Predictors of Home Deliveries in Rakai District, Uganda

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ABSTRACT

In order to identify independent predictors for home delivery, 211 women from 21 clusters, who had a delivery in the previous one year, were interviewed in Rakai District, Uganda, from June 2 to 30, 1997. Mothers answered questions regarding socio-economic, local, reproductive and self-efficacy variables and whether they delivered at home or not. Ninety-four (44.5%) of the women delivered at home. On univariate analysis, the factors that favoured home delivery were: not being from Kyotera County, mother not having at least primary education, not being a Muganda, not being a Catholic, father not having secondary education, mother being a peasant or housewife, father being a peasant, living more than 5 kilometres from a maternity centre, living within more than one hour walking distance to a maternity centre, not attending antenatal clinic, saying that choice of delivery site is dependent on the mother, saying that safe delivery depends on God, previous delivery at home, and not being of high social status. On stepwise multivariate analysis, the independent factors that favoured home delivery were: not being from Kyotera County, father being a peasant, previous delivery at home, and not being from a high social class. The highest risk for current home delivery was previous home delivery with an adjusted odds ratio of 16.52. These data suggest that in addition to improving access to maternity services, educating fathers about safer delivery may discourage home deliveries. (*Afr J Reprod Health* 1999; 3(2):79-86)

RÉSUMÉ

Les facteurs qui favorisent des accouchements à la maison dans le district de Rakai en Ouganda. Pour identifier les facteurs indépendants qui favorisent des accouchements à la maison, 211 femmes venant de 21 groupements qui avaient accouché dans l'année précédante ont été interviewées dans le district de Rakai en Ouganda, du 2 juin au 30 juin 1997. Les mères ont répondu aux questions portant sur les variables socio-économiques, locaux, reproductive et l'auto-efficacité. Elles devaient aussi indiquer si elles ont jamais accouché à la maison. Suivant l'analyse univariable, il s'était trouvé que les facteurs suivants ont favorisé l'accouchement à la maison: le fait qu'on n'est pas issu du compté de Kyotera; qu'on a un père qui n'est pas scolarisé au niveau de l'école secondaire; qu'on a une mère paysanne ou qu'on est une femme pot au feu; qu'on est un père paysan qui habite plus de cinq kilomètres d'une maternité; qu'on habite à une distance de plus d'une heure de marche à pied de la maternité; qu'on n'assiste pas à la consultation prénatale; qu'on affirme que le choix d'un lieu d'accouchement dépend de la mère, que l'accouchement sans risque dépend aussi bien de Dieu, que de l'accouchement à la maison antérieur et de l'appartenance à une position sociale élevée. A l'aide de l'analyse multivariable en marche d'escalier, on a constaté que les facteurs indépendants qui favorisent l'accouchement à la maison étaient les suivants: le fait qu'on n'est pas issu du compté de Kyotera; qu'on a un père paysan; qu'on a eu un accouchement à la maison antérieur; qu'on n'appartient pas à une classe sociale élevée. Le plus grand risque pour l'accouchement à la maison à l'heure actuelle était l'accouchement à la maison antérieur avec un rapport ajusté de 16,52. Les données indiquent qu'en plus de l'amélioration de l'accès au service de gynécologie-obstétrique, si les pères sont éduqués au sujet de l'accouchement sans risque cela peut décourager l'accouchement à la maison. (*Rev Afr Santé Reprod* 1999:3(2):79-86)

KEY WORDS: *Predictors, home-deliveries, Uganda*

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Introduction

The global annual maternal mortality is about 585,000 women with another 17.5 million women suffering significant maternal morbidity of birth injuries and, or, humiliating painful disabilities.[1] Nearly all these deaths and morbidities are shouldered by low income countries.[1,2] In Uganda, for example, the maternal mortality ratio (MMR) is about 600–1000 deaths per 100,000 live births, which translates to 4,800–8,000 annual maternal deaths.[3] Home deliveries in low income countries contribute to this immense human tragedy as they are bound to be unhygienic and unsupervised, and when intervention is required it is usually not at hand.[3-8]

Previous surveys in Uganda showed that whereas about 80% of women attend ANC at least once during pregnancy, only a small proportion deliver in health units.[3,9-11] Very many studies that have assessed determinants of home delivery have not analysed for the interaction and confounding among the determinants.[3-11] Since the factors influencing delivery sites are interrelated, it is difficult to know which is important without assessing their interaction and confounding. This study was designed to elucidate the independent factors influencing home deliveries. It was aimed at investigating the role of demographic, socio-economic, reproductive, local and self-efficacy factors in predicting home deliveries, with a view to suggesting remedial measures for variables that could be modified.

Methods

This was a population-based cross-sectional survey carried out in Rakai District, southwestern Uganda. The district has a projected population of 450,000 people (from the 1991 national census) distributed over an area of 4,973 square kilometres. Over 95% of the population are rural dwellers whose main occupation is (subsistence) farming. Twenty-one per cent of the total population is made up of women in the reproductive age group of 15 to 45 years, with a general fertility of 7.7 children per woman. The district is administratively divided into 4 counties — Kyotera, Kooki, Kakuto and Kabula, in descending order of population size — 21 sub-counties, 3 town councils, 112 parishes, 1,039 villages, and about 82,707 households. Kyotera County is the most affluent with better transport system, better quality health units and relatively good infrastructure.

In each of its 4 counties, there is a big government-owned health unit — 2 hospitals and 2 health centres — manned by a doctor, with facilities for caesarean section. There are other 42 health units with maternity facilities about evenly distributed in the counties. About 80% of the population live within 5 kilometres to a health unit. There are also a number of private clinics and nursing homes scattered all over the district. There is an ongoing programme of training traditional birth attendants (TBAs) on safer delivery practices, with the aim of integrating them into the health care delivery system of the district.

Selection of Study Participants

The study population was all women, aged 15-45 years, who had a delivery in the past 12 months prior to the first day of data collection (June 2, 1997). Twenty-one villages (clusters) of 10 women each were chosen. The district was first stratified into counties, then from a list of villages, the clusters were selected proportional to the population size of the counties using a table of random numbers. Standing in the centre of each village, a stick was spun and the direction it took was the one followed by interviewers, who started visiting homes in that direction. If a home did not have the appropriate mother for the interview, the next home was visited, until the sample required was obtained.

Data Collection Instruments

A pre-coded and pre-tested questionnaire was administered to the mothers from June 2 to 30, 1997, in the selected clusters by trained interviewers who were either community development or health assistants employed by the district. To establish the economic status of respondents, observations were made during the interviews. These observations were made on the materials in which the wall, roof and floor of the main house were made of and the type of properties owned by the family (such as car, bicycle, radio, and a farm of crops and/or animals).

Measurement of Variables

Dependent variables

In this study, the criterion for home delivery was delivery at home for the whole process of labour without being transferred to a health unit. Non-

home deliveries include those mothers who were transferred to the TBA's place or to a health unit before or during the process of labour.

Independent variables

The independent variables were age, ethnic background, religion, marital status, educational level of mother and father, occupation of mother and father, and distance to the nearest maternity. They also include time taken to walk to the nearest maternity unit, distance to the nearest health unit where caesarean section is done, and attendance of antenatal care for recent delivery. Others are whether decision to attend ANC depends on father or not, who determines place of delivery, whether safe delivery depends on God, parity, whether previous delivery resulted in live birth or stillbirth, type of previous delivery, place of previous delivery, county, and socio-economic status. In this paper, previous delivery refers to the one preceding the most recent (recent is the one under study).

Homesteads were observed for indicators of socio-economic status. These indicators were given scores depending on the materials used for roof, floor and walls of main house — for the roof (1 for grass thatch, 2 for iron sheets and 3 for tiles); floor (1 for non-cemented and 2 for cemented); wall (1 for mud and wattle and 2 for brick or stone). Household property, like owning a radio 2 marks, bicycle 2 marks, a farm of food and cash crops 2 marks, owning a farm of animals 3 marks and a car 4 marks, were also recorded. Then the homesteads were categorised into the following classes of economic status: A — high (>14 scores), B — medium (7014 scores) and C — low (>7 scores).

Ethical Considerations

The Examination Board of the Faculty of Medicine, Makerere University, approved the research, and informed consent was sought before interviewing.

Data Analysis

Univariate analysis with the chi-square or Fisher's exact test was used to compare proportions. To identify independent predictors of home delivery, stepwise multivariate logistic regression procedures were used. All variables that were significant on univariate analysis (p) were used in the multivariate analyses. Forward selection and backward elimination methods were used to enhance the robustness of the model. Both procedures produced the same model. Variables that did not improve the fit of the regression (as measured by log likelihood) were left out. Statistical packages, *Epi-Info* version 6 and *SPSS/PC+*, were used in the analyses.

Results

The ages of the 211 women ranged from 15 to 45 years with a mean age of 25 years. The parity range was 1 to 12 pregnancies with a mean of 4 and median 3. Most (70%) of the women were of the Baganda ethnic group. Others were Banyankole (13%), Bakiga (4%) and Banyarwanda (13%). Of the 211 women interviewed, 94 delivered at home, giving a prevalence rate of 44.5% (95% confidence interval (CI) 37–51). The factors influencing place of delivery are presented under socio-demographic, reproductive, local/access, self-efficacy and predictor variables.

Demographic and Socio-Economic Variables

The results of the demographic and socio-economic variables are shown in Table 1. On univariate analysis, the variables that favoured home delivery include not being a Mugandan, not being a Catholic, mother not having attended school, father not having at least secondary education, mother being a peasant or house wife, father being a peasant, and not belonging to high social class. The crude odds ratios (COR), 95% confidence interval (CI) and p-level of these variables are shown in Table 1.

Reproductive Variables

The results of the reproductive variables are shown in Table 2. On univariate analysis, the only reproductive variable that favoured current home delivery was previous delivery at home. Previous type of delivery was only marginally significant ($p = 0.051$). Previous birth outcome appeared not to influence current site of delivery.

Table 1 **Crude's Odds Ratios, 95% Confidence Interval and P-Levels of Socio-Economic and Demographic Variables Influencing Site of Delivery**

Variable	Home N=94	Non-home N=117	Crude's odds ratio	95% confidence interval	P-level
Age					
Less than 24	47	57	1.05	0.62-1.81	0.85
24 and above	47	60			
Tribe					
Baganda	55	93	0.36	0.20-0.67	0.002
Others	39	24			
Religion					
Catholic	40	69	0.52	0.39-0.89	0.03
Others	54	48			
Marital status					
Married	64	85	0.80	0.44-1.46	0.57
Not married	30	32			
Mother's Education					
None	26	17	2.25	1.08-4.27	0.03
Primary/secondary	68	100			
Father's education					
None/primary	80	82	2.44	1.16-5.17	0.02
Secondary	14	35			
Occupation of mother					
Peasant/housewife	83	98	1.46	0.66-3.25	0.46
Business/salaried/employed	11	19			
Occupation of (father)					
Peasant	64	49	2.31	1.24-4.31	0.007
Business/salaried/employed	30	53			
Socio-economic class					
A (compared with B and C)	16	41	0.38	0.20-0.74	0.006
B (compared with A and C)	49	51	1.41	0.82-2.43	0.27
C (compared with A and B)	29	24	1.72	0.92-3.26	0.11

Table 2 **Crude's Odds Ratios, 95% Confidence Interval and P-Levels of Reproductive Variables Influencing Site of Delivery**

Variable	Home N=94	Non-home N=117	Crude's odds ratio	95% confidence interval	P-level
Parity					
1	10	22			
>1	84	95	0.51	0.23-1.15	0.15
Type of previous delivery					
Vaginal	68	82			
Caesarean section	14	6	0.34	0.11-1.01	0.051
No previous delivery	12	21	1.38	0.60-3.24	0.20
Place of previous delivery					
Home	70	26			
Non-home	12	70	15.57	6.93-36.32	<0.001
No previous delivery	12	21	4.71	1.89-11.93	<0.001
Live birth at previous delivery					
Yes	62	75			
No	20	21	0.88	0.41-1.88	0.32
No previous delivery	12	21	1.60	0.67-3.87	0.34
Stillbirth at previous delivery					
Yes	17	31			
No	66	83	1.62	9.69-3.84	0.32
No previous delivery	12	21	2.75	0.86-8.97	0.10

Previous delivery refers to the one preceding the most recent (recent is the one under study).

Local Variables

The variables refer to the address of the mother and accessibility to health units relative to her address. The local variables include county and access to health units with maternity services and facilities for caesarean section. On univariate analysis, all the local variables were statistically significant. Twenty (25%) of the 70 mothers in Kyotera delivered at home, compared with 74 out of 132 (65%) in other counties (COR 0.27, CI 0.14–0.49, p<0.0001). Sixty-three out of 163 (39%) mothers who were within 5 kilometres to a maternity centre delivered at home, compared with 31/47 (66%) of those who lived more than 5 kilometres from a maternity centre (COR 0.35, CI 0.17–071, p =0.003). Twenty out of 78 (26%) mothers who were within one hour walking distance to a maternity centre delivered at home, compared with 74 out of 133 (56%) of those who were within more than one hour walking distance to a maternity centre (COR 0.27, CI 0.14.65, p <0.001). Thirty-three out of 137 (26%) of the mothers who were within 5 kilometres to a health unit that could do caesarean section delivered at home, compared with 61 out of 94 (65%) who were more than 5 kilometres from a health unit that could do caesarean section (COR 0.21, CI 0.11–0.40, p-level < 0.001).

Table 3 **Adjusted Odds Ratios, 95% Confidence Interval for Independent Predictors of Home Deliveries**

Variable	Adjusted odds ratio	95% confidence interval	P-level
Previous place of delivery (home)	16.51	7.01-38.84	<0.001
County (not Kyotera)	3.91	1.75-8.33	0.008
Husband's occupation (peasant)	2.32	1.09-5.00	0.03
Socio-economic class (not high)	4.06	1.61-10.00	0.003

Self-Efficacy Variables

Self-efficacy can be defined as a person's belief that she can perform the desired behaviour and that she can cope with barriers that may hinder actual performance.[12,13] Thus, self-efficacy variables for this study refer to the mother's ability to perceive practices such as attendance of ante-natal clinic and choice of place of delivery as to whether they depend on her or other people and, or, things. Out of the 211 women interviewed 176 (83%) attended ANC at least once. Not attending ANC favoured home delivery (COR 3.33, CI 0.14–0.65, p-level = 0.003). Ninety-nine out of 211 (47%) said that attendance of ANC depended on the spouse. There was no significant difference in proportion of home deliveries between women who said ANC attendance depended on the spouse 41/99 (41%) and those who said it does not depend on the spouse 53/112 (47%) (COR 0.79, CI 0.46–1.36, p= 0.47). Regarding choice of delivery site, 122 out of 211 women (58%) said that the delivery site choice very much depended on them. Others said that the choice of delivery site was mainly dependent on the spouse 53 (25%); mother-in-law 8 (4%); traditional birth attendant 13 (6%); and midwife 15 (7%). Women who said that delivery site depended on them 63/122 (56%) were more likely to deliver at home, compared with those who said it depended on other people 31/89 (35%) (COR 1.99, 1.14–3.51, p=0.02). Women were asked whether safe delivery depended on God. One hundred and sixty-six out of two hundred and eleven (79%) answered in the affirmative. Women who said that safe delivery depended on God 79/164 (48%) were more likely to deliver at home, compared with those who said that safe delivery does not depend on God 15/47 (32%) (COR 1.98, CI 1.01–3.95, p=0.048).

Predictor Variables

All the variables that were significant on univariate analysis ($p<0.05$) were included in the multivariate analysis. Other variables that should normally make it a prerequisite for a woman to deliver in a health unit, like previous caesarean section, were also included. The variables that emerged as predictor variables after multivariate regression analysis are shown in Table 3. Thus, home delivery is independently favoured by previous delivery at home, mother not being from Kyotera county, father being a peasant, and mother not being of high social class. The adjusted odds ratios, 95% confidence interval and p-level of the predictor variables are shown in Table 3. The strongest predictor for current home delivery was previous delivery at home, with an adjusted odds ratio of 16.51.

Discussion

This study replicated earlier findings in Uganda, which show that whereas more than 80 per cent of pregnant mothers attended antenatal clinic at least once, a much smaller proportion deliver in health units.[3,9-11] The proportion of home deliveries is similar to that found in the Uganda and demographic health survey[3] and other surveys in Uganda.[9-11]

Most previous research into factors influencing place of delivery have not assessed previous delivery site and never evaluated interaction and confounding among the determinants.[3-7,9-11] This study examined the effect of previous delivery site and

also controlled for interaction and confounding of factors. It was therefore possible to identify independent predictors associated with home deliveries. Thus, after adjustment for interaction and confounding, the only significant variables were occupation of the father, previous place of delivery, county and mother's socio-economic class. Factors that were found to be significant in previous studies,[3,9-11] such as parity, age, educational level of mother, and occupation of mother were found not to be significant in this study after multivariate analysis. These studies never adjusted for confounding and interaction, and this could have been a possible reason for the difference in findings.[14]

The occupation of the father emerged significant in multivariate analysis. It was interesting that education and occupation of the mother did not appear significant. Thus, this study suggests that decision on where to deliver may be more influenced by the father rather than the mother herself, and may point to the dominant role men play in decision-making in Uganda.[3] On the other hand, these results may imply that mother's influence on delivery site may be mediated through the socio-economic status as was defined in our study.

Distance to health units has been found to be a significant factor in deciding where women deliver, and more so distance to units where obstetric emergencies can be handled both in Uganda[3] and elsewhere.[4,7-8] In our study, these factors were significant on univariate but not on multivariate analysis. This could be because we only assessed the physical distance and walking time, but not the time spent to reach delivery centres with other transport means such as a car or motorcycle. Such means of transport may be important especially in prolonged labour. Another factor closely related to accessibility of health units was the county of the mother. The Kyotera County that has a good transport system and relatively better health units has a much lower proportion of home deliveries than the other counties, and this could be a reflection of the relatively good infrastructure and better quality of health services in the county. Another explanation may be the selection bias of respondents. Our random cluster sample, however, makes this less likely.

The strongest factor influencing home delivery in this study was habit, that is to say that mothers who delivered at home previously were sixteen times likely to deliver at home again. Our qualitative results from the same district,[15] and from literature, support habit as a strong influence of current behaviour.[16,17] Respondents in the focus group discussions in our earlier qualitative study said that a mother who delivered without complications at a previous site is more likely to deliver there again.[15] Since more deliveries are naturally uneventful, then mothers who previously delivered at home without mishap are more likely to choose to deliver there again. It has been suggested that changing specific habits may be difficult,[18] suggesting that education on safer delivery practises should be tailored to existing habitual delivery practises. In this aspect, the use of TBAs in assisting deliveries (probably to mothers in their homes) may be indispensable.[19]

Thus, our data suggest that when educating mothers about the need to deliver in health units, there is need to involve their spouses. There is also need for health education messages that will target both low and medium economic classes and those who are spouses of peasants. The improvement of access and quality of care in health units, though technically and financially difficult, may also be an important intervention for promoting delivery in health units. A more practical way that has been suggested is the establishment of maternity waiting places near health units where mothers may be admitted a few days before commencement of labour.[10]

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