performing an in-depth literature review on the health status of Honduras and conducting a needs assessment with Project Hope Clinic in northern Honduras, the need for improved perinatal care education in the community was identified. The three specific resources deemed necessary to improve outcomes regarding perinatal care included a sexual health powerpoint, maternal health pamphlet, and childhood nutrition pamphlet. These materials were delivered to the clinic and implemented by volunteers. Our project faced obstacles such as cultural and language barriers and potential lack of sustainability. However, a significant portion of the educational material was implemented by clinic workers who are fluent in Spanish and are a part of the El Cacao community. To improve sustainability of education, the resources were provided in digital form for future distribution.

Throughout this project, we learned the power that education can bring to a population with great health deficits, specifically in regards to preventable complications surrounding pregnancy and birth. While at times the lack of perinatal care seemed like an overwhelming obstacle to tackle, hearing about the impact that was made on individual's lives through the resources was encouraging. While this project only took into consideration three facets of the broken Honduran healthcare system, hearing feedback from volunteers regarding the initial

success provides hope for long-term sustainable change. Education is best received in the context of relationship, and we are grateful for our partnership with Project Hope Clinic that allowed for the resources to be delivered in a way that was meaningful and sustainable.

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