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Determinants and contextual influences on the use of skilled birth attendants at delivery in Makueni County, Kenya: a cross sectional study

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Abstract

Background
Kenya has a maternal mortality ratio of 488 per 100,000 live births. Preventing maternal deaths depends on ensuring that there is a skilled birth attendant at delivery. Kenyan national statistics estimate that 44% of births are attended by a skilled health professional. With the objective of increasing the access and utilisation of skilled birth attendants, this study examines the associations between mother’s characteristics, access to reproductive health services and the use of skilled birth attendants.

Methods
Secondary data analysis of a cross sectional cluster survey was conducted, including bivariate measures of association and multivariable logistic regression at 95% confidence interval.

Results
Bivariate measures of associations of the mother’s characteristics demonstrated that education, employment status and number of births in the past five years were significant. Use of modern family planning methods and frequent and early antenatal care attendance was significantly associated with use of reproductive health services. At multivariable logistic regression, the mothers who were formerly married (widowed, divorced or separated) were eight times likely to use skilled birth attendants at delivery. A higher education level for the mother and the partner were also associated with increased odds of using skilled delivery. In terms of employment status- mothers who were employed by a different employer (employers other than themselves) had a high probability of accessing skilled birth at delivery. Mothers, who had three or more children, similarly had increased odds of using skilled birth attendants. Attending four ANC sessions or more increased the odds of skilled delivery. Further, a shorter distance to health facilities (1-5 Km) was associated with an increase in skilled birth attendant at delivery.
Conclusions

Further research is required in order to better understand some of the unexpected results. The areas of partner’s level of education, marital status, and mother’s employment status will have to be investigated before providing recommendations on the improved utilisation of skilled birth attendants in Makueni County.

Keywords

Maternal Health, Skilled Attendant, Delivery, Birth, Obstetric Care, Kenya
Background

The Millennium Development Goal (MDG) number 5, on improving maternal health, has made the least amount of progress to date, on a worldwide scale [1]. Global statistics estimate that in 2010 there were 287,000 maternal deaths and 99% took place in developing countries [2]. Sub-Saharan Africa accounts for 56% of the global maternal deaths [2]. Data from the most recent Kenya Demographic and Health Survey (KDHS) demonstrates that Kenya has a maternal mortality ratio of 488 per 100,000 live births [3]. The maternal mortality ratio in Makueni County is 452 per 100,000 live births [3].

The use of a skilled birth attendant at delivery is viewed as the most important intervention to prevent maternal deaths; target 5.2 of the MDGs focuses on the proportion of births that are delivered by a skilled birth attendant. The majority of maternal deaths are entirely preventable, and the presence of a skilled professional reduces the risk of complications becoming fatal. Postpartum haemorrhage remains the number one cause of maternal deaths globally and with the presence of a skilled birth attendant these deaths can be avoided [4]. Globally, 66% of births are attended by a skilled professional and within sub-Saharan Africa 49% of births are delivered by a skilled birth attendant [5]. On a country level, 44% of births in Kenya are attended by a professional compared to 43.1% of the births in the Eastern Province [3].

The objective of this study is to identify relationships between the mother’s characteristics, (Table 2) access to reproductive health services and the use of skilled birth attendants during delivery. The analysis will be used to make recommendations on improving maternal health in Kenya and increasing the access and utilisation of skilled birth attendants.

Methods

Study design

A secondary data analysis was conducted to a cross sectional cluster survey that was collected for an African Medical & Research Foundation (AMREF) intervention project.
entitled *Mama na Mtoto wa Afrika* (Mother and Child of Africa) in Makueni County, Kenya. The outcomes of the *Mama na Mtoto wa Afrika* project focus on increasing the access and utilisation of maternal health services, and increasing the capacity of local health systems to provide quality services. The cross sectional survey was a component of baseline data collection and was carried out with the purpose of establishing benchmarks for the maternal, newborn and child health (MNCH) intervention project in Makueni County.

**Study area**

The household survey was conducted in Makueni County, which is located in the southern end of the Eastern Province in Kenya. The total population of Makueni is 884,527 with 11.8% living in urban areas [6]. Makueni has a surface area of 8,009 km$^2$ and a density of 110 people per km$^2$ [6]. The survey focused on five specific sub-counties: Kilungu, Kathonzweni, Mbooni East, Mbooni West and Mukaa.

**Study population**

The study population is women aged 15 – 49 years with children aged 0 – 59 months, who responded to the survey in Makueni County. Table 1 outlines the five sub-counties, the total population and the number of households that were sampled.

The primary sampling unit is based on the Population and Census Enumeration Areas used in the 2009 Population and Housing Census conducted by the Kenya National Bureau of Statistics. A two-stage sampling design was used. In the first stage, a random sample of clusters was selected for each sub-county based on probability proportional to their population. The number of clusters selected from each sub-county was determined based on population weights from the census which detailed the number of women and men per household in each locality. In the second stage, a minimum of 20 households were selected from each cluster in order to create a sample of about 1,181 households. Out of the targeted sample of 1,181 women, a total of 1,205 women aged 15-49 years were successfully interviewed including providing data on their children (0-59 months). Through
the data cleaning process, 939 respondents had complete responses and qualified for inclusion in the data analysis.

**Data collection**

Data collection took place between August 13th and 23rd, 2012. The survey questionnaire was adopted from the 2008/09 KDHS and was designed to permit the calculation of specific MNCH indicators. The survey tool was pre-tested before data collection began. Trained enumerators were responsible for collecting the data. The survey was in English; however, the enumerators were capable of translating questions into Kamba, the local language, when necessary.

**Data processing and analysis**

The data was first entered into Census and Survey Processing System version 4.0 and then it was exported to Statistical Package for Social Sciences (SPSS) for further cleaning and analysis. Statistical analysis was based on the specific objectives of: identifying association between the mother’s characteristics and the use of skilled birth attendants during delivery and identifying associations between access to reproductive health services and the use of skilled birth attendants during delivery.

The primary outcome of interest is the use of a ‘skilled attendant’ at delivery, which “refers exclusively to people with midwifery skills (for example, doctors, midwives, and nurses) who have been trained to proficiency in the skills necessary to manage normal deliveries and diagnose, manage, or refer obstetric complications”[7]. Within the context of the household survey, traditional birth attendants “are excluded from the category of skilled attendant at delivery”[8]. This is aligned with Kenyan national policies, the World Health Organization and the United Nations Population Fund. The survey asked respondents ‘who assisted with the delivery of (name)?’ Within the analysis, doctors and nurse/midwives were considered as a skilled attendant at delivery and traditional birth attendants, relatives, friends or any other individual was labelled as unskilled.
Data analysis was conducted using SPSS version 17.0. Bivariate statistics were used to measure the association between the outcome of skilled/unskilled delivery and independent variables. Results with statistical significant p-values (p<0.05) were then included in the logistic regression model. Multivariable logistic regression, forward stepwise selection method (Wald), was used to identify variables that lead to the utilisation of a skilled birth attendant in Makueni County. Odds ratios were reported with a 95% confidence interval.

**Ethical considerations**

Ethical approval for the secondary data analysis of the cross sectional cluster survey was provided by AMREF’s Ethics & Scientific Review Committee (ESRC). AMREF ESRC has been appointed by The Kenya National Council of Science and Technology (NCST) as one of the Institutional Review Boards (IRBs) responsible for the ethical review process in Kenya.

**Results**

Of the 939 women included in the analysis, 410 (43.7%) were assisted by a skilled birth attendant at last delivery compared to 529 (56.3%) who were not. Descriptive statistics were divided into two sections: mother’s social demographic characteristics and access to reproductive health services (Table 2 and Table 3). The majority of women, 694 (85.4%), were currently married. Over half the women had primary education, 574 (64.4%), and 201 (22.6%) had secondary education. Slightly over three quarters, 553 (79.6%), of the women were unemployed. Greater than half the women, 524 (55.8%), practiced modern family planning and 909 (96.8%) attended skilled antenatal care sessions. The distance to the nearest health facility, in kilometres, demonstrated that 679 (72.3%) women lived within one to five kilometres and 260 (27.7%) lived over six kilometres from a facility.

**Bivariate Measures of Association**

Education, employment status and number of births in the past five years were significantly associated with use of a skilled birth attendant (Table 4). Marital status and
religion were not significantly associated with use of a skilled birth attendant. For the individual and partner’s education, advanced levels of education including secondary and higher education (tertiary, university and postgraduate) were associated with an increase in skilled attendance at delivery. Women who were employed demonstrated a higher percentage of using a skilled birth attendant at delivery. Mothers who had between 0 to 1 children in the last five years were more likely to use a skilled birth attendant in comparison to women with 2 or 3 children.

Practicing modern family planning methods and attending skilled ANC sessions were associated with the outcome of using a skilled birth attendant (Table 5). Four or more ANC sessions were associated with an increased likelihood of using a skilled attendant at delivery. The earlier a mother attended her first ANC session, the increased percentage of delivering with a skilled attendant. Living in close proximity, between 1 to 5 KMs from a health facility, or a further distance of over 6 KMs was not associated with the outcome of using a skilled attendant, with a p value greater than 0.05.

**Multivariable Logistic Regression**

Using a forward stepwise selection method (Wald), multivariable logistic regression were developed (Table 6). For the mother’s characteristics, the individual level of education and the partner’s level of education were significant. A higher education level for the mother, secondary, tertiary, university or postgraduate, increased the probability of using a skilled attendant at delivery. A lower level of education for the partner, primary, none/never or pre-school, decreased the probability of a mother using a skilled attendant at delivery. In particular the odds ratio indicated that women with a high education level were eight times likely to seek delivery compared to women with no education at all.

The partner’s education level was also significant in influencing skilled delivery; in that a woman’s whose partner had a secondary education level was three times likely to access skilled delivery as compared to a woman whose partner had no education at all or had gone
up to primary school. On the contrary, a partner who had gone up to secondary school had a slightly high odds ratio of influencing skilled delivery as compared to a partner who had gone up to College or University.

Women who were employed by a different employer had high odds of seeking skilled delivery as compared to those who were unemployed or self-employed.

Number of ANC sessions and the distance to the health facility; proved to be significant in the logistic regression model. Attending ANC sessions four times or more increased the probability of the primary outcome occurring. Mothers who resided with a range of 6 Km and above from a health facility had a decreased odd of using a skilled attendant.

Discussion

The cross sectional study demonstrates that 43.7% of births within Makueni were attended by a skilled professional. These results are aligned with the KDHS, whereby statistics for skilled attendants are 44% in Kenya and 43.1% in the Eastern Province [3]. The Makueni Multiple Indicator Cluster Survey from 2008 reports lower statistics for Makueni County with 36% of births attended by a skilled professional, one of the lowest percentages within the Eastern Province [9].

The multivariable logistic regression results relating to the mother’s level of education and partner’s level of education are similar to the predominant theory that an increased level of education for a mother or her partner equals an increased odd of delivering with a skilled attendant [3, 10, 11]. The KDHS demonstrates that mothers with a higher education report higher rates of utilising a skilled attendant at birth: 72.5% for women who have completed secondary school, 48.9% for those who have completed primary school, compared to 28.5% among those who failed to complete primary schooling and 19.2% with no education [3]. Partner’s level of education is typically seen as important since it reflects the influence of the head of the household in making reproductive health decisions [12]. The results portrayed in the multivariable logistic regression are dissimilar to what is expected as they suggest that husband’s with a slightly high education level (college or university) are a
hindrance to women accessing skilled attendants as compared to the partners with secondary school education. This could be because the highly educated partners are mostly away from their rural homes—these they seek better opportunities in order to provide for their families and as such they might not be present when a woman makes the decision on whether to use skilled birth attendants during delivery.

The results depict that individuals who are formerly married (widowed, divorced or separated) are eight times likely to seek delivery compared to those who are already married. This could be due to the fact that the formerly married women enjoy a greater autonomy and hence the decision to seek skilled delivery. On the other hand, those who are married may largely depend on the decision made by their husbands, since the husband is the head of a household.

Qualitative research could shed light on the family dynamics and structural barriers that influence the woman as she makes a decision on whether to use skilled birth attendants during delivery. Investigation is needed in order to highlight the behavioural influences in Makueni County and the impact of previous maternal health programs.

Receipt of ANC was high with 96.8% of respondents reporting such care. These findings align with Kenyan national statistics of 92% of women attending ANC[3]. While ANC attendance is high, the problem arises with following through to using a skilled attendant at delivery. Only 44.6% of women who received antenatal care actually delivered with a skilled attendant. This disconnect is visible in other studies from Kenya [3, 13]. This relates to the frequency of ANC visits, with the recommended being four visits. Consistent ANC attendance should translate into the decision to use a skilled attendant at birth. The association between ANC and skilled delivery was accepted.

The logistic regression results demonstrated high odds ratios for women who sought four or more antenatal care visits; these women are more likely to seek skilled birth attendants during delivery. While it is recommended to begin ANC within the first trimester,
only 15% of women in Kenya follow these guidelines [3]. The trend in delaying ANC has been seen within other research studies in Kenya [14]. It’s plausible that the delay in ANC speaks to the quality of care, the level of satisfaction with services provided and the behavioural attitudes towards the importance of ANC. The results demonstrate that when a woman decides to attend ANC, it also influences their decision whether to seek professional care during delivery.

Further investigation is needed in order to highlight whether the importance of skilled delivery is well received during ANC sessions.

The logistic regression also demonstrated that the distance to a health facility largely influences a woman’s decision as to whether to seek skilled delivery; mothers who are far away from a health facility (6 Km and above) are less likely to seek skilled delivery. This can be attributed to the terrain in Makueni County in Kenya; some sub counties are quite hilly and have impassable roads. The obstacle effect of distance is stronger when combined with terrain and lack of transport such as ambulances to carry pregnant women to health facilities, in case they experience labour.

**Limitations of the study**

A key limitation of the research is the use of secondary data which was collected for a different purpose. During the data cleaning process, a large number of respondents (22%) were discarded and this reduced the sample size.

Due to the nature of some unexpected results, further research is required in order to gain a better understanding on the utilisation of skilled attendants at delivery in Makueni County. In terms of the mother’s characteristics, qualitative research, including focus group discussions, could provide insight into the gender and societal norms of the area and who is responsible for reproductive health decisions. An assessment of the quality of facilities and
available health care services would assist with explaining the access to reproductive health results.

Conclusion

The results of the cross sectional study present a case for further research in Makueni County specifically on the underlying structural barriers that hinder women from using skilled birth attendants during delivery. The results relating to a woman’s education level, frequency of ANC sessions, parity, accessibility to family planning and antenatal care as well as the distance to a health facility, depict maternal health trends that do not differ from standard theory. This study calls for an in depth investigation of the other variables in order to better understand the situation in Makueni County and positively influence the utilisation of skilled attendants.
List of abbreviations


Competing interests

The authors declare that they have no competing interests.

Authors’ contributions

AG: Participated in the origination of the study and its design. CH: conducted literature review, data analysis and writing of the paper. HO: participated in data analysis and writing of the paper. EK: contributed to the drafting. PO: contributed to the refinement of the initial research idea and reviewing of drafts. AL: Contributed to analysis and interpretation of results and writing of the paper. JN: conceptualization, technical oversight and reviewing of the drafts.

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7. Skilled attendance at birth [http://www.unfpa.org/public/mothers/pid/4383]