

Effect of Education on Adherence to Recommended Prenatal Practices in the Indigenous Communities of Bocas Del Toro, Panama



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Abstract

Prenatal care is a significant factor in infant and maternal health. Rural communities of indigenous populations are significantly underserved medically, leading to a remarkable lack of prenatal care. While the lack of medical service is believed to contribute to negative postpartum outcomes in many of these remote locations, the lack of prenatal education is thought to be a large determinant in poor outcomes, especially in indigenous populations throughout Panamanian provinces like Bocas del Toro. It is hypothesized that Ngäbe-Buglé women who receive prenatal education will follow more recommended prenatal practices than those who did not receive any education. In order to test this, a survey was verbally administered to 137 women present at 8 different communities who were attending medical clinics set up by the Floating Doctors organization. The survey assessed which prenatal practices women adhered to when pregnant and if they received any prenatal education. Each participant was scored out of eight based on the amount of good prenatal practices (GPPs) followed and they were categorized based on the type of education they received. This was compared to the scores of participants who did not receive any education. The data supports that there are significantly more good prenatal practices followed by women who were educated as compared to those who were not ($p < 0.001$). Out of the types of prenatal education, those who were educated by the Panamanian Ministry of Health received the highest mean GPP score and those educated by community members received the lowest. These results demonstrate the importance of educating indigenous populations on prenatal practices, as it can have a significant impact on health.

Introduction

According to articles relating to prenatal health in Bocas del Toro, Panama, the need for further prenatal education in rural Panama has been established. There is data suggesting that Panamanian women scored lower than Costa Rican women in most domains of knowledge in prenatal health care, possibly contributing to the worse outcomes of maternal mortality and infant mortality in Panama as opposed to Costa Rica.¹ While this data establishes that increased prenatal education may correlate with better health outcomes, it does not specifically address how education can result in better health outcomes. There are additional studies that show the need for education with community participation in areas of pregnancy, prenatal care, family planning and the role of the midwife.^{2,3,4} However, it is not known, to what degree this education can influence decision making of adhering to good prenatal practices. According to recommendations, following good prenatal practices such as taking vitamins, avoiding alcohol/substances, altering exercise and diet and receiving checkups are substantially important in infant and maternal health.⁵ This research will analyze the effectiveness of different sources of prenatal education on adherence to good prenatal practices for the indigenous communities of Bocas Del Toro, Panama. Even in resource limited settings, knowledge of healthy practices may influence daily activities in a meaningful way. By establishing the relationship between education and good prenatal practices, this data can support the influence that prenatal education has on overall maternal and infant mortality rates.

Image 1: Map of the Panamanian communities visited by Floating Doctors.



Image 1: Participants in this study were from the communities of Tierra Oscura, San Cristobal, Cayo de Agua, Quebrada Sal, Bastimentos, Valle Escondido, Playa Lorenzo, and Playa Verde. These communities were traveled to by boat with the Floating Doctors organization.

Methods

Recruitment and Participants

This study was approved by the Panama Ministry of Health and Drexel University. Inclusion criteria for our study included women above 18 years of age living in Bocas Del Toro, Panama who were currently pregnant/ had been pregnant and consented to participate.

Data Collection

A total of 137 women participated in a verbally administered and anonymous 7 question survey (see Image 2) regarding their previous or current prenatal practices and level of prenatal education.

Data Analysis

To assess if there was a significant difference in good prenatal practices (GPPs) followed by members of the communities who were educated versus uneducated, each participant was given a score out of eight. Each participant's data was then categorized into which type of prenatal education they received including education from a family member (FM), a community member (CM), Floating Doctors (FD), the Ministry of Health (MINSa) or no education. The GPP scores within each category of education, overall educated, and uneducated were averaged. A two-tailed test was performed (95% CI, $\alpha = 0.05$, DF= 136, Z-critical value = ± 1.977). If $p < 0.05$, the data is statistically significant and the null hypothesis can be rejected.

Image 2: Prenatal Survey

Results

Figure 1:

Impact of Education on Prenatal Practice Score in all Communities

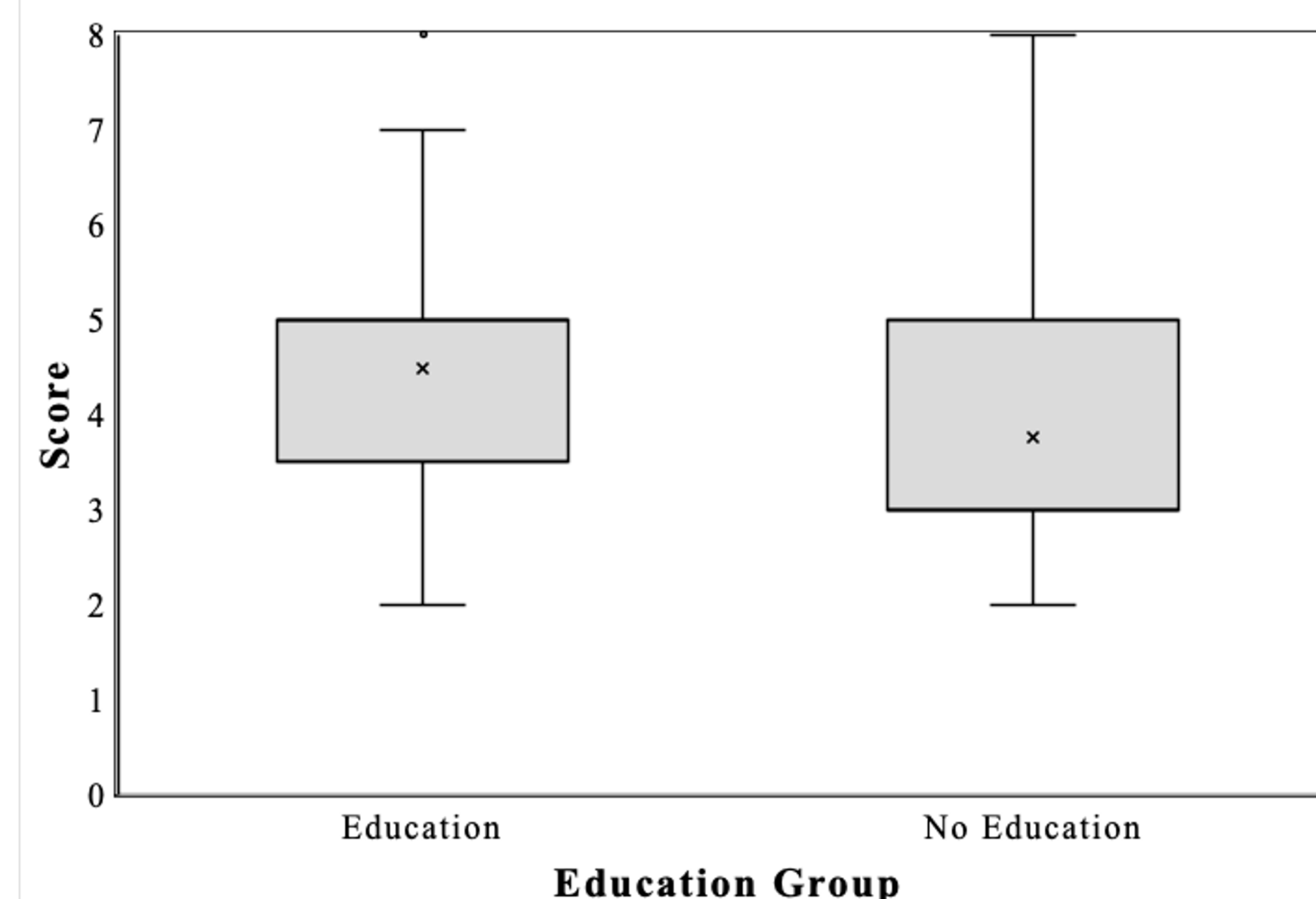


Figure 1: Impact of Education on Prenatal Practices Score in All Communities. The average GPP score for those who were educated (85 participants) was 4.482 (range: 2 to 7). The average GPP score for those who did not receive education (52 participants) was 3.750 (range: 2 to 8).

Figure 2:

Impact of Education Type on Prenatal Practice Score in all Communities

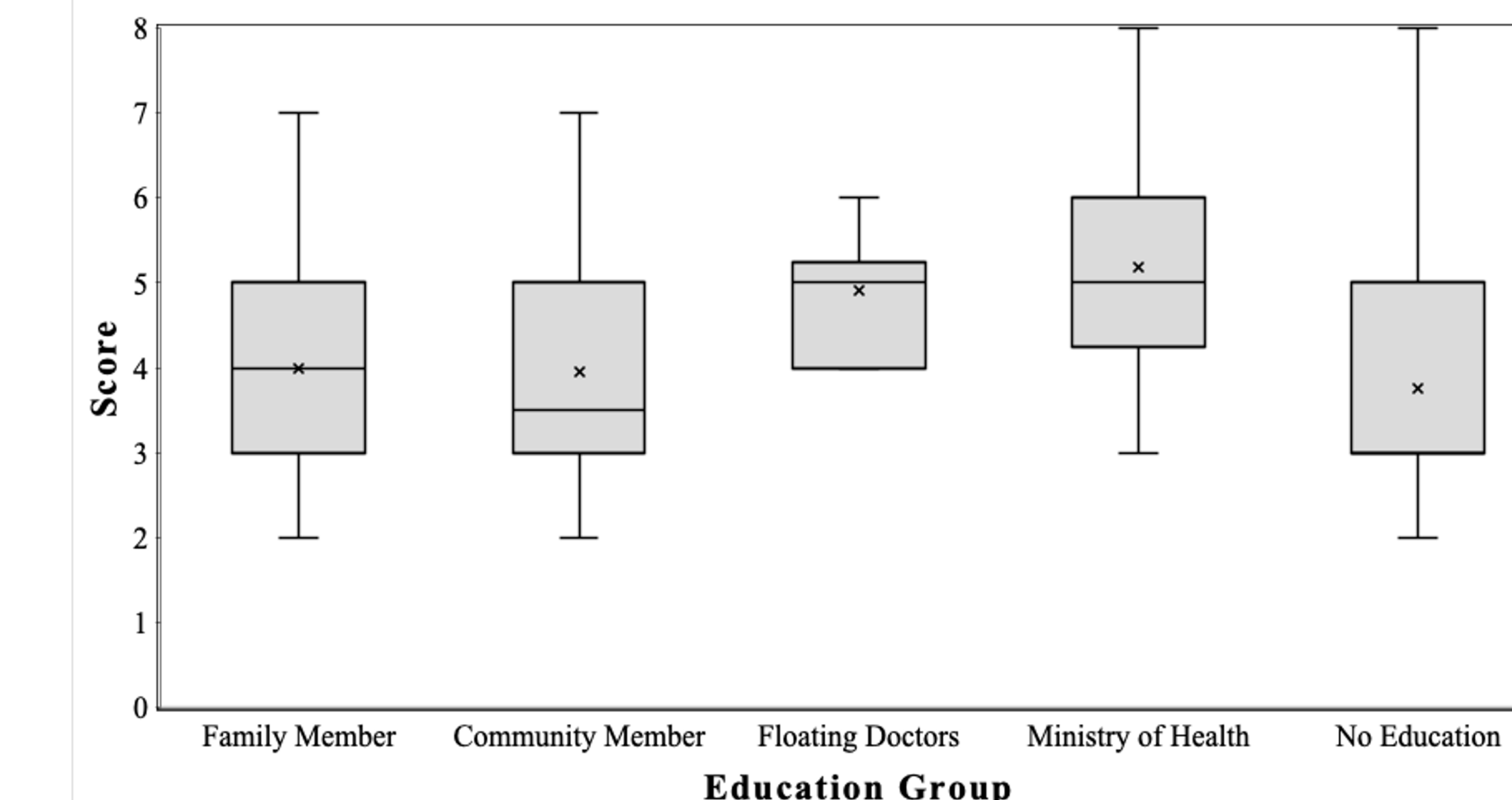


Figure 2: Impact of Education Type on Prenatal Practices Score in All Communities. The average GPP score for a woman educated by a family member was 4 (range: 2 to 7). The average GPP score for a woman educated by a community member was 3.95 (range: 2 to 7). The average GPP score for a woman educated by the floating doctors was 4.916 (range: 4 to 6). The average GPP score for a woman educated by the Ministry of Health was 5.192 (range: 3 to 8). The average GPP score for a woman who did not receive any prenatal education was 3.75 (range: 2 to 8).

Figure 3: Heat Map of Raw Survey Data



Figure 3: Heat Map of Raw Survey Data. Each row represents a single participant. The columns represent the five good prenatal practices for which each participant was assessed. The good prenatal practices include taking prenatal vitamins, avoiding alcohol, increasing caloric intake, maintaining physical activity level, and receiving prenatal check-ups by a physician, respectively. The participants were separated by community with bolder horizontal lines. The communities, in order from top to bottom include, Tierra Oscura, San Cristobal, Cayo de Agua, Quebrada Sal, Bastimentos, Valle Escondido, Playa Lorenzo, and Playa Verde. If the participant effectively followed the good prenatal practice assessed, she was marked with a green box. If the practice was not followed, the box was coded red.

Figure 4: Hypothesis Testing with 95% CI

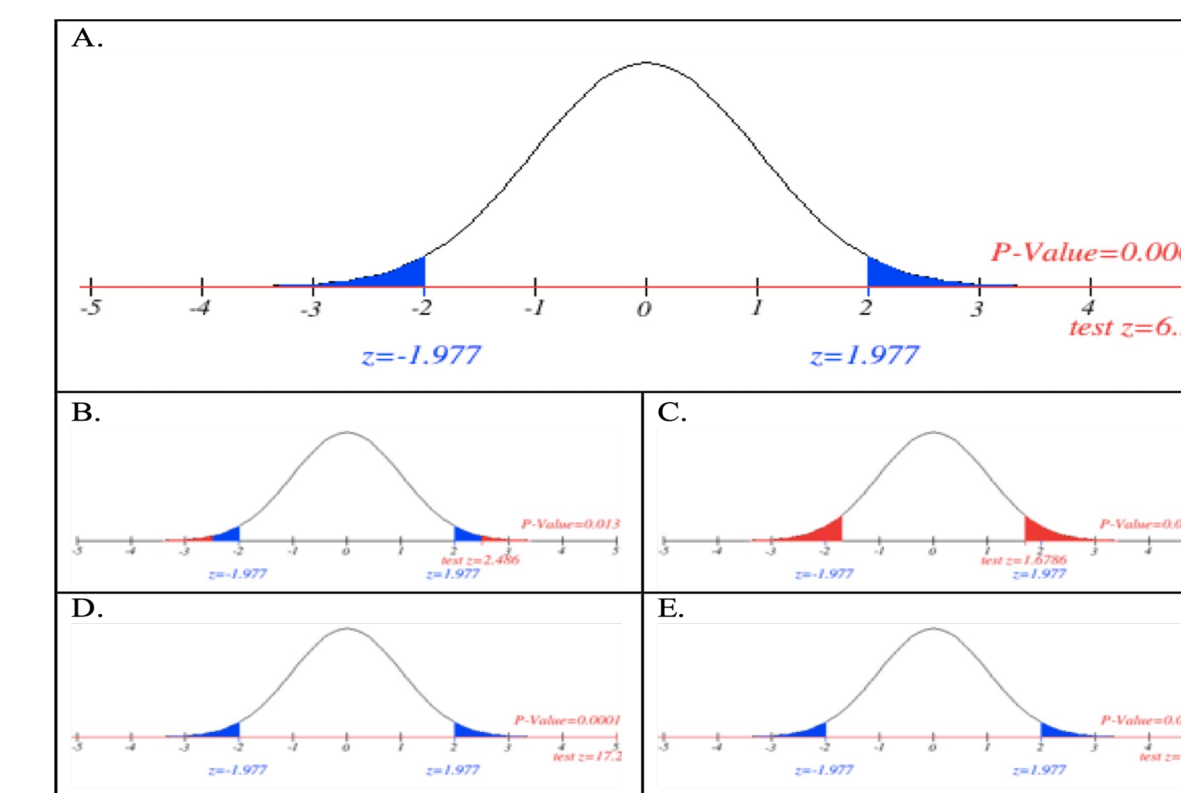


Figure 4: Hypothesis testing with 95% CI. The z-value for each education group and education overall was discerned and statistically plotted against a Z critical value of ± 1.977 ($\alpha = 0.05$, DF= 136). **A.** For women who were educated through any method (FM, CM, FD, MINSa), the z-value was calculated to be 6.519. This yielded a p-value of 0. **B.** For women educated by FM, the z-value was calculated to be 2.486. This yielded a p-value of 0.014. **C.** For women educated by CM, the z-value was calculated to be 1.678. This yielded a p-value of 0.095. **D.** For women educated by a FD the z-value was calculated to be 0.793. This yielded a p-value of 0. **E.** For women educated by MINSa the z-value was calculated to be 1.233. This yielded a p-value of 0.

Figure 5: Distribution of Education Types

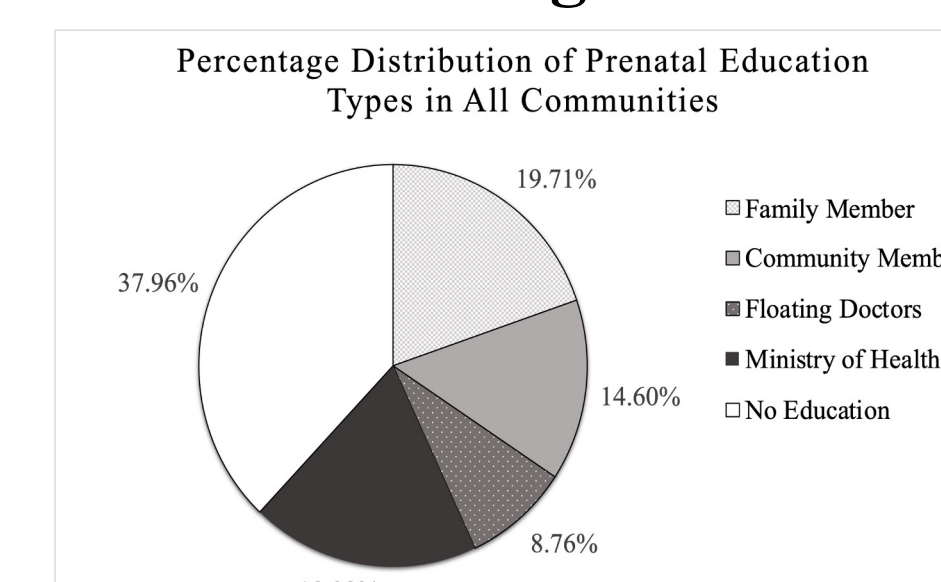


Figure 5: Distribution of Education Type. The figure depicts the educational categorization of each woman surveyed. Of the 137 women surveyed, 27 people were educated by family members (19.71%), 20 people were educated by other members of their community (14.60%), 12 people were educated by the Floating Doctors (8.76%), 26 people were educated by the Ministry of Health (18.98%), and 52 people had never received prenatal education (37.96%).

Discussion

It is believed that the lack of prenatal education in indigenous populations throughout Bocas del Toro is a large determinant in poor maternal and infant health outcomes. Thus, it may be hypothesized that Ngäbe-Buglé women who receive prenatal education will have a higher good prenatal practice (GPP) score than those who did not receive any education. This hypothesis was supported by our data. This GPP score (maximum of 8) is based on five criteria of taking prenatal vitamins (2), avoiding alcohol (2), increasing caloric intake (1), maintaining physical activity level (1), and receiving prenatal check-ups (2) by a physician. The average GPP score for those who were educated (85 participants) was 4.482. The average GPP score for those who did not receive education (52 participants) was 3.750. Using a two-tailed test with a CI of 95%, the difference between these means is statistically significant and highly unlikely due to chance ($p < 0.001$). The average GPP score for a woman educated by a family member was 4 ($p = 0.014$). The average GPP score for a woman educated by a community member was 3.95 ($p = 0.095$). The average GPP score for a woman educated by the Floating Doctors was 4.916 ($p < 0.001$). The average GPP score for a woman educated by the Ministry of Health was 5.192 ($p < 0.001$). All of these data points are statistically significant, using a two-tailed test with a CI of 95%, with the exception of the difference between a community educated woman and a woman with no prenatal education. Thus, this data tells us that family members, Floating Doctors, and the Ministry of Health are all aptly teaching good prenatal practices while community member education is lacking in some degree. It is unknown which methods of teaching allow for FM, FD, and MINSa to show a significant increase in GPP score opposed to CM. It is also unknown whether it is the access to prenatal care provided by the FD and MINSa physicians that skews the GPP score opposed to the education provided by these groups. It is also important to note that while the score of educated women were significantly higher than women lacking prenatal education, very few women in these communities were scoring the maximum of 8. This calls for reflection of teaching methods and increased effort to disseminate knowledge and care to these communities. Ultimately, the data supports that there is a notable difference in prenatal outcomes when a woman receives education. This helps to direct future efforts in educating women in the indigenous communities in both Bocas Del Toro and across the globe.

Conclusion

A significant limitation of this study is that many women do not have access to prenatal checkups. Although Floating Doctors visit the communities every 3 months, it may be difficult for some women who live far away to be seen by a physician while they are pregnant. A second limitation of this study is that the participants self-reported their data which can introduce inaccuracy in their responses. Another limitation of this study is that the survey was conducted in Spanish and translated into English which allows the possibility for mistranslation of responses. Future research directions include continuing to assess the prenatal education and practices of the other communities served by Floating Doctors. Floating Doctors can utilize this information to fortify their prenatal education when visiting with patients. In addition to this, future research is needed in the areas of birthing practices in indigenous Panamanian villages and other practices done during pregnancy that may or may not affect birthing outcomes. The authors report no declaration of interest.

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Acknowledgements

PI: Dr. Kristen Ryczak
 Translator: Odette Rosales
 Data Collection: Angela Johnson
 Special thanks to the Floating Doctors organization.