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DETERMINANTS OF PLACE OF BIRTH DECISIONS IN UNCOMPLICATED CHILDBIRTH IN BANGLADESH: AN EMPIRICAL STUDY

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INTRODUCTION

The World Health Organization (WHO) estimates that worldwide 358,000 women die annually from pregnancy-and childbirth-related complications; with sub-Saharan Africa and South Asia accounting for 87% of these deaths (World Health Organization, UNICEF, UNFPA, & The World Bank, 2010). The United Nations Millennium Development Goal 5 (MDG-5) (2006) has identified the reduction of maternal mortality by three quarters, between 1990 and 2015, as a global public health priority. The most effective, internationally recognized strategy to reduce maternal mortality is for every woman to be assisted by a skilled birth attendant (SBA) who is supported or backed by emergency obstetric care (Cambell & Graham, 2006; De Brouwere & Van Lerverghe, 2001; Paxton, Maine, Freedman, Fry, & Lobis, 2005; Paxton, Maine, Freedman, & Smith, 2003).

SBAs are accredited health professionals, such as a midwife, doctor or nurse, who are educated and trained to proficiency in the skills needed to manage normal pregnancies, childbirth and the immediate postnatal period, and in the identification, management and referral of complications in women and newborns (Thomson, 2005). The proportion of births attended by skilled health personnel is one of the indicators of progress towards MDG-5. The successes of strategies that promote SBAs are dependent on both their availability and use during childbirth. In developing countries worldwide lack of availability of SBAs restricts use, however, data from *India* (Griffiths & Stephenson, 2001; Sunil, Rajaram, Zottarelli, & Zottarelli, 2006), *China* (Anson, 2004), *Vietnam* (Duong et al., 2004),

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Uganda (Amooti-Kaguna & Nuwaha, 2000) *Guatemala* (Glei, Goldman, & Rodriguez, 2003) and *Nigeria* (Esimai, Ojo, & Fasubaa, 2002) indicate women choose homebirth with lay attendants despite the availability of SBA services. Although, numerous reasons contribute to the observed under utilization of SBAs (Koblinsky, Anwar, Mridha, Chowdhury, & Botlero, 2008), their role and relative importance in decision-making, particularly among women who do not experience complications, is not clear. Gabrysch and Campbell's (2009) review of determinants of delivery service use in low and middle income countries yielded no studies that distinguished preventive (i.e., precautionary seeking of a SBA for anticipated normal delivery) and emergency (i.e., seeking of a SBA in the event of complications) care-seeking despite the global emphasis that SBAs attend all deliveries.

Here we describe a study designed to test the predictive power of women's reasons for delivering at home or in a facility (henceforth, referred to as decision criteria) in the event of uncomplicated childbirth in a area where SBAs are available. We conducted a retrospective, cross-sectional study in two phases: (i) the first qualitative phase used data from in-depth interviews of 25 women to identify the criteria used in the decision-making process, (ii) the second quantitative phase used data from structured questionnaires of 246 women to test the predictive capability of the decision criteria identified from the first phase.

METHODS

Analytical Approach

Ethnographic decision modeling, a context-sensitive cognitive modeling strategy, was employed (Gladwin, 1989). The approach uses in-depth interviewing to elicit from individuals their decision criteria within a narrative about the decision making process itself (Bernard, 2006). Categorical criteria are identified and then combined, clustered, and ordered by the researcher in the form of a composite decision tree based on individual decision processes. After construction, the criteria and model are validated against actual choice data in a different yet representative sample from the same population from which the criteria were identified. This paper is a report of the second phase of the study, the predictive capability of the decision criteria.

Study Setting

In Bangladesh, a low-income country in Southeast Asia, the government has prioritized training and deployment of SBAs. Matlab, a rural area in the Chandpur district southeast of the capital city Dhaka, was the site of the study. Approximately 90% of the population is Muslim, the remainder is Hindu, and almost all residents speak in *Bangla*, the official national language. The principal economic activities are agriculture and fishing. Remittances from men who migrate to the city or abroad for work are another source of income. Matlab is the principal field station of the International Center for Diarrheal Disease Research, Bangladesh (ICDDR,B) and home to a series of maternal and child health program trials (Dynes M et al., 2011) and the longest standing Health and Demographic Surveillance System (HDSS) in the developing world (HDSS, 2007). At the time of the study, there were 31,527 women 15-49 years of age residing in the 67 villages that make up the four blocks of the service area where an estimated 2,700 births occur each year. Midwives (with auxiliary staff) routinely provide basic essential obstetric care at the four health sub-centers and town hospital essentially free of charge 24 hours a day. As of 2001, home births with midwives were no longer offered (Blum, Sharmin, & Ronsmans, 2006; M. Chowdhury, Ahmed, Kalim, & Koblinsky, 2009); thus use of an SBA is now equivalent to facility delivery. Home births with midwives were found to be constrained by inadequate supervision, difficulty traveling, lack of family and community support, lack of security, insufficient supplies and equipment, and inappropriate environments for home delivery. The midwives practicing in

the area prefer facility-based birthing over home birthing as they are in charge: they can ensure safety, cleanliness, and availability of supplies; accommodate other work; facilitate referrals easier; and call on clinical colleagues and emergency transport if needed (Blum, et al., 2006). At the time of the study, the alternative to facility-based delivery by a SBA was home delivery attended by a *dai*. In the study context, the term *dai* refers to both traditional birth attendants who serve multiple families and to family relatives/birth attendants who assist in delivery within their own extended family.

Characteristics of Participants

The population of interest was women 18-49 years of age residing in the Matlab service area who experienced an uncomplicated pregnancy and delivery resulting in a live birth. The inclusion criteria included ever-married women who experienced a birth event in the three months prior to data collection. The exclusion criteria were the presence of antepartum or intrapartum risk factors or complications, history of chronic or underlying physical conditions known to be associated with birth complications, and major cognitive impairments. The sample was drawn from program records linked to the HDSS. For the first phase, a purposive sample of 25 women was selected, 12 of whom delivered at home and 13 in a facility. For the second phase, a representative sample was stratified by place of delivery. Screening based on the inclusion and exclusion criteria resulted in a final sample size of 246 women, of which 124 delivered at home and 122 in a facility.

The Institutional Review Board for the Protection of Human Subjects at Emory University and the Ethical Review Committee at the ICDDR,B approved both phases of the study. Oral, voluntary informed consent was obtained from all participants following standard disclosure procedures. Women were assured ICDDR,B sponsored services would remain available if they declined participation in the study.

Phase I Qualitative Research Method

Data for the first phase were collected between June and August 2007. A bilingual Bangladeshi research officer, who had accrued five years experience conducting interviews among villages in the study area, asked a series of questions using a pre-tested interview guide designed to elicit information about the respondent's pregnancy and decision process regarding place of birth. All audio-taped interviews were conducted in the home and averaged 70 (SD = 9.9) minutes. Field notes served as a backup method of retrieving data. Each interview was transcribed verbatim and translated, assisted by transcription software.

The transcripts were read repeatedly together with the field notes to extract an initial understanding of the data. As specific birth choices were discussed in the interviews, blind review of the data was not possible. The data were analyzed using a constant comparison approach. Line-by-line and highlighting analyses were conducted to identify decisional themes embedded in the narratives. Individual responses were reviewed, categorized, and ranked, according to reasons for use and non-use of facilities. Reflecting on the data from the individual cases, an evolving set of discrete decision criteria were identified and subsequently used to create questions for the second phase of the study.

Phase II Quantitative Research Method

Data for the second phase was collected through a structured questionnaire, developed by the study researchers and administered in face-to-face interviews, between September and December 2009. Four trained research officers, assisted by two porters, contacted potential informants in their homes, the customary research practice in the study area. The questionnaire, translated into Bengali, included standard socio-demographic and obstetric history questions in addition to 20 close-ended questions derived from the decision criteria

identified in phase one of the study. Each decision criteria question had a dichotomous response option (yes/no). The reference group (a “no” response) was coded 0 and the response group (a “yes” response) was coded 1. Interviews took on average one hour and twenty minutes (SD =17 minutes), verbatim responses were recorded directly on the questionnaire form.

We employed a wealth index using household asset ownership, based on a procedure described by Gwatkin and colleagues (2000) and widely used in economic analyses in developing countries. Resulting asset scores were categorized into five wealth quintiles ranging from one (poorest) to five (richest). The linear distance from a respondent's household to the nearest health facility was obtained from the ICDDR,B geographic information system. Data were entered into SPSS 17.0 software (SPSS Inc., 2008), cleaned, and described using standard descriptive statistics. Exploration of the data revealed that many variables did not meet the assumptions for use of parametric procedures; therefore chi-square tests for independence and Mann-Whitney U tests were used for select group comparisons. Statistical significance was established at $p < 0.05$.

Bivariate analyses were done to characterize group level differences in the independent variables between women who delivered in a facility and those who delivered at home. Chi-square tests were conducted to determine which of the variables were significantly associated with place of birth. Fisher's Exact test calculated significance values for criteria with cell counts < 5 . Unadjusted odds ratios with 95% confidence intervals were calculated. Next, a multivariate logistic regression using the direct entry procedure was performed. The dependent variable represented use/non-use of a facility for delivery. The independent variables represented socio-demographic and obstetric background characteristics in addition to the decision criteria. The selection of six background characteristics and seven decision criteria, for the logistic regression model, was based on the results of bivariate analyses, adequate response variation and in the case of age its known influence on place of birth decisions. Potential sources of multicollinearity were assessed using a pair-wise correlation matrix and VIF and tolerance statistics.

Eight cases had missing data on one or more of the variables to be tested. Therefore, data from 237 women were available for analysis: 122 women who delivered in the home, and 115 women who delivered in a facility.

RESULTS

Participants

Key characteristics of the participants in the qualitative and quantitative study phases were comparable in that they did not significantly differ with regard to age ($p = .58$), education ($p = .27$), parity ($p = .77$), and asset score ($p = .34$). Table 1 lists the characteristics of phase two participants. The average age of participants was 24.68 (SD = 5.1) years. The average asset quintile, a proxy measure of wealth, was 3 (SD = 1.4). Nearly all of the women were married (99.2%) and the mean marital age was 17 (SD = 2.5) years. One participant was widowed and another reported that she was deserted by her husband. Over 90% of marriages were arranged and 94% resulted in relocation to the husband's residence, characteristics of patrilocal kinship systems. The average parity was 2.2 (SD = 1.1), close to replacement level [that is, level of fertility at which a population exactly replaces itself from one generation to the next], and reflects the country's declining national fertility trends. The average educational attainment measured by the highest grade completed was 6.6 (SD = 3.4) however; 12% reported never attending school and 15% reported not being able to read or write (i.e., literacy). Over half of the sample (57.3%) was not regularly exposed to the media (e.g., watch television or listen to the radio at least once a week). The linear distance from a

participant's household to the nearest health facility ranged from .09 to 5.25 km (mean $\pm$ *SD*, 1.9 ± 1.0).

Bivariate Analysis

The results from the bivariate analysis (Table 2) indicate that compared with women who delivered in a health facility, women who delivered at home were poorer ($p = .01$), had less formal education ($p = .001$), married at a younger marital age ($p = .000$), had a higher parity ($p = .04$), reported being less exposed to media on a regular basis ($p = .05$), and had a fewer number of antenatal care encounters ($p = .02$). There was an inverse relationship between the distance to the nearest facility and its use (point-biserial correlation $r = -.261$, $p < .001$). A women's age ($p = .47$), literacy ($p = .07$), previous use of a facility for childbirth ($p = .53$), and number of usual household members ($p = .69$) did not have a significant association with place of birth and therefore were not selected for inclusion in the final model (data not shown).

As shown in Table 2, women who delivered at home were more likely to have concerns about the costs associated with delivery care ($p = .02$), receive advice by an influential person to stay home for the delivery ($p < .001$), have concerns about lack of privacy in a facility ($p = .00$), reside in close proximity to a *dai* ($p < .001$), and have an intention to deliver at home during pregnancy ($p < .001$). Women were also more likely to deliver at home if they perceived rapid progression of labour (< 3 hours from onset of labour pains) ($p < .001$), and lacked adequate transportation ($p < .001$). No significant differences were observed between place of birth and the following decision criteria: concern about "cutting" or surgical procedures ($p = .60$), availability of accompaniment to a facility ($p = .77$), labour onset at night ($p = .53$), labour onset during inclement weather ($p = .70$), and delay (> 1 hour) in making the final decision about seeking care ($p = .79$) (data not shown). Therefore, these criteria were not selected for inclusion in the final model.

Multivariate Analysis

Results of the multivariate analysis are shown in Table 3. The final model was statistically significant, X^2 ($df = 13$, $N = 237$) = 163.95, $p < .001$, indicating the predictors, as a set, reliably distinguish between women who deliver at home and those who deliver at a facility. Overall classification, on the basis of a constant alone, was 51.5%. The improvement to 85.2%, in the final model, reflects a 33% improvement over chance level. Multicollinearity was not a problem.

Four decision criteria and one socio-demographic characteristic reliably predicted the place of birth decision, according to the Wald criterion. The odds of facility delivery *increased* for women who reported an intention to deliver in a facility during pregnancy (adjusted *OR* = 14.43, 95% *CI* = 3.83-54.35), *increased* for women who reported available transportation at the time of labour (adjusted *OR* = 9.80, 95% *CI* = 3.51-27.33), and *increased* with each year increase in marital age (adjusted *OR* = 1.38, 95% *CI* = 1.12-1.70). The odds of facility delivery *decreased* for women who reported the perception of rapid progression of labour (adjusted *OR* = 0.09, 95% *CI* = 0.40-0.22) and *decreased* for women reporting that a *dai* was available in the area to assist with a home delivery (adjusted *OR* = 0.21, 95% *CI* = 0.06-0.86). In other words, a women's intention about where to deliver during pregnancy, her perception of labour progress, the availability of transportation at the time of labour, and the close proximity of a *dai* to the household were independent predictors of SBA use. Together with the above stated decision criteria, marital age was a significant predictor of use in the model.

Participant characteristics found to be significantly associated with place of birth in the bivariate analysis, but not in the multivariate analysis, include education, parity, regular exposure to the media, number of antenatal care visits, and distance from the household to the nearest health facility. Decision criteria found to be significant in the bivariate analysis but not in the multivariate analysis include: concerns about the cost of going to a facility, concerns about maintaining privacy in a facility, and receiving advice from an influential household member to deliver at home. The logistic regression estimates of these variables did not make a significant contribution to the use of SBA services and therefore did not appear in the final model. In other words, in the presence of all other variables in the model they did not best predict SBA use.

Discussion

The study contributes to research on place of birth decisions in low-resource settings in two important ways. First, the study focused on the determinants of place of birth decisions for preventive as opposed to emergent purposes. Through sampling and screening procedures we were able to isolate a representative sample of women who did not experience childbirth complications. Decisions about place of birth, namely seeking care from a SBA, typically follow perceived complications during pregnancy or difficulties during a trial of labour at home. Previously, Paul and Rumsey (2002) reported that women with a history of birth related complications, who anticipate or encounter complications, are 20-fold more likely to seek professional assistance. Similarly, Chakraborty and colleagues (2003) reported that women with a history of life-threatening complications are 2.2 (95% *CI* = 1.5-3.18) times more likely to seek care from a doctor or nurse (in the home or a facility) to treat pregnancy related morbidities. In contrast to these previous studies, none of the women in our study experienced emergent complications that required emergency obstetric care. Thus, the observed associations are not modified by the known effect of perceived or actual complications on place of birth decisions.

Second, by conducting the study in the Matlab we controlled for access to facility-based SBA services. Women in our study had the option to deliver at home with a *dai* or in a facility with a SBA. This is in contrast to many rural, low resource settings, where home birth, with or without a lay birth attendant, is the only option. Lack of access in such settings confounds the study of place of birth decisions, particularly in uncomplicated childbirth. Thus, controlling for two common variables associated with place of birth decisions- perceived or actual obstetric complications and access to SBA services- allowed us to test the predictive capability of a set of decision criteria, with regard to utilization of delivery services. We concluded that women's intention about where to deliver during pregnancy, perceptions of labour progress, availability of transportation, and availability of alternative birth attendant option were independent predictors of SBA use.

Our finding that intention was a strong predictor of health service use in childbirth is consistent with the Theory of Planned Behavior (Fishbein & Ajzen, 1975), which posits that a person's behavior is most proximally determined by his or her intention to perform the behavior. This study provides some empirical evidence in support of this theory, with intention corresponding with behavior in 71.1% of the sample. However, a gap between women's intended and actual place of delivery suggests that the behavior was not completely based on their initial intentions. Such differences may be explained by "switching behavior" a phenomenon observed in rural Karnataka, India (Matthews, Mahendra, Kilaru, & Ganapathy, 2001; Matthews, Ramakrishnan, Mahendra, Kilaru, & Ganapathy, 2005), with regard to women's health seeking behavior. Decisions about birth attendants and place of birth are part of a dynamic health seeking process involving delays in reaching and actualizing a final course of action. Conditions such as availability of

transportation and the availability of an alternative (i.e., a *dai*) are impediments to use of a facility that may prevail over positive intentions, a finding that is consistent with the literature on intention and uptake of mammography (Rutter, Steadman, & Quine, 2006). It seems a positive intention, formed during pregnancy, is necessary but not sufficient in the decision process that results in facility use; an important consideration in the measurement and evaluation of birth plans.

Not surprisingly, our study showed that availability of transportation is a major consideration in the decision to use a SBA, extending the findings of several investigations in Bangladesh (Ahmed, Islam, Mitra, Khanum, & Khuda, 1999; Chaudhury & Chowdhury, 2008; Paul & Rumsey, 2002), that show lack of transportation is a barrier to facility use and accounts for delays in access to care in complicated childbirth. Transportation acts as a key link between the potential and actual use of services and may bias patients toward the use of less trained but more easily accessible providers. In Matlab, residents typically rely on multiple modes of transportation, including traveling on foot, rickshaw, three-wheeled mini taxi, and country boat. Roads do not provide access to many remote villages, and during the rainy season, transportation becomes even more difficult due to coverage of the land-mass by flood waters. Approaches, such as targeted voucher systems (Ir, Horemans, Souk, & Van Damme, 2010) and development of community-based plans for emergency transportation (Schmid, Kanenda, Ahluwalia, & Kouletio, 2001), are shown to improve connectivity between households and health facilities.

A mother's decision to seek the care of a SBA is known to be effected by the timing of her recognition of labour onset and her perceptions about the rate of progression. In some cases, by the time the signs and symptoms of labour are recognized and care seeking is initiated, there may not be adequate time to reach a healthcare facility. The literature on emergency care is full of examples of perceived or actual time constraints in the recognition and response to complications (Chaudhury & Chowdhury, 2008; A. Chowdhury, Mahbub, & Chowdhury, 2003; Killewo, Anwar, Bashir, Yunus, & Chakraborty, 2007; Muna, Ross, Laston, & Bhuyian, 2002). Furthermore, the findings from our study of uncomplicated births show that timely recognition of labour onset and perceived rate of progression are also a critical influence on the decision to utilize health services for preventive purposes. What is not clear, however, is why some women, are sufficiently delayed in their recognition and response to normal labour as to preclude timely access to care, particularly women who want to deliver in a facility. Possible explanations include the actual experience of precipitous labour, difficulty in recognizing or interpreting the signs and symptoms of early labour onset and/or progress, and delay in informing significant others about labour onset and progression. This finding highlights the need to investigate the timing and self-diagnosis of labour onset and progression, and the initial actions taken in response to the perceived pattern of routine labour, particularly among women who have unintended home delivery. Birth preparedness and complication readiness programs need to include anticipatory guidance on the normal stages of labour in relation to when to seek care, and not solely focus on danger signs.

The proximity of a *dai* who provides home delivery services in or near to a women's *village* increased the odds of home delivery. This is expected as *dais* are the main alternative to use of an SBA in Matlab. We were unable to identify any studies that examined *dai* availability as an independent variable in place of birth decisions in Bangladesh. However, Haider's baseline survey (as cited in (Rahman, Parkhurst, & Normand, 2003) provides evidence that the shortage of SBAs coupled with the availability of TBAs are factors that favor seeking traditional delivery services. According to recent ICDDR,B registry figures, updated in 2009, 404 TBAs reside in the Matlab service area. Coupled with the family birth attendants,

who are not counted in the registry, a viable alternative to SBA use remains in Matlab, though the trend is towards use of SBAs.

Marital age emerged as a significant demographic characteristic influencing SBA use in our model, the later a women's marital age the more likely she was to use a facility based SBA. One explanation for the observed relation is that lower marital age is associated with higher parity, which in turn increases the demands placed on a women's time and financial resources, the latter resulting in a decrease in service use. However, our model accounted for parity, demonstrating the independent effect of marital age on health service use. In the demographic literature, age at first marriage is used as a proxy for women's status, with higher status being associated with older age at marriage (Balk, 1994). Older age at marriage is also associated with increase in education, urbanization and emergence of new roles for single women (Jejeebhoy, 1995). Although the specific reasons underlying the relation cannot be determined from the data in this study, with variation in education, parity, and household wealth controlled for in the analysis, it is possible that older at marriage reflects woman's autonomy and influence in household decision-making, an area for future study.

Limitations

Limitations relevant to the conduct of this study include the use of a retrospective, cross-sectional design and self-report. The data were collected at one time point, give no indication of the sequence of events, and inference of causality is not possible. As with all retrospective self-reports recall bias is a concern. However, some research findings suggest that long term maternal recall of pregnancy related events is both reproducible and accurate, including mode of delivery, onset of labour, arrival at the hospital, and actions of others (Githens, Glass, Sloan, & Entman, 1993; Quigley, Hockley, & Davidson, 2007; Simkin, 1992; Tomeo et al., 1999). By limiting the recall period to 3 months, and focusing on one specific birth event, attempts were made to minimize this bias. These findings, while not generalizable to the rest of Bangladesh, might be relevant to areas where services are available but underused. Finally, because home-based SBA services were not available in the study area, our findings reflect the decision to deliver at a facility with an SBA or at home with a *dai*, not the decision to use home versus facility based SBA services-a distinct decision.

Conclusion

In many rural, low-resource areas worldwide, SBA services do not exist and women have no choice but to deliver at home without a SBA. Yet, our results show that access to SBA services does not guarantee use. Instead specific considerations and conditions during pregnancy and in and around the time of birth influence the preventive health seeking behavior of women during childbirth. Our findings have implications for birth preparedness and complication readiness initiatives that aim to strengthen timely use of SBAs for all births. Demand side strategies to reduce barriers to health seeking, as part of an overall health system strengthening approach, are needed to meet the MDG-5 goal.

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Table 1

Characteristics of Participants

Characteristic	Total Sample (N = 246)	Home Delivery (n = 124)	Facility Delivery (n = 122)	p value
Age in Years (n%)				0.47
18-21	85 (34.7%)	38 (30.9%)	47 (38.5%)	
22-25	67 (27.3%)	34 (27.6%)	33 (27.0%)	
26-29	45 (18.4%)	26 (20.3%)	19 (15.6%)	
30	48 (19.6%)	25 (20.3%)	23 (18.9%)	
Parity (n%)				0.04
1	84 (34.3%)	34 (24.7%)	50 (41%)	
2	73 (29.8%)	38 (30.9%)	35 (28.7%)	
3	57 (23.3%)	36 (29.3%)	21 (17.2%)	
4	31 (12.7%)	15 (12.2%)	16 (13.1%)	
Marital Age in Years (n%)				<0.001
<15	30 (12.2%)	15 (12.2%)	15 (12.3%)	
15-18	158 (56.3%)	91 (74.0%)	67 (54.9%)	
18-21	45 (18.4%)	17 (13.8%)	28 (23.0%)	
22-25	12 (4.9%)	-	12 (9.8%)	
Education by Grade Completion (n%) *				<0.001
Never attended	30 (12.2%)	18 (14.6%)	12 (9.8%)	
1-5 years	62 (25.3%)	37 (30.1%)	25 (20.5%)	
6-10 years	134 (54.7%)	63 (51.2%)	71 (58.2%)	
11-14 years	19 (7.8%)	5 (4.1%)	14 (11.5%)	
Asset Score (n%)				0.01
1 (lowest)	43 (17.8%)	29 (23.6%)	14 (11.8%)	
2	50 (20.7%)	25 (20.3%)	25 (21.0%)	
3	48 (19.9%)	25 (20.3%)	23 (19.3%)	
4	53 (22.0%)	25 (20.3%)	28 (23.5%)	
5 (highest)	47 (19.5%)	18 (14.6%)	29 (24.4%)	
Regular Exposure to Media (n%)				0.04
Yes	105 (42.7%)	45 (36.3%)	60 (49.2%)	
No	141 (57.3%)	79 (63.7%)	62 (50.8%)	
Antenatal Care Visits (n%)				0.02
None	5 (2.0%)	3 (2.4%)	2 (1.6%)	
1	7 (2.9%)	4 (3.3%)	3 (2.5%)	
2	19 (7.8%)	10 (8.1%)	9 (7.4%)	
3	76 (31.0%)	46 (37.4%)	30 (24.6%)	
4	138 (56.3%)	60 (48.8%)	78 (63.9%)	

Characteristic	Total Sample (<i>N</i> = 246)	Home Delivery (<i>n</i> = 124)	Facility Delivery (<i>n</i> = 122)	<i>p</i> value
Distance (km) from Nearest ICDDR,B Health Facility (n/%)				<0.001
1	48 (19.5%)	12 (9.7%)	36 (29.5%)	
1.1-2.0	80 (32.5%)	46 (37.1%)	34 (27.9%)	
2.1-3.0	64 (26.0%)	40 (32.3%)	24 (19.7%)	
3.1	23 (9.3%)	14 (11.3%)	9 (7.4%)	
Unknown	31 (12.6%)	12 (9.7%)	19 (15.6%)	

Note: Significance levels for differences between home and facility delivery groups

*
1 case missing

Table 2
Results of Descriptive and Bivariate Analysis for Decision Questions by Place of Birth, Odds of Home Delivery

No	Decision Criteria Question	Total Sample (N=246)	Home Delivery (N=124)	Facility Delivery (N=122)	p value	Unadjusted Odds Ratio (OR)	95% Confidence Interval (CI)
01	During your pregnancy did you worry that going to a facility would cost too much money?						
	Yes	20 (8.1%)	15 (12.1%)	5 (4.1%)	.022	3.20	
	No	226 (91.9%)	109 (87.9%)	117 (95.9%)		1.00	1.1, 9.2
02	During your pregnancy did any influential person in your life (such as a mother-in-law, sister-in-law, or husband) advise you to stay at home for delivery?						
	Yes	58 (23.6%)	44 (35.5%)	14 (11.5%)	<.001	4.24	
	No	188 (76.4%)	80 (64.5%)	108 (88.5%)		1.00	2.1, 8.3
03	During your pregnancy, did you worry about going to facility because of lack of privacy (break purdah)?						
	Yes	58 (23.6%)	39 (31.5%)	19 (15.6%)	.003	2.50	1.3, 4.6
	No	188 (76.4%)	85 (68.5%)	103 (84.4%)		1.00	
04	During your pregnancy, was there a dai in your area (household, bart, or close to your bart) to assist with a home delivery?						
	Yes	210 (85.4%)	120 (96.8%)	90 (73.8%)	<.001	10.70	3.6, 31.3
	No	36 (14.6%)	4 (3.2%)	32 (26.2%)		1.00	
05	During your pregnancy, where did you want to deliver?						
	Home	61 (24.8%)	57 (46.0%)	4 (3.3%)	<.001	14.02	
	Facility	185 (75.2%)	67 (54.0%)	118 (96.7%)		1.00	5.25, 37.45
06	Did you labour progress very quickly or rapidly? (delivered <3 hours after labour pains started)						
	Yes	122 (49.6%)	89 (71.8%)	33 (27.0%)	<.001	6.86	3.9, 11.9
	No	124 (50.4%)	35 (28.2%)	89 (73.0%)		1.00	
07	During your labour, was transportation available to reach a facility? [†]						

No	Decision Criteria Question	Total Sample (N=246)	Home Delivery (N=124)	Facility Delivery (N=122)	p value	Unadjusted Odds Ratio (OR)	95% Confidence Interval (CI)
	Yes	183 (74.7%)	74 (60.2%)	109 (89.3%)		0.18	0.91, 0.36
	No	62 (25.3%)	49 (39.8%)	13 (10.7%)	<.001	1.00	

Note: Significance levels for differences between home and facility delivery groups indicated by p values derived from Pearson Chi Square test or when cell counts < 5 by Fisher's Exact test.

[†] 1 missing.

Summary of Multivariate Logistic Regression Analysis for Decision Criteria and Participant Characteristics Associated with Place of Birth, Odds of Facility Delivery (N=237)

Table 3

Predictors	B	SE	Wald	Adjusted Odds Ratio ^a	95% CI for Odds Ratio	
					Lower	Upper
Constant	-10.28	2.61	15.57	.000		
Marital Age	.324	.107	9.23	1.38**	1.12	1.70
Media Exposure	.354	.424	.699	1.43	.621	3.27
Parity	.223	.201	1.24	1.25	.844	1.85
Education	.052	.067	.606	1.05	.924	1.20
Distance to Health Facility	-.288	.207	1.93	.750	.499	1.13
No. Antenatal Care Visits	.418	.261	2.58	1.52	.912	2.53
Cost Concerns	-.588	.857	.470	.556	.104	2.98
Advise to Stay Home	-.699	.556	1.58	.497	.167	1.48
Privacy Concerns	-.018	.536	.001	.982	.344	2.81
Perception of Rapid Labour Progress	-2.36	.436	29.14	.095**	.040	.223
Transportation Available	2.29	.524	18.99	9.79**	3.51	27.33
Dai Available	-1.53	.701	4.76	.217*	.055	.857
Intention Facility	2.67	.677	15.56	14.43**	3.83	54.35
Overall Predicted				85.2%		
Model	-2 Log Likelihood		Chi-Square		df	Sig.
Constant Only	328.35					
Final	164.40		163.95		13	<.001

Note: R² = .499 (Cox & Snell), .666 (Nagelkerke), Homer and Lemeshow (df 8) = .831.

^a Odds ratios have been adjusted for all other predictors in the model.

* p < .05,

** p < .01.