

ASSESSING THE EFFECTIVENESS OF AN EDUCATIONAL INTERVENTION REGARDING
PRENATAL CARE IMPORTANCE, PREGNANCY LIFESTYLE, AND BREASTFEEDING IN
WOMEN ATTENDING THE REFUGE INTERNATIONAL CLINIC IN SARSTUN,
GUATEMALA

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ABSTRACT

During spring of 2018, a group of UT Southwestern physician assistant, clinical nutrition and medical students partnered with Refuge International (RI), a non-profit organization, to go on a week-long medical mission trip to provide health care and education to the rural areas of Guatemala. Guatemala has one of the highest infant mortality rates in the world and based on a needs assessment project performed in Sarstun, Guatemala, a large deficit in prenatal care knowledge was identified. We conducted an educational intervention on prenatal care to include prenatal care importance, pregnancy lifestyle recommendations, and breastfeeding importance. The intervention consisted of a brief pre-test assessing baseline prenatal care knowledge, a direct educational intervention tailored around the questions of the pre-test, and a post-test survey, which was used to assess the effectiveness of the intervention. We surveyed 48 women attending the same RI Health Clinic. Results indicated a significant increase in knowledge on the topics of prenatal vitamins ($p=0.000$), prenatal visits ($p=0.0078$), what foods to avoid while pregnant ($p=0.007$), what foods help your baby's brain grow ($p=0.002$), and breastfeeding guidelines (0.0023). Based on these results, future educational interventions on prenatal care and other topics would prove to be greatly beneficial in this population.

INTRODUCTION

Per the World Health Organization (WHO), 99% of all maternal deaths occur in developing countries and maternal deaths are higher among women living in rural areas and poorer communities.¹ The majority of these deaths are attributed to postpartum hemorrhage, infection, unsafe abortion and eclampsia. The WHO reports that unavailable, inaccessible, unaffordable, or poor quality of prenatal care contributed to these cases.¹ This is why skilled care before, during, and after childbirth can save the lives of women and newborns.¹ In 2015, only 40% of all pregnant women in low income countries had the recommended prenatal care visits. Improving maternal health is one of WHO's key priorities.¹ Prenatal care visits should be maintained throughout pregnancy and the benefits of adherence have shown to decrease incidence of complications such as neural tube defects, anemia, premature labor, infectious disease and improved child/maternal mortality.⁶ Along with regular prenatal visits, lifestyle changes play an important role in a safe and successful pregnancy. On top of prenatal vitamins, women should include food sources that are high in iron and folate as well as avoid foods that could potentially be harmful to their pregnancy. Lastly, it is highly recommended to exclusively breastfeed for the first 6 months of a newborn's life and continue supplementing through 2 years or beyond.⁷ There are benefits of breastfeeding for both mothers and children in developing countries, namely Guatemala, including the reduction of child mortality, gastrointestinal (GI) infections, and mothers' development of hypertension (HTN), diabetes, cardiovascular disease, and breast/ovarian cancers.

Guatemala has among the highest maternal and infant mortality rates in Latin America. The infant mortality rate is 30 deaths⁴ at 20 week gestation or greater per 1,000 live births and fetal deaths, compared to the rate of 6 in the United States⁵. A study performed by Garcia,

“Teaching Guatemala Midwives about Postpartum Hemorrhage,” was aimed to evaluate the effects of culturally sensitive teaching on midwives’ traditional nursing knowledge regarding the interventions to treat and prevent postpartum hemorrhage.³ In this study, sixteen midwives participated in an educational intervention at the Refuge International (RI) clinic in Sarstun, Guatemala using a pre- and post-test design. The results indicated that the educational intervention improved traditional midwives’ knowledge and skills regarding interventions to manage postpartum hemorrhage. This educational intervention benefitted the same population that we targeted with this prenatal educational intervention and had a similar beneficial result.

In 2017, a physician assistant student (P.Burnett) led the project, “Assessing the Knowledge, Attitudes, and Barriers to Prenatal Care in Women attending the Refuge International clinic in Sarstun, Guatemala.”² Results from this study indicated that 75% of the 23 women surveyed attended 2-4 prenatal visits while only 25% attended more than 5 prenatal care visits. Of the women surveyed, 35% reported that they have experienced 1 or more miscarriages in their life. Among the 4 women who did not believe that a woman should seek medical care while pregnant, only 1 (25%) received prenatal care while pregnant. Among the 15 women who believed that a woman should seek care while pregnant, 13 received prenatal care while pregnant. Knowledge of importance of receiving prenatal care was found to have a significant association with receiving prenatal care ($p=0.37$). Of the women surveyed, 30% believed that there was nothing a woman should avoid throughout her pregnancy. When asked what the pregnant woman would do if she were to develop signs and symptoms of a miscarriage, 43% of the woman stated they would go to a hospital while the other 43% stated that they would do nothing. When asked who they seek pregnancy advice from, 43% stated they would seek advice from their parent or relative while 43% stated they would seek pregnancy advice from a

healthcare professional or midwife.² This project was designed to directly address the gaps in knowledge and awareness identified in the needs assessment.

METHODS

Setting

The setting for this project was a RI Health Clinic set up in the rural area along the Sarstoon River, at the border between Guatemala and Belize. RI is an American non-profit organization founded by nurse practitioner Deborah Bell in 2001, with the goal to provide clean water, health care, and education to the people of Guatemala (<https://refugeinternational.com/>). RI has set up 4 clinics throughout Guatemala and one in Texas that it uses to host regular medical mission trips every year. The clinic in Sarstun, which served as the site of this project, is one of the most remote locations and serves the community with some of the poorest health situations and limited health resources.

Sarstun is a small fishing village that resides on Sarstoon River, the southernmost border between Guatemala and Belize. It can only be accessed by a 2-hour boat ride from Puerto Barrios, a port town which is 8-hour bus drive from the centrally located Guatemala City. Puerto Barrios serves as one of the nearest sources of medical care for the community should anything happen that needs higher level attention.

The village is in the Izabel Department of Guatemala and consists of the clinic, a school with 2 teachers whose salaries are paid for by RI, a small mart for food and supplies, and the surrounding homes. The clinic is a 3,000 square foot, two-story building with 6 examination rooms, a pharmacy, surgical suite, post-op room and showers on the first floor. RI has also drilled a clean water well for the community which has been crucial in reducing water borne illnesses.

The RI Health Clinic services all patients in the surroundings homes and villages. Patients that attend the clinic arrive by foot or boat to be seen for their medical concerns. Some patients come from distant mountain villages.. Medical mission groups are sent approximately 4 times per year, consisting of physicians, physician assistants, nurse practitioners, nurses, and various healthcare students to provide both medical and surgical care to patients attending clinic.

Participants

The inclusion criteria were female patients, ages 18 years or older, attending the RI Clinic, and willing to participate in the voluntary study. Exclusion criteria were male patients, females under the age of 18 years, and unwillingness to participate in the voluntary study.

Intervention

Throughout the study, we surveyed 48 local women at the RI Clinic using a 9-question pre- and post-test to assess the effectiveness of a direct educational intervention on the prenatal care knowledge in the women of the Izabel Department of Guatemala.

The educational intervention included information on prenatal care importance, pregnancy lifestyle recommendations, and breastfeeding importance. During triage at the Sarstun clinic, women were screened for inclusion criteria and asked at the sign-in table whether or not they would like to voluntarily participate in a prenatal care intervention. The women were informed that their decision to participate would not impact their care given at the clinic. Once a woman verbally agreed to participate in the prenatal care intervention, she was handed a card with a number. This number corresponded with her pre and post-test and did not include any personal identification information. The first woman had number 1, the second woman had number 2, and so forth. Approximately 2-3 women were gathered at a time for the intervention, which lasted no longer than 15 minutes. The teaching intervention was done verbally with the

use of Spanish and Ke-chi translators as needed. See appendix A for educational intervention and appendix B for pre-/post-test in English.

Survey Measures

The pre- and post-test were designed to evaluate knowledge targeted in the content of the educational intervention. The pre-test consisted of 4 demographic questions and 5 additional questions to test the existing knowledge of the women on the importance of prenatal care, pregnancy lifestyle recommendations, and breastfeeding. Content of the survey came from literature review on the topic and Based on the results of the project, “Assessing the Knowledge, Attitudes, and Barriers to Prenatal Care in Women attending the Refuge International clinic in Sarstun, Guatemala.” The demographics section included information on age, age at first pregnancy, total number of pregnancies, and how many pregnancies prenatal care was received. The survey questions contained information to assess the woman’s base knowledge on prenatal care information. Women were asked when they should begin taking prenatal vitamins and at what time during a pregnancy they should have their first prenatal visit. In regards to diet, they were asked what foods they should avoid and what foods they should eat during pregnancy to help the baby’s brain grow. An additional question about breastfeeding asked whether they knew for how long they should breastfeed their child. The post-test was identical to the pre-test and was administered following the teaching intervention to evaluate the effectiveness of the training session. The pre and post-test were written in English and Spanish and administered using Spanish and Ke-chi translators.

Data Analysis

Responses were analyzed using Survey Monkey and STATA 14.0. Frequencies and percentages were used to report demographics and prenatal care knowledge. McNemar tests

were conducted to determine significant changes in knowledge before and after the educational intervention.

RESULTS

Demographics

Demographic characteristics are reported in Table 1. During our 2-week survey, 48 women agreed to participate in the survey. Half (50%) stated they were between the ages of 18 and 29. Of the remaining women, 23% were between the ages of 30 and 39, and 27% were 40 years or older. Of the women that had at least 1 pregnancy a majority reported their first pregnancy between the ages of 15 and 20 (49%). Out of the remaining women, 28% reported their first pregnancy between the ages of 21 and 25, 21% reported their first pregnancy between the ages of 12 and 15, and 2% had their first pregnancy at 26 years or older. Over half (60%) of women had 1 to 3 pregnancies, while 40% had 4 or more pregnancies in their lifetime. A majority (63%) of women had received prenatal care during all of their pregnancies, while 37% had not received prenatal care during all of their pregnancies.

Prenatal Care Knowledge

Pre- and post-test knowledge results are reported in Table 2. When asked when a woman should take prenatal vitamins, 31% of the women who completed the pre-test answered correctly that they should take them before, during, and after pregnancy while breastfeeding. Following the intervention, this number increased to 69% of the women answering correctly ($p=0.000$). On the pre-test, 75% of the women stated correctly that they should have their first prenatal visit during the first trimester, which increased to 92% on the post-test following the intervention ($p=0.0078$). When asked about what foods to avoid during pregnancy, on the pre-test 40% answered correctly to avoid raw meat and eggs. This number increased to 71% on the post-test

following the intervention ($p=0.007$). On the pre-test, a majority of the women (63%) correctly selected all food items listed (papaya, corn, green leafy vegetables, beans), which help a baby's brain grow. After the intervention, on the post-test this number increased to 83% ($p=0.002$). Only 23% of the women surveyed on the pre-test answered correctly that they should breastfeed their child exclusively for 6 months, and to continue for at least 2 years. Following the intervention, this number increased to 50% on the post-test. ($p=0.0023$)

DISCUSSION

The purpose of this project was to assess the effectiveness of an educational intervention regarding prenatal care importance, pregnancy lifestyle, and breastfeeding in women attending the RI clinic in Sarstun, Guatemala. Our results showed a vast improvement in their overall knowledge of prenatal care, with significant increases in knowledge of prenatal vitamins ($p=0.000$), prenatal visits ($p=0.0078$), what foods to avoid while pregnant ($p=0.007$), what foods help your babies brain grow ($p=0.002$), and on breastfeeding guidelines (0.0023).

In the Guatemalan culture around Sarstun, women were more inclined to ask about prenatal advice from their mothers, aunts, midwives and elders. We found that over one-quarter of the women surveyed (27%) were over the age of 40, and since they were less likely to get pregnant in the future, we are hopeful that they will pass down the information gained during their intervention to future generations. While it would shock most in America, it is common for women in their young teens to become pregnant for the first time and as mentioned above are very likely to go to their family members and elders for prenatal advice. We wanted to target this group with hopes of improving. We found that a majority of women had their first child before the age of 20, and with higher incidences of multiparous women, they are having subsequent children at younger ages as well. Our demographic data showed that only 63% of women

received regular prenatal care during all of their pregnancies. Factors that contribute to this include the lack of access to regular obstetric care, cost of visiting a clinic on a regular basis, traveling from the villages to a clinic or on a boat to Puerto Barrios, and lack of necessary resources such as no ultrasound equipment at the RI clinic.

When compared to the results of the study by Garcia, our outcomes showed similar efficacy. In the Garcia study the mean score on the pre-test was $1.385 \pm \text{SD } 0.870$ (1-3) and the mean post-test score was $4.846 \pm \text{SD } 0.899$ (3-6).³ As her sample size in this study was not large enough to determine if this difference was significant, they only presented the mean raw scores, which are clearly indicative of a strong increase in knowledge after the educational intervention.³ Our study, which was of similar design, showed similar increases in prenatal knowledge after the intervention, but with a larger sample size ($n=48$) allowed us to demonstrate significance. The greatest shift in knowledge came on the question about when a woman should take her prenatal vitamins, which we saw the % correct answers increase from 31-69% ($p=0.000$). This shows that initially women had a misconception about the use and duration of prenatal vitamins but after education were more understanding and receptive of its use. The woman already had a high understanding of when they should make their first prenatal visit, with pre-test 75% correct answers. But we still saw an increase to 92% ($p=0.0078$) correct, the highest of all the questions, after education. This shows that even with a high baseline knowledge there was still room to learn and that we had a high success rate reaching almost all of the women on this topic. On the topics of prenatal diet, we saw an increase from 40-71% ($p=0.007$) correct answers on what foods to avoid during pregnancy and increase 62.5-83% ($p=0.002$) on what foods help a baby's brain grow. These results further show the receptiveness of the women to prenatal education especially on the topic of diet, which holds personal and cultural significance. The pre-test score

on how a woman should breastfeed had the lowest % correct at 23%, but still increased up to 50% ($p=0.0023$) after the educational intervention. This was significant in showing there is an initial lack of understanding about the duration and importance of breastfeeding an infant, even with the older women. These overall improvements show the benefit of this type of educational intervention project for a population with health knowledge deficits in areas such as prenatal care. This educational intervention project exemplifies the significance of physician assistants in promoting preventative services to promote health of patients in underserved populations.

Strengths and Limitations

During the project we encountered a few barriers to the application of the results in the future. A small population of villagers speak a specific Mayan dialect called K'echi', which made translation a two-step process: English to Spanish, Spanish to K'echi', and vice versa. During the educational intervention they were not as focused and didn't appear to actively understand some of the concepts discussed. After post-test analysis it became evident that they were not improving as well as the other women, which could be attributed to translation error. This project was conducted in Sarstun, which is predominantly Spanish speaking and not in the neighboring K'echi' villages, therefore the results cannot accurately depict the K'echi' knowledge. In the future, a similar project will most likely require a direct English to K'echi' translator to reduce error and be more focused on the surrounding villages. Other barriers to the reception of the intervention included cost and travel of women from farther villages to the clinic. We did not keep track of the total number of women eligible for the study, nor did we track the number of women we approached vs. those who agreed for the study. This data could

be collected in further studies and be more useful in finding out how many women are being missed by this type of intervention.

Currently, Guatemala does not meet the 2015 WHO Sustainable Developmental Goal for maternal mortality of 70 female deaths per 100,000 live births, and sits at 88 female deaths per 100,000 live births⁸. With the majority of these deaths coming from post-partum hemorrhage, infection, unsafe abortion and eclampsia, our hope is that increase in prenatal knowledge garnered from our educational intervention can lead to recognition and prevention of these problems with adequate obstetrical care. Another of the WHO Sustainable Development Goals being to ensure access to sexual and reproductive health care services, namely family planning, information and education, we believe our prenatal educational intervention provided a benefit to the population of Sarstun. Our results not only showed a general lack of knowledge regarding prenatal healthcare but also a dramatic increase in knowledge following a direct intervention. Their receptiveness to this type of education shows that future projects similar to this should be attempted in the future, for further promotion of maternal and prenatal healthcare, in order to help push Guatemala to its goals above.

As University of Texas Southwestern (UTSW) students traveling with RI to Sarstun, Guatemala to provide medical care to the people of this region, this project would not be possible without their support and resources. By joining with RI, we have partnered with the community partner to develop this project based on the interest of the students and the needs of the community. Based on our results, I think it is highly recommended for future students to carry on similar projects in this area. The women of Sarstun, Guatemala would still benefit from further expanded prenatal education, including more in-depth diet education and physical activity educations. The population would also benefit from further projects in other health fields, such as

general diet education, dental hygiene, and dehydration/heat exhaustion awareness to name a few.

TABLES

Table 1: Demographics

Demographic Characteristics	N	%
Age		
18-29 years of age	24	50%
30-39 years of age	11	23%
40 years of age and older	13	27%
Age of First Pregnancy		
12-15 years of age	9	21%
16-20 years of age	21	49%
21-25 years of age	12	28%
26 years of age or older	1	2%
Number of Pregnancies		
1-3 pregnancies	26	60%
4 or more pregnancies	17	40%
For how many pregnancies did you receive prenatal care?		
All pregnancies	27	63%
Not all pregnancies	16	37%

Table 2: Prenatal Care Knowledge

Prenatal Care Knowledge	Pre-test		Post-test		p-value
	N	%	N	%	
When should a pregnant woman take prenatal vitamins?					
Correct	15	31%	33	69%	0.0000
Incorrect	33	69%	15	31%	
When should a woman have her first prenatal visit?					
Correct	36	75%	44	92%	0.0078
Incorrect	12	25%	4	8%	
What foods should a pregnant woman avoid?					
Correct	19	40%	34	71%	0.0070
Incorrect	29	60%	14	29%	
Which of the following foods help your baby's brain grow?					
Correct	30	62.5%	40	83%	0.0020
Incorrect	18	37.5%	8	17%	
For how long should a woman breastfeed her child?					
Correct	11	23%	24	50%	0.0023
Incorrect	37	77%	24	50%	

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Appendix A

Prenatal Care Intervention

1. Prenatal care importance
 - a. Important to visit midwife or Sarstun clinic when find out you are pregnant to receive proper prenatal care and prenatal vitamins
 - i. First visit when you find out you are pregnant / first 12 weeks of pregnancy
 - b. Prenatal vitamins daily prior to and throughout pregnancy. Also to continue while breastfeeding after birth
 - i. Folic acid importance- brain development
 1. Deficiency increases risk of neural tube defects,
 - ii. Iron importance- blood development to aide oxygen transport to body for growth
 1. Severe anemia increases risk of premature labor, child/maternal mortality, and infectious disease
2. Pregnancy lifestyle recommendations
 - a. Dietary
 - i. Prenatal care vitamins containing iron and folic acid (provided by midwives and Sarstun clinic)
 - ii. Foods to avoid: raw meat, raw eggs, raw fish, alcohol, unwashed vegetables
 - iii. Foods that contain iron:
 1. Beans, nuts, peanut butter
 2. Meat (chicken, beef, pork), egg yolk
 3. Oatmeal, fortified rice and cereals
 4. Green leafy vegetables, darker the better
 - iv. Foods that contain folate:
 1. Papaya
 2. Corn
 3. Green leafy vegetables
 4. Beans
 - v. Exercise
 1. Avoidance of the following:
 2. TBD - based on what they are doing for physical labor already
 3. Aim for <10-15 pounds past 20 weeks
3. Breastfeeding importance
 - a. "We have noticed that many women breast feed here, which is fantastic!"
 - b. Breast feed exclusively for 6 months and continue at least for 2 years (per WHO)
 - c. Continue prenatal vitamins while breastfeeding
 - d. Infant benefits
 - i. Reducing infant mortality in developing countries
 - ii. Reducing in gastrointestinal infections
 - iii. Improving baby's immune system
 - e. Maternal benefits
 - i. Reducing mother risk of developing diabetes, cardiovascular disease, hypertension, breast and ovarian cancer

Appendix B

Pre/Post Test

1. Age _____
2. At what age were you pregnant for the first time? _____
3. How many pregnancies have you had? _____
4. How many of your pregnancies did you receive prenatal care?
 - a. All of them
 - b. Half of them
 - c. None of them
5. When should a pregnant woman take prenatal vitamins?
 - a. Daily throughout her pregnancy
 - b. For the first 3 months of pregnancy
 - c. Before her pregnancy
 - d. **Daily throughout her pregnancy and while breastfeeding**
6. When should a female have her first prenatal visit?
 - a. **When you find out that you're pregnant (first 12 weeks of pregnancy)**
 - b. Middle of pregnancy (second 12 weeks of pregnancy)
 - c. Towards end of pregnancy (last 12 weeks of pregnancy)
7. What foods should a pregnant women avoid?
 - a. Dairy (cheese, milk, queso fresco)
 - b. Breads (rice, tortillas, bread)
 - c. Caffeine
 - d. **Raw meat and raw eggs**
8. What of the following foods helps your baby's brain grow? (select all that apply)
 - a. **Papaya**
 - b. **Corn**
 - c. **Green leafy vegetables**
 - d. **Beans**
9. For how long should a woman breastfeed her child?
 - a. Exclusively for 2 years
 - b. For 6 months
 - c. **Exclusively for 6 months and continue at least for 2 years (per WHO)**
 - d. Exclusively for 1 year