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DOI: 10.21106/ijma.213**ORIGINAL ARTICLE****Factors Influencing the Choice of Child Delivery Location among Women Attending Antenatal Care Services and Immunization Clinic in Southeastern Nigeria****Johnbull Egharevba, MD, MPH;¹ Jennifer Pharr, PhD;² Brian van Wyk, PhD;³ Echezona Ezeanolue, MD, MPH⁴**

¹Center for Clinical Care and Clinical Research Nigeria (CCCRN), Ebonyi State, Nigeria; ²School of Community Health Sciences, University of Nevada, Las Vegas, USA; ³School of Public Health, University of the Western Cape, South Africa; ⁴Global Health Initiative, School of Community Health Sciences, University of Nevada, Las Vegas, USA

 Corresponding author email: jennifer.pharr@unlv.edu

ABSTRACT

Background and Objective: In Nigeria, most deliveries take place at home or with traditional birth attendants (TBAs). This study examined the factors that influenced or determined utilization of healthcare facility delivery services among women who attended antenatal care (ANC) services.

Methods: A cross-sectional survey was conducted with 220 women who registered for ANC at a hospital and delivered within 18 months. Associations between independent variables and choice of healthcare facility delivery were analyzed. Multiple logistic regression was also used to identify the predictors of choice of delivery among women.

Results: Of the 220 women who registered for ANC, 75% delivered at a healthcare facility while 15% delivered with a TBA or at home. In the final model, number of children, having planned to deliver at a hospital, labor occurring at night, and labor allowing time for transportation were significant predictors of child delivery location among the women.

Conclusion and Global Health Implications: Utilization of the health facilities for childbirth may increase if pregnant women are encouraged to book early for ANC and if during ANC, pregnant women were counseled to detect labor signs early. In addition to focused and intensified counseling for women with more children, support should be provided that includes financial provisions for transportation to the healthcare facility.

Key words: Delivery Location • Pregnant Women • Maternal Utilization • Healthcare Facility Delivery • Skilled Birth Attendants • Traditional Birth Attendants (TBA) • Antenatal Care Services (ANC) • Nigeria

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I. Background and Objective

About 800 women worldwide die every day during pregnancy and childbirth.^[1] Ninety-nine percent of these deaths occur in developing countries, with Sub-Saharan Africa accounting for over 50%. In Nigeria, there is a 1 in 13 chance of a woman dying during pregnancy.^[1] Maternal deaths mainly occur during labor, delivery, or within the first 24 hours after birth. In most cases, they are largely due to preventable causes such as hemorrhage, infections, unsafe abortions, eclampsia, and obstructed labor.^[2-4]

Availability of skilled health professionals at the point of is the single most important factor in the prevention of maternal deaths.^[5] The proportion of skilled health professionals available at the time of delivery is also one of the indicators for monitoring progress towards the Millennium Development Goal of improving maternal health.^[6] In many urban areas of developing countries, skilled health professionals at childbirth are provided in the health facility^[7]. In sub-Saharan Africa, uptake of skilled delivery services in healthcare facilities is low compared to other parts of the world.^[1] In Nigeria, only 35% (25% in rural and 60% in urban areas) of pregnant women use delivery services at healthcare facilities.^[8]

St. Patrick's Hospital is a faith-based healthcare institution in Southeastern Nigeria. It was established in 1937 and has a long-standing history as a high volume maternity facility. Of the 18,200 clients registered for Antenatal Care (ANC) in the hospital between February 2011 and May 2012, less than a quarter (23.9%) delivered at the hospital.^[8] In a study, Idris, Sambo and reported that while 98% of new mothers in Northern Nigeria attended ANC services at a health facility, only 24% of them actually delivered at a healthcare facility.^[9] The main barriers to healthcare facility delivery identified in their study were no previous complications with delivery (57%) and negative attitudes of providers (24%).^[9]

Since there are a low number of facility deliveries at St. Patrick's hospital, we wanted to determine the peculiar factors preventing pregnant women from utilizing the hospital or other healthcare facilities as their place for delivery even after accessing ANC services. Previous qualitative research has

examined socio-demographic and cultural factors, perceptions of pregnancy and quality of care, and financial and access barriers to the utilization of healthcare facilities during delivery in low income countries.^[10-14] We utilized these findings to develop our survey to understand the phenomenon of low facility delivery in our population. The objective of this study was to determine the factors that influenced the choice of delivery location, healthcare facility versus non-healthcare facility (TBA or home delivery), among women who attended ANC at St Patrick's hospital. We sought to understand how the following factors were associated with choice of delivery location: socio-demographics of the women and their husbands, characteristics of the hospital and staff, physical accessibility and economic factors.

2. Methods

2.1. Study design and setting

The design for this study was cross sectional. Surveys were conducted with mothers of newborns at a single point in time.^[15,16] This study was conducted at St Patrick's Hospital in the suburbs of Abakaliki, the administrative capital of Ebonyi State, in Southeastern Nigeria. The survey was designed with experts in the field, and a pilot study of twelve postpartum women was conducted at a similar healthcare facility to provide evidence for content/face validity.

2.2. Participants and sampling procedure

The population included the women who (1) attended ANC at St Patrick's Hospital, (2) delivered in the 18 months prior to December 31, 2012, and (3) presented to the immunization clinic of the hospital to have their infants immunized. The daily immunization clinic register was used to determine the population. Monthly, an average of 500 women attends the clinic to have their infants immunized. The sample size was calculated using a confidence level of 95% and a confidence interval of 5. Based on a population size of 500, the sample size was determined to be 217.^[17]

Systematic sampling was used because the complete population was not available at the onset of the study.^[16] Women who were waiting to have their infants immunized were approached. Alternate

women were asked to participate in the study. If she was not eligible, or declines participation, the next eligible woman was used as replacement. Ninety-nine percent of the women who were eligible agreed to participate in the anonymous survey. One eligible woman could not participate because she needed to return home to receive her older child from school. As an incentive and also to encourage handwashing practices, participants were given a bar of soap for completing the survey.

ANC and immunization clinics run independently. However, over 95% of the communities postnatal women attend the immunization clinic with their newborn. Because of this, we felt we could safely infer that all those who attend ANC also attend immunization clinics with their newborn babies.

2.3. Data collection and data analysis

Data were collected using a structured questionnaire. The questions were translated into Igbo, the local dialect, by two different translators working independently. A pilot was carried out on 12 participants (2 per interviewer) from another health facility of similar circumstance, to ensure that the questions were understood by the participants. A further back translation was done independently by a third translator to ensure accuracy. In all, 255 questionnaires were distributed. Of these, 35 questionnaires were excluded because they were incomplete giving an effective response rate of 86%. The survey was administered in Igbo, the local dialect. The interviewers were fluent in Igbo and the participants were able to communicate in Igbo. The questionnaire, which was developed using information from a review of literature, covered socio-demographic, economic, and cultural factors; events surrounding labor; ANC and prior delivery experiences; and perceived quality of care.^[10-13] The questionnaires were administered by six trained Community Health Workers (CHW) who were drawn from another hospital, in order to ensure independence and confidentiality. The primary outcome variable was delivery at a health facility. The odds ratios (OR) and its 95% confidence intervals (CI) were calculated to describe the strength of association of independent variables with healthcare

facility delivery. Additionally, multiple logistic regression was used to determine factors that predict healthcare facility delivery. A *p*-value of less than 0.05 was considered significant. IBM Statistical Package for the Social Sciences (SPSS) 24 was used for the data analysis.

2.4. Ethical considerations

The study received ethical approval from the University of the Western Cape Senate Research Committee. Permission for the study was obtained from the management of St Patrick's Hospital. Eligible participants were given information explaining the confidential and voluntary nature of the study. The consent form was explained to them by the interviewers and those who consented either signed or thumb printed the consent form.

3. Results

3.1. Distribution of place of delivery

Two hundred and twenty women completed the survey. Seventy-five percent (164) of the respondents delivered at a healthcare facility while 25% (56) delivered at TBA's location or at home. Of those who delivered in a healthcare facility, 146 (89%) delivered at St Patrick's Hospital and 18 (11%) delivered at another healthcare facility. Of those who delivered outside of a healthcare facility, 27 delivered at a TBA's location and 29 delivered at home.

3.2. Socio-demographic characteristics of respondents and influence on health facility delivery

Table 1 presents the socio-demographic characteristics of respondents. Most of the respondents were between 20-29 years old and most of the women were from local ethnic groups such as Izzi and Ezza. Over 90% of the women were married and 60% were Catholics. More than half of the respondents had 2-4 children.

Women with a post-secondary education were 2.48 (95% CI 1.04-5.93) times more likely to deliver at a healthcare facility than women with a primary education (Table 1). Women whose husband had a post-secondary education were 36 (95% CI

Table 1: Demographic characteristics of study participants and influence of demographic characteristics on choice of health facility delivery

| Variables | Delivery at health facility | | Delivery at HOME/TBA | | Odds ratio | 95% CI |
|---------------------------|-----------------------------|-------|----------------------|-------|------------|-------------|
| | N=164 | (%) | N=56 | (%) | | |
| Age in years | | | | | | |
| 20-29* | 110 | 67.07 | 41 | 73.21 | * | * |
| <20 | 6 | 3.66 | 0 | 0.00 | 0.20 | 0.01-3.72 |
| 30-39 | 48 | 29.27 | 15 | 26.79 | 0.84 | 0.42-1.66 |
| Educational level | | | | | | |
| Post-secondary* | 39 | 23.78 | 11 | 19.64 | * | * |
| None | 7 | 4.27 | 4 | 7.14 | 2.03 | 0.50-8.21 |
| Primary | 30 | 18.29 | 21 | 37.50 | 2.48 | 1.04-5.93 |
| Secondary | 88 | 53.66 | 20 | 35.71 | 0.81 | 0.35-1.84 |
| Husband education | | | | | | |
| Post-secondary* | 61 | 37.20 | 5 | 8.93 | * | * |
| No education | 1 | 0.61 | 3 | 5.36 | 36.60 | 3.19-419.88 |
| Primary | 22 | 13.41 | 21 | 37.50 | 11.65 | 3.91-34.65 |
| Secondary | 80 | 48.78 | 27 | 48.21 | 4.12 | 1.50-11.31 |
| Marital status | | | | | | |
| Married* | 160 | 97.56 | 55 | 98.21 | * | * |
| Single | 1 | 0.61 | 1 | 1.79 | 2.91 | 0.18-47030 |
| Widowed | 3 | 1.83 | 0 | 0.00 | 0.41 | 0.02-8.12 |
| Ethnic groups | | | | | | |
| Izzi* | 49 | 29.88 | 19 | 33.93 | * | * |
| Ezza | 43 | 26.22 | 19 | 33.93 | 1.14 | 0.54-2.43 |
| Anambra | 10 | 6.10 | 1 | 1.79 | 0.26 | 0.03-2.16 |
| Ezzangbo | 7 | 4.27 | 4 | 7.14 | 1.47 | 0.39-5.62 |
| Ngbo | 10 | 6.10 | 1 | 1.79 | 0.26 | 0.03-2.16 |
| Other tribes | 45 | 27.44 | 12 | 21.43 | 0.69 | 0.30-1.57 |
| Religion | | | | | | |
| Catholics* | 105 | 64.02 | 35 | 62.50 | * | * |
| Protestants | 15 | 9.15 | 6 | 10.71 | 0.96 | 0.47-1.95 |
| Pentecostals | 44 | 26.83 | 14 | 25.00 | 1.20 | 0.43-3.33 |
| Number of children | | | | | | |
| 1* | 55 | 33.54 | 9 | 16.07 | * | * |
| 2-4 | 84 | 51.22 | 31 | 55.36 | 2.25 | 1.00-5.10 |
| 5 or more | 25 | 15.24 | 16 | 28.57 | 3.91 | 1.52-10.05 |

* = Reference variable

3.19-419.88) times more likely than those with no education, 11.65 (95% CI 3.91-34.65) times more than those with primary education, and 4.12 (95% CI 1.50-11.31) times more likely than those with a secondary education to deliver at a healthcare

facility. Women with one child were 2.25 (95% CI 1.00-5.10) times more likely than women with 2-4 children and 3.91 (95% CI 1.52-10.05) times more likely than women with 5 or more children to deliver at a healthcare facility.

3.3. ANC visits and travel time on health facility delivery

Nearly all of the women expressed satisfaction with the ANC counseling they received (98%); were satisfied with the quality of ANC (98%); thought the hospital had enough equipment (97%); and were specifically informed of the need for them to deliver at the hospital (98%) (Table 2). Because of the small cell size for questions about the quality and satisfaction with ANC (i.e. zero women were dissatisfied), odds ratios generated should be considered with caution (Table 2). Women who had five or more ANC visits were 7.15 (95% CI 2.63-19.45) times more likely to deliver at a healthcare facility than women with 1-2 visits and 3.85 (95% CI 1.93-7.79) times more likely than women with 3-4 visits. Women who planned to deliver in a hospital were 9.63 (95% CI 3.52-26.38) times more likely to deliver at a healthcare facility than women who did not plan to deliver at a hospital. Women who lived less than 30 minutes from the hospital were 3.01 (1.22-7.40) times more likely to deliver at a healthcare facility than women who lived over an hour from the hospital (Table 2).

3.4. Influence of labor associated factors on health facility delivery

Healthcare facility delivery was influenced by a number of labor-associated factors including: the ability to get transportation; labor occurring at night and allowing time to get to the health facility; having a person to accompany the woman to the healthcare facility; problems during labor; and previous home delivery. Women who delivered at a healthcare facility were significantly more likely to have had a person to accompany them to the healthcare facility (OR 2.56 [95% CI 1.16-5.64]), for their labor to have allowed time to get to the health facility (OR 37.25 [95% CI 15.76-88.04]), or to have had problems during labor (OR 3.30 [95% CI 1.11-9.78]). Women were significantly less likely to deliver at a health facility if they had difficulty getting transportation (OR 0.31 [95% CI 0.17-0.59]), if labor occurred at night (OR 0.02 [95% CI 0.01-0.05]), or if they had previously delivered at home (OR 0.47 [95% CI 0.24-0.92]) (Table 3).

3.5. Influence of socio-cultural and economic factors on health facility delivery

Many of the previously identified socio-cultural factors that have been identified as barriers to healthcare facility delivery were not found in this study. In both groups, low percentages of women reported that culture encouraged home delivery or the belief that weak women deliver at health facilities. Economically, women who had money for transportation during labor were 2.82 (95% OR 1.32-6.03) times more likely to deliver at a healthcare facility (Table 4).

3.6. Predictors of health facility delivery

Factors significantly associated with healthcare facility delivery in univariate analyses were included in the multiple logistic regression: number of ANC visits, mother's education, husband's education, number of children, planned to deliver at hospital, travel time to hospital, difficulty getting transportation, labor occurring at night, labor allowing time for transportation, accompanied to the hospital, problems in labor, and previous home delivery. The model was significant (Chi square = 133.17; $p < 0.01$) and explained 53% of the variance in healthcare facility delivery. Significant predictors included: number of children, planned to deliver at hospital, labor occurring at night, and labor allowing transportation time for transportation. The final model including these factors and explained 49% of the variance in healthcare facility delivery (Table 5).

4. Discussion

Healthcare facility delivery was largely dependent on the events around labor. Labor occurring during the night was a strong predictor of home/TBA delivery. Though sometimes labor can be sudden, in most cases it is not. Women who deliver at home many times attribute their actions to the sudden nature of their labor.^[18,19] Hence, the ability to detect labor signs early may be a major factor in determining where the women deliver. This study showed that when labor allowed time for women to get to a healthcare facility, they were more likely to deliver at a healthcare facility. The ability to detect labor signs early is important skill received during ANC visits.

Table 2: Antenatal care visits and travel time on choice of health facility delivery

| Variable | Delivery at health facility | | Delivery at HOME/TBA | | Odds ratio | 95% CI |
|--|-----------------------------|-------|----------------------|--------|------------|------------|
| | N=164 | (%) | N=56 | (%) | | |
| Number of ANC visits | | | | | | |
| Five times or more* | 117 | 71.34 | 20 | 35.71 | * | * |
| 1-2 | 9 | 5.49 | 11 | 19.64 | 7.15 | 2.63-19.45 |
| 3-4 times | 38 | 23.17 | 25 | 44.64 | 3.85 | 1.93-7.79 |
| Satisfied with counseling at ANC | | | | | | |
| Yes | 161 | 98.17 | 56 | 100.00 | 0.74 | 0.69-0.80 |
| No | 2 | 1.22 | 0 | 0.00 | | |
| Satisfied with quality of ANC services | | | | | | |
| Yes | 160 | 97.56 | 56 | 100.00 | 0.74 | 0.69-0.80 |
| No | 4 | 2.44 | 0 | 0.00 | | |
| Hospital staff friendly | | | | | | |
| Yes | 140 | 85.37 | 54 | 96.43 | 0.22 | 0.05-0.95 |
| No | 24 | 14.63 | 2 | 3.57 | | |
| ANC Clinic waiting time acceptable | | | | | | |
| Yes | 129 | 78.66 | 49 | 87.50 | 0.52 | 0.22-1.26 |
| No | 35 | 21.34 | 7 | 12.50 | | |
| Hospital equipped enough | | | | | | |
| Yes | 159 | 96.95 | 55 | 98.21 | 0.97 | 0.10-9.46 |
| No | 3 | 1.83 | 1 | 1.79 | | |
| Informed of hospital delivery | | | | | | |
| Yes | 161 | 98.17 | 52 | 92.86 | 4.13 | 0.90-19.05 |
| No | 3 | 1.83 | 4 | 7.14 | | |
| Husband or relative participated in ANC health talk | | | | | | |
| Yes | 57 | 34.76 | 14 | 25.00 | 1.60 | 0.81-3.17 |
| No | 107 | 65.24 | 42 | 75.00 | | |
| Planned to deliver in hospital | | | | | | |
| Yes | 158 | 96.34 | 41 | 73.21 | 9.63 | 3.52-26.38 |
| No | 6 | 3.66 | 15 | 26.79 | | |
| Travel time to hospital | | | | | | |
| Less than 30 mins* | 58 | 35.37 | 15 | 26.79 | * | * |
| 30 mins - 1 hr | 88 | 53.66 | 27 | 48.21 | 1.19 | 0.58-2.42 |
| Over 1 hr | 18 | 10.98 | 14 | 25.00 | 3.01 | 1.22-7.40 |

* = Reference variable

Having more children has been shown to be associated with a decreased likelihood of healthcare facility delivery.^[20] This finding was supported by this study, as women with one child were more likely to deliver at a healthcare facility than women with more children. This may be associated with more

experience and confidence with childbirth. Women and families with more children may also be less likely to be able to afford healthcare facility delivery due to other financial commitment of their large families.

Participants who had planned to deliver at a hospital were 30 times more likely to deliver at a

Table 3: Labor-associated factors on choice of health facility delivery

| Variable | Delivery at health facility | | Delivery at Home/TBA | | Odds ratio | 95% CI |
|---|-----------------------------|-------|----------------------|-------|------------|-------------|
| | N=164 | (%) | N=56 | (%) | | |
| Had difficulty getting transportation during labor | | | | | | |
| Yes | 49 | 29.88 | 32 | 57.14 | 0.31 | 0.17-0.59 |
| No | 112 | 68.29 | 23 | 41.07 | | |
| Labor occurred at night | | | | | | |
| Yes | 7 | 4.27 | 40 | 71.43 | 0.02 | 0.01-0.05 |
| No | 155 | 94.51 | 16 | 28.57 | | |
| Labor allowed time | | | | | | |
| Yes | 149 | 90.85 | 12 | 21.43 | 37.25 | 15.76-88.04 |
| No | 13 | 7.93 | 39 | 69.64 | | |
| Company in labor | | | | | | |
| Yes | 142 | 86.59 | 38 | 67.86 | 2.56 | 1.16-5.64 |
| No | 19 | 11.59 | 13 | 23.21 | | |
| Problem in labor | | | | | | |
| Yes | 33 | 20.12 | 4 | 7.14 | 3.30 | 1.11-9.78 |
| No | 130 | 79.27 | 52 | 92.86 | | |
| Previous home delivery | | | | | | |
| Yes | 41 | 25.00 | 24 | 42.86 | 0.47 | 0.24-0.92 |
| No | 94 | 57.32 | 26 | 46.43 | | |
| Problem in previous delivery | | | | | | |
| Yes | 22 | 13.41 | 10 | 17.86 | 0.81 | 0.35-1.85 |
| No | 112 | 68.29 | 41 | 73.21 | | |

health facility in the final multiple logistic regression model. Such prior decision could be a result of previous experience or access to services. However, a conscious determination to deliver in a healthcare facility backed up with adequate counseling and birth plans have been shown to increase the odds of healthcare facility delivery because it places the pregnant woman in a better position to overcome the barriers to healthcare facility delivery.^[12,21]

Although not significant in the final model, our univariate analyses showed that increased maternal and paternal education were significantly associated with healthcare facility delivery, supporting previous finds by Duong et al., Onah et al. and Dhakal et al.^[15,22,23] This might be because education helps people to understand and appreciate the importance of healthcare facility delivery. Education can also influence hospital delivery through its

effect on socioeconomic status, as the more educated respondents are also more likely to be able to afford transportation to a healthcare facility during labor.

Attendance at ANC has been shown to be associated with healthcare facility delivery.^[24,25] In this study, all the women sampled were ANC attendees at St Patrick's Hospital. Women who attended five or more ANC visits were more likely to deliver at a healthcare facility than those who attended less than five visits. The greater number of ANC visits, the greater the opportunity to reinforce health messages. This could result in better understanding and compliance by the women.

The problems of distance, cost of transportation and accompaniment have been identified as major factors preventing women from seeking delivery services in healthcare facilities.^[26] This was also

Table 4: Sociocultural and economic factors on choice of health facility delivery

| Variable | Delivery at health facility | | Delivery at Home/TBA | | Odds ratio | 95% CI |
|--|-----------------------------|-------|----------------------|-------|------------|-----------|
| | N=164 | (%) | N=56 | (%) | | |
| Decision maker on place of delivery | | | | | | |
| Self* | 81 | 49.39 | 32 | 57.14 | * | * |
| Husband | 69 | 42.07 | 16 | 28.57 | 0.60 | 0.30-1.16 |
| Mother/Mother-in-law | 10 | 6.10 | 6 | 10.71 | 1.52 | 0.51-4.53 |
| Culture encourages home delivery | | | | | | |
| Yes | 12 | 7.32 | 9 | 16.07 | 0.40 | 0.16-1.02 |
| No | 142 | 86.59 | 43 | 76.79 | | |
| Traditional practice at delivery | | | | | | |
| Yes | 8 | 4.88 | 7 | 12.50 | 0.40 | 0.14-1.16 |
| No | 135 | 82.32 | 47 | 83.93 | | |
| Belief that hospital delivery is for weak women | | | | | | |
| Yes | 1 | 0.61 | 1 | 1.79 | 0.34 | 0.02-5.52 |
| No | 162 | 98.78 | 55 | 98.21 | | |
| Unable to afford cost of hospital delivery | | | | | | |
| Yes | 14 | 8.54 | 9 | 16.07 | 0.49 | 0.20-1.20 |
| No | 150 | 91.46 | 47 | 83.93 | | |
| Had money for transportation during labor | | | | | | |
| Yes | 139 | 84.76 | 15 | 26.79 | 2.82 | 1.32-6.03 |
| No | 20 | 12.20 | 37 | 66.07 | | |

* = Reference variable

Table 5: Multiple logistic regression of predictors of choice of health facility delivery

| | β | S.E. | Wald | df | P value | Exp (B) | 95% CI Exp(β) | |
|--|---------|------|-------|----|---------|---------|-----------------------|--------|
| | | | | | | | Lower | Upper |
| 1 Child compared to 2-4 children | 1.56 | 0.76 | 4.23 | 1 | 0.04 | 4.77 | 1.08 | 21.13 |
| 1 Child compared to 5 or more children | 1.34 | 0.90 | 2.24 | 1 | 0.14 | 3.83 | 0.66 | 22.26 |
| Labor occurred at night | -3.81 | 0.71 | 28.76 | 1 | <0.01 | 0.02 | 0.01 | 0.09 |
| Labor allow time | 1.45 | 0.67 | 4.73 | 1 | 0.03 | 4.26 | 1.15 | 15.71 |
| Planned to deliver at hospital | 3.41 | 0.85 | 16.18 | 1 | <0.01 | 30.17 | 5.74 | 158.70 |
| Constant | -0.8311 | 0.86 | 0.93 | 1 | 0.34 | 0.44 | | |

shown in this study as women who did not have money for transportation during labor were more likely to deliver at home. Although not significant in the final model, those who live more than an hour from the hospital were less likely to deliver there, and opted for home delivery or a nearby TBA. Additionally, many women are unable to deliver in the healthcare facility due to the unavailability of

their husbands or a relatives to accompany them to the healthcare facility during labor.^[27,28]

Many women deliver in a healthcare facility after referral from TBAs or other health professionals following pregnancy or labor related complications.^[19] This study also showed the significance of this factor with healthcare facility delivery in the univariate

analysis. The place of previous deliveries is also likely to affect subsequent deliveries.^[24,29] Our study indicates that women who have delivered at home previously were more likely to do so again.

Interestingly, cultural factors and myths which have been shown to increase home delivery, (e.g. culture encourages home delivery, the belief that weak women deliver at a health facility, etc.) were not found to be significant factors. Because all women participating in the study attended at least one ANC visit, ANC may be an opportunity to dispel cultural myths. Surprisingly, we found that a high percentage of women delivered at a healthcare facility in this study when compared to previous studies and our hospital records.^[8,9] Idris, Sambo and Ibrahim had found that one barrier to health facility delivery was the negative attitudes of providers.^[9] However, in this study, a high percentage of women in both groups felt the hospital staff was friendly and were satisfied with the ANC they received. This may have influenced the high rate of healthcare facility delivery, although this was not significantly associated with healthcare facility delivery.

4.1. Limitations of study

In this sample 146 (67%) of the respondents delivered in St Patrick's Hospital. This is much higher than the 25% found from the ANC register. This may be due to selection bias because immunization clinic might be a reflection of the more dedicated clientele of the hospital. The same reasons that made them deliver at the hospital may have influenced their decision to also continue with the immunization of their children at the hospital. Additionally, because the answers to the questions were self-report this study may also be limited by self-report bias as it is possible that the true opinions of all the respondents were not reflected due to perceived social pressure to respond to the questions in a certain way. Because women could participate in this study if they had delivered within 18 months, there is the possibility of recall bias in that the women might not have been able to remember circumstance surrounding an event that happened several months prior to the survey. This study was conducted in Ebonyi State, in Southeastern Nigeria and may not be generalizable

to other states in Nigeria. Additionally, this study was conducted at one hospital in Ebonyi State and may not be generalizable to other hospitals.

5. Conclusions and Global Health Implications

We found that barriers to healthcare facility delivery among women who attended ANC in a developing country were mostly associated with factors surrounding labor and a lack of planning. Early commencement of ANC by pregnant women should be encouraged at the community level. During ANC, pregnant women should be counseled on how to detect labor signs early and to seek care early in labor. There should be focused and intensified counseling for women with more children and those with history of previous home deliveries to emphasize the benefit of facility delivery. ANC attendees should be encouraged to prepare for childbirth financially and psychologically through the institution of "Birth Plan" counseling sessions. Increased social support is needed throughout pregnancy and it should be intensified near delivery. Such social support should also include financial provisions for the women during the third trimester of pregnancy to help facilitate their transportation to the healthcare facility when labor ensues. ANC may also be important for dispelling cultural beliefs that prevent women from delivering at a healthcare facility.

Compliance with ethical standards

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Key Messages

- Factors associated with labor strongly predicted healthcare facility delivery among women who attended antenatal care (ANC) including, labor at night, and labor allowed time for transportation.
- ANC visit should provide an opportunity to educate pregnant women on how to detect labor signs early and to seek care early in labor.
- Healthcare providers should utilize ANC sessions to prepare pregnant women for childbirth through the institution of “Birth Plan” counseling sessions where other best practices including healthcare facility delivery are encouraged.

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