A quantitative study on the determinants of utilization of skilled birth attendance, Bamba division, Kilifi

Sophia W. Mwinyikione¹*, Yeri Kombe², Drusilla Makworo³

¹Department of Public Health, Jomo Kenyatta University of Agriculture and Technology, Nairobi, Kenya
²Kenya Medical Research Institute, Nairobi, Kenya
³Jomo Kenyatta University of Agriculture and Technology-College of Health Sciences, Nairobi, Kenya

Received: 04 April 2016
Accepted: 07 May 2016

*Correspondence:
Dr. Sophia W. Mwinyikione,
E-mail: waithera.soffy@gmail.com

ABSTRACT
Background: Improving maternal health by three quarters is the fifth millennium development goal that is set to be achieved through the provision of skilled attendance during delivery. However, the proportion of Skilled Birth Attendance (SBA) is generally poor in most developing countries, including Kenya with an estimate of 43%. This study aimed at determining the factors associated with the utilization of SBA among women 18 to 49 years of age, who had delivered within the last 12 months.

Methods: This study was a population based cross sectional study conducted in Bamba division. It used a structured questionnaire where random selection of households was done. Logistic regression of multiple factors was done to identify the determinants of SBA.

Results: A total of 286 women participated in the survey and 47.2% of them sought skilled care in the health facilities while 52.8% delivered at home under unskilled care. The questionnaire identified factors such as distance (OR=73.195, 95% CI=5.993-873.936), pregnancy problems (OR=6.389, 95% CI=2.057-19.844), mosquito net use (OR=6.389, 95% CI=2.057-19.844) and prolonged labour (OR=110.671, 95% CI=24.618-497.523) to be highly significant with SBA.

Conclusions: This study confirmed that the proportion of women seeking SBA was still low. Long distance to the health facility was the most significant predictor of SBA. Therefore more effort should be put in addressing long distances to the health facilities in order to ensure that SBA is embraced by women.

Keywords: Maternal mortality ratio, Skilled birth attendance, Unskilled birth attendance, Maternal health

INTRODUCTION
Globally, there were an estimated 287 000 maternal deaths in 2010, yielding a maternal mortality ratio (MMR) of 210 maternal deaths per 100,000 live births. The developing countries account for 99% (284,000) of the global maternal deaths, majority of which are in sub-saharan Africa (162 000) and Southern Asia (83 000). The MMR of 240 per 100,000 live births in developing regions is 15 times higher than 16 per 100,000 in developed regions. The MMR in sub-saharan Africa was highest at 500 maternal deaths per 100,000 live births while eastern Asia had the lowest MMR of 37 per 100,000 live births. In addition Southern Asia had 220 maternal deaths per 100,000 and Western Asia had MMR of 71 per 100,000 live births.¹ In Kenya the MMR is estimated at 488 maternal deaths per 100,000 live births which present an increase from 414/100,000 live births in 2003 as per the 2008/2009 KDHS report. An estimate of 8,000 women die annually due to pregnancy related complications.² Skilled birth attendance is among the indicators established for monitoring the achievements of...
the MDG 5. Skilled delivery care prevents both direct and indirect causes of maternal deaths such as, infection, shock, blood loss, convulsions and surgical procedures such as caesarean delivery. Use of skilled attendance at birth was reported to reduce maternal mortality rate by a range of 13% to 33%. Globally, during the period 2005 to 2012, 70% of women were assisted by a skilled attendant during birth. However access to skilled care is lowest in the WHO South East Asia and African regions with low income countries reporting 47% coverage of skilled attendant at delivery compared with 60% in lower middle income countries and 99% in upper middle income countries. In addition, skilled attendance at birth in Kenya was estimated at 43% according to the Kenya Demographic and Health Survey (KDHS), 2008/2009.

The low utilization of care during delivery may be responsible for the poor maternal health outcomes experienced in the country. The introduction of free maternity service in Kenyan health facilities is expected to address the poor maternal health outcomes experienced and the inequitable access to maternity care across women of different socio-economic groups. Evidence reveals that, user fees delay care, may contribute to inappropriate home treatment, food and economic insecurity among others. Currently, 56% of deliveries are not attended by skilled health professionals as per the 2008/2009 report. Hence the free maternity programme in government facilities is expected to increase utilization of skilled attendance at birth. Skilled attendance at birth is important in the prevention of maternal deaths and the exemption of user fees is a step towards achieving the fifth millennium development goal. In spite of undoubted progress towards greater coverage rates, however, studies done in African countries have shown that women continue not to attend ANC services and not to seek skilled attendance at birth even after the exception of user fees. This has been attributed to long distances to the health facilities, unavailability of drugs, limited health care workers and cultural practices.

It is therefore important to understand who continues to remain excluded from access to maternal care services and determine factors that are associated with the utilization of skilled attendance at birth.

METHODS

This study was done in Bamba division in Ganze constituency within Kilifi county. It covers an area of 1,532.70 sq.km. Bamba division has a population of about 45,563 of which an estimate of 10,573 are women of child bearing age 15-49 years. The main ethnic group living in the study area are the Giriama. It has five locations including Bamba, Msara wa Tsatsu, Ndigiira, Bandari and Mitangani with a total of 14 sub-locations and three Ministry of Health facilities (MOH) and two private owned health facilities. Farming is a major economic activity and it includes maize production, coconuts, cashew nuts, cassava and local cattle rearing with a few goats.

This was a population based cross sectional study and the study population constituted women of reproductive age (18-49) years, who had delivered during the last twelve months prior to the study and who had or not had a living child. The sample size was calculated using Fisher’s formula based on the prevalence of skilled attendance at birth taken to be 21.6% (according to Kilifi HMIS July 2010 to June 2011. Multi-stage sampling was used, one location was randomly selected and the list with the number of population clusters was used as a sampling frame.

Random households were selected and included in the study and if any of the selected households did not have women who met the study inclusion criteria they were replaced by using Ms Excel generated random numbers until the target sample size was reached. In each selected household, all women who delivered within the last twelve months prior to the study were included after giving their consent. In cases where more than one wife was in a household, each woman was considered separately as long as they met the study inclusion criteria regardless of whether they were cooking from one pot.

Ethical clearance was given by KNH/UoN Ethical clearance committee and permission to collect data in Bamba division was given by the Kilifi county department of health. Informed Consent was sought from the study participants who met the study inclusion criteria and enrolment was based on whether they agreed to take part by signing the informed consent form. A structured questionnaire was used that was administered by the researcher and research assistants, the questionnaire was originally prepared in English and translated to Kiswahili to allow ease in the data collection process.

Respondents were asked on social demographic characteristics (age, place of residence, parity, religion, marital status, level of education), access factors (distance to the health facility, means of transport) and perceived benefit (pregnancy wanted, initiation of ANC visits, no. of ANC visits, previous facility use). Data captured in questionnaires was entered in Epi info version 7 for data cleaning and data imported to SPSS vs. 20 for analysis. The dependent variable was Skilled Birth Attendance and according to this study those women who delivered in the health facility were coded as one while those who delivered outside the health facility coded as zero. Descriptive statistics and Pearson chi-square tests were done on all study variables. Univariate and multivariate logistic regression done on some selected factors.

RESULTS

A total of 286 respondents were interviewed representing a response rate of 100%. This was possible because the questionnaires were administered by the researcher and research assistants. Majority of the respondents were aged between 18-29 years (70.3%) and most of the respondents (40.9%) had more than five children. On
religion, almost half of the participants had embraced Christianity (n=141, 49.3%), those with no religion were 97, (33.9%) and those who were Muslims comprised 16.8 % (n=48). Slightly more than half (57%, n=163) of the participants had no education and only 2% had college education. Farming was the most famous occupation followed by manual laborers and those in small business. Majority (65%) earned less than 1000 Kenya shillings. The distance between participant’s home and the health facility ranged from within 30 minute walk and over two hours. Majority (75.9%) of the participants lived more than 5km from health facility (Table 1).

**Health seeking behaviour of respondents**

The women who either delivered at home or on the way were 151 (52.8%) while 135 (47.2%) delivered in the health facility. Among the home deliveries, 97 (33.92%) were conducted by relatives, 42 (14.7%) by TBAs and 12 (4.2%) by self. The deliveries conducted by skilled attendants were 135 (47.2%). The most common cited reason for seeking traditional birth attendants was their nearness to the respondent’s home (Table 2).

**Univariate analysis:** Further analysis using univariate logistic regression was done on the variables that showed some relevance with delivering in the health facility after chi-square tests were done. Some factors were found to be independently significant with the utilization of skilled care at birth (Table 3).

Women with previous prolonged or difficult labour were thirty times more likely to deliver in a health facility than those who had no difficult labour during delivery (OR=30.667, 95% CI=12.481-75.350). Distance between the participants homes and the health facility was another interesting finding where women living 0-2 km had a 21 times probability of seeking skilled assistance in the health facility than those women living more than 10 km (OR=21.636, 95% CI=4.672-100.191) among others as indicated in Table 3.

**Table 1: Descriptive statistics of the socio-demographic characteristics of the respondents.**

| Variable                      | Frequency (%) | n = 286 | Variable                      | Frequency, n = 286 |
|-------------------------------|---------------|---------|-------------------------------|--------------------|
| Social-demographic factors    |               |         | Husband education             |                    |
| Maternal age                  |               |         | No education                  | 51 (17.8%)         |
| 18-29 years                   | 201 (70.3%)   |         | Primary                       | 192 (67.1%)        |
| 30-39 years                   | 79 (27.6%)    |         | Secondary                     | 24 (8.4%)          |
| 40-45 years                   | 6 (2.1%)      |         | College                       | 1 (0.3%)           |
| Parity                        |               |         | Maternal occupation           |                    |
| 1-2                           | 76 (26.6%)    |         | Business                      | 37 (12.9%)         |
| 3-4                           | 93 (32.5%)    |         | Skilled                       | 8 (2.8%)           |
| Above5                        | 117 (40.9%)   |         | Unskilled                     | 54 (18.9%)         |
| Marital status                |               |         | Farmer                        | 184 (64.3%)        |
| Married                       | 267 (93.4%)   |         | Housewife                     | 3 (1.0%)           |
| Single                        | 10 (3.5%)     |         | Husband occupation            |                    |
| Divorced                      | 4 (1.4%)      |         | Business                      | 44 (15.4%)         |
| Widowed                       | 5 (1.7%)      |         | Skilled                       | 53 (18.5%)         |
| Location/place of residence   |               |         | Farmer                        | 42 (14.7%)         |
| Chapungu                      | 73 (25.5%)    |         | Unskilled                     | 128 (44.8%)        |
| Maryango                      | 71 (24.8%)    |         | Monthly income                |                    |
| Mwakwala                      | 71 (24.8%)    |         | Below1000                     | 186 (65%)          |
| Religion                      | 2001-5000     |         | 2001-5000                     | 28 (9.6%)          |
| Christian                     | 141 (49.3%)   |         | Above5000                     | 14 (4.9%)          |
| Muslim                        | 48 (16.8%)    |         |                               |                    |
| Traditional/no religion       | 97 (33.9%)    |         |                               |                    |
| Maternal education            |               |         |                               |                    |
| No education                  | 163 (57.0%)   |         |                               |                    |
| Primary                       | 118 (41.3)    |         |                               |                    |
| Secondary                     | 3 (1.0%)      |         |                               |                    |
| College                       | 2 (0.7%)      |         |                               |                    |
**Multivariate analysis:** Binary logistic regression of multiple factors using forward selection method was done on the eight factors that were found to be independently significant with the utilization of SBA. Only four out of the eight were significant (as shown in Table 3). Women who had some difficulty in their previous labour (AOR=110.671, 95% CI=24.618-497.523) were more likely to deliver in the health facility than those who did not experience prolonged/difficult labour. Distance from the participants home and the health facility was also found to be a strong predictor of SBA, women living below 2 km had a 73 times likelihood of using skilled attendance at birth (AOR=73.195, 95% CI=5.993-873.936) than those living more than 10 km. Women who experienced problems during the pregnancy and those who reported to use mosquito nets were more likely to seek skilled attendance (Table 3).

Table 2: Descriptive statistics of variables on health seeking behaviour of women.

| Variable                                | Frequency | Variable                                | Frequency |
|-----------------------------------------|-----------|-----------------------------------------|-----------|
| Assistance at birth                     | ANC visits made | Nurse (38.5%)                           | 110 (3.5%) |
| Nurse                                   | One       | Midwife (8.7%)                          | 25 (11.5%) |
| Midwife                                 | Two       | TBA (14.7%)                             | 42 (25.5%) |
| TBA                                     | Three     | Relatives (33.92%)                      | 97 (58.7%) |
| Relatives                               | Four & above | Self (4.2%)                            | 12 (18.9%) |
| Self                                    | Initiation of ANC Visits | Reasons for TBA (0-3months) | 58 (20.3%) |
| Reasons for TBA                         | 0-3months | Near to my house (11.2%)                | 32 (60.1%) |
| Near to my house                        | 4-6months | I can able to look after my family (2.1) | 6 (5.6%) |
| I can able to look after my family      | 7-9months | All the other deliveries were successful | 4 (1.4%) |
| All the other deliveries were successful | ANC tests done | Means of transport (Good(tests done for at least 3times)) | 135 (47.2%) |
| Means of transport                      | Poor(tests done for less than 3 times) | Bicycle (1.7%)                          | 5 (52.1%) |
| Bicycle                                 | Malaria drugs | Motorbike (33.6%)                       | 96 (93.7%) |
| Motorbike                               | Yes       | Car (2.8%)                              | 8 (9.1%) |
| Car                                     | No        | Previous Prolonged/difficult labour     | 16 (9.1%) |
| Previous Prolonged/difficult labour     | Iron folic drugs | Yes (24.5%)                            | 70 (88.5%) |
| Yes                                     | No        | ANC services (65%)                      | 186 (10.8%) |
| ANC services                            | Tetanus jab | Yes (99%)                              | 283 (75.9%) |
| Yes                                     | No        | No                                      | 31 (23.4%) |
| No                                      | Mosquito net use | If yes places sought (98.6%) | 248 (86.7%) |
| If yes places sought                    | GK clinic (98.6%) | Yes (37.4%)                            | 107 (24.1%) |
| GK clinic                               | No        | Yes                                      | 69 (75.9%) |
| Yes                                     | No        | If not,give reasons                     | 217 (63.3%) |
| No                                      | Pregnancy problems experienced | Husband (34.6%)                          | 99 (4.2%) |
| Husband                                 | Vaginal bleeding | Mother (0.7%)                           | 2 (4.1%) |
| Mother                                  | Severe headache | Muminlaw (2.1%)                         | 6 (1.4%) |
| Muminlaw                                | Painful urination | Pregnancyplanned (1.3%)                | 1 (3.6%) |
| Pregnancyplanned                        | Severe vomiting | Yes (36.7%)                             | 105 (2.0%) |
| Yes                                     | Genital ulcers | No (63.3%)                              | 181 (3.1%) |
| No                                      | Body weakness | If not,give reasons                     | 19 (6.6%) |
| If not,give reasons                     | Abdominal pains | Husband forced me (1.4%)                | 4 (2.1%) |
| Husband forced me                       | Flatulence | Accidentally conceived (53.1%)          | 152 (1.7%) |
| Accidentally conceived                  | Difficulty in breathing | God’s plan (9.1%)                      | 26 (3.6%) |
| God’s plan                              | Less baby movements | Mother (0.7%)                           | 2 (1.4%) |
| Mother                                  | Severe headache | If additional ANC visits                | 16 (5.6%) |
| required ANC visits                     | Three      | Four & above (76.9%)                    | 220 (17.5%) |
| Four & above                            | I do not know | I do not know (76.9%)                   | 50 (17.5%) |
Table 3: Univariate analysis and multivariate analysis of some selected study factors.

| Variable                          | Frequency n=286 (%) | OR & (95% CI of OR) | Multivariate analysis-AOR |
|-----------------------------------|---------------------|---------------------|---------------------------|
| **Social-demographic factors**    |                     |                     |                           |
| Maternal age                      |                     |                     |                           |
| 18-29 years                       | 201 (70.3%)         | 1.161 (0.229-5.892) |                           |
| 30-39 years                       | 79 (27.6%)          | 0.436 (0.082-2.319) |                           |
| 40-45 years                       | 6 (2.1%)            |                     |                           |
| **Parity**                        |                     |                     |                           |
| 1-2                               | 76 (26.6%)          | 3.241 (1.776-5.916) |                           |
| 3-4                               | 93 (32.5%)          | 2.227 (1.272-3.899) |                           |
| Above 5                           | 117 (40.9%)         |                     |                           |
| **Location/place of residence**   |                     |                     |                           |
| Paziani                           | 71 (24.8%)          | 4.087 (2.031-8.223) |                           |
| Chapungu                          | 73 (25.5%)          | 1.707 (0.871-3.347) |                           |
| Maryango                          | 71 (24.8%)          | 1.352 (0.683-2.676) |                           |
| Mwakwala                          | 71 (24.8%)          |                     |                           |
| **Maternal education**            |                     |                     |                           |
| No education                      | 163 (56.9%)         | 2.438 (1.551-3.832) |                           |
| Primary/others                    | 123 (43.01%)        |                     |                           |
| **Monthly income**                |                     |                     |                           |
| Below1000                         | 186 (65%)           | 0.295 (0.089-0.976) |                           |
| 1001-2000                         | 58 (20.3%)          | 0.325 (0.091-1.157) |                           |
| 2001-5000                         | 28 (9.6%)           | 1.000 (0.242-4.138) |                           |
| Above5000                         | 14 (4.9%)           |                     |                           |
| **Other factors**                 |                     |                     |                           |
| Distance                          |                     |                     |                           |
| 0-2km                             | 16 (5.6%)           | 21.636 (4.672-100.191) | 73.195 (5.993-873.936) |
| 3-5km                             | 53 (18.5%)          | 11.802 (5.458-25.520) | 64.428 (9.651-430.095) |
| 6-10km                            | 82 (28.7%)          | 3.949 (2.196-7.102)  | 12.964 (2.871-58.531)    |
| More than 10km                    | 135 (47.2%)         |                     |                           |
| Previous Prolonged/difficult labour |                   |                     |                           |
| Yes                               | 30.667 (12.481-75.350) | 110.671 (24.618-497.523) |
| No                                |                     |                     |                           |
| **Pregnancy planned**             |                     |                     |                           |
| Yes                               | 105 (36.7%)         | 1.772 (1.090-2.880) |                           |
| No                                | 181 (63.3%)         |                     |                           |
| **Mosquito net use**              |                     |                     |                           |
| Yes                               | 248 (86.7%)         | 2.846 (1.326-6.107)  | 5.903 (1.203-28.962)     |
| No                                | 38 (13.3%)          |                     |                           |
| **Pregnancy problems**            |                     |                     |                           |
| Yes                               | 69 (24.1%)          | 8.465 (4.282-16.733) | 6.389 (2.057-19.844)     |
| No                                | 217 (75.9%)         |                     |                           |
| **Pregnancy problems**            |                     |                     |                           |
| Yes                               | 69 (24.1%)          | 8.465 (4.282-16.733) | 6.389 (2.057-19.844)     |
| No                                | 217 (75.9%)         |                     |                           |

**DISCUSSION**

This study established that the proportion of women delivering in the health facility and those having skilled care at birth was 47.2% while 52.8% delivered under unskilled care. Majority of the home births were delivered by relatives 97 (33.92%). The low SBA results are also similar to other studies done in other countries such as Ethiopia and Tanzania and also comparable to studies done in other parts of the country such as Western Kenya and Nyandarua South District.16-20 More women should be encouraged to seek care in the health facilities since unskilled birth attendants are more preferred in the locality. These estimates are low when compared to the WHO estimates and KDHS survey. Globally, the proportion of births attended by a skilled health personnel...
from 2007-2014 was estimated to be 74%. In the European and American region SBA was estimated at 98% and 96% respectively, 68% in South East Asia, 67% in Eastern Mediterranean.

While in the who african region 51% of women delivered under skilled personnel, which is lower compared to other regions. In Kenya according to the most recent KDHS survey 2014 SBA and health facility deliveries nationally were 62% and 61%, in Coast region were 58.2% and 57.7% while in Kilifi county were 52.3% and 52.6% respectively.

This study did not find education of both the woman and the spouse to affect whether a woman delivered at the health facility because of high illiteracy levels that exists in the study area. This is contrary to most studies that found that women with no education were found to be more likely to use unskilled care at birth compared to those who had primary or more education.

Younger women below thirty years were positively associated with the utilization of SBA than those above thirty years. The possible reason was that the older women were more experienced in giving birth and perceived skilled care as unnecessary, this was also revealed in other studies.

Lower parity women were more likely to deliver in the health facilities under skilled care compared to those who had three and more children. The possible reasons; women who were giving birth for the first time might be younger and have better understanding about the benefits of delivering in the health facility, less experienced in the birthing process thus fears about the possibility of a difficult labour may motivate them to seek skilled delivery care.

Low income was negatively associated with skilled care though charges for giving birth in the health facilities were abolished by the government. The possible reason was that transport charges were high and they also could not meet some additional charges that were required by the hospital.

This study did not find an association between marital status and seeking delivery care in the health facilities. This was contrary to other study findings that established that married women were more likely to seek care during delivery than single women who may feel ashamed to deliver in the hospital.

The utilization of ANC services among the study participants was also found not to influence the seeking of skilled care at the health facility. This was contrary to other studies that established that women who had utilized and had the highest number of ANC visits were more likely to deliver in the health facility. Access to the health facility was a strong factor that associated with SBA, women who lived within 0-2 kilometres from the health facility were more likely to deliver in the health facility while those living more than 10 kms mostly had home deliveries. Similar results were observed in other studies, for instance, lack of transport and living more than one hour walking distance led to 80% of women delivering outside the health facility.

Women who had a history of prolonged or difficult labour were likely to deliver in the health facility. This was also established in other studies. Another finding was that women who planned to have the pregnancy were more likely to have safe births under skilled care than those who had unplanned pregnancies.

This study also established that women who had experienced some health related issues during the pregnancy period sought skilled delivery care in the health facilities. This result was comparable to other studies.

In addition, mosquito net use among women was found to be a positive factor to the use of skilled attendance at birth. The possible reason for the finding is that women who had and were using a mosquito net were more knowledgeable on the importance of preventing themselves from contracting malaria and were also aware of the benefits of seeking skilled care during delivery.

Certain study limitations were inevitable; the cross sectional nature of data collection could only provide evidence of statistical associations between independent variables and the use of skilled delivery care at birth and cannot establish cause effect relationship.

Data collection was based on self-report by the respondents and the validity of such responses would be uncertain. Therefore recall bias would affect the validity of the findings and to minimize this mother and baby booklet was used to verify the verbal responses from the respondents.

Data collection was done partly by research assistants and this may have brought about a certain degree of interview variation. To minimize this effect, the research assistants were trained before data collection. During the sampling process, long distances between homes made data collection very tiresome.

Several recommendations can be made; at the policy level the concerned parties should ensure that the health facilities are operational with all the required facilities and equipment and also more facilities to be established to curb the long distances the women have to make to seek skilled care. In addition more sensitization on the benefits of SBA should be done in the locality, adult education programs should be encouraged to ensure that the residents are literate so that they can be able to make informed decisions concerning their health. In general this study has established that women are not considerably utilizing skilled care at birth as expected.
since the exemption of maternity fees by the government due to long distance to the health facility.

ACKNOWLEDGEMENTS

The authors are grateful to both Kilifi County Health Department and Bamba local Authorities for their good co-operation during the data collection process

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. WHO, World Bank, UNICEF, United Nations Population Fund. Trends in maternal mortality: WHO, UNICEF, UNFPA and The World Bank estimates (1990 to 2010), Geneva: World Health Organization; 2012.
2. Kenya National Bureau of Statistics (KNBS) and ICF Macro. Kenya demographic and health survey 2008/2009. Calverton, Maryland; 2010.
3. National Roadmap. For accelerating the attainment of the MDG’s related to maternal and new-born health in Kenya. 2010.
4. Adegoke AA, Broek VDN. Skilled attendance-lessons learnt. BJOG. 2009;116(Suppl 1):33-40.
5. World Health Organization. Maternal mortality in 2005: estimates developed by WHO, UNICEF, UNFPA, and the World Bank. Geneve; 2008.
6. Mwabu G, Mwanzia J, Liambila W. User charges in government health facilities in Kenya: effect on attendance and revenue. Health Policy Plan. 1995;10(2):164-70.
7. Hutton G. Is the jury still out on the impact of user fees in Africa? A review of the evidence from selected countries on user fees and determinants of health service utilization. East Africa Medical Journal. 2004;81(suppl 4):545-60.
8. Johnson A, Goss A, Beckerman J, Castro A. Hidden costs: the direct and indirect impact of user fees on access to malaria treatment and primary care in Mali. Soc Sci Med. 2012;75(10):1786-92.
9. Bosu W, Bell JS, Klemesu MA, Tornui JA. Effect of delivery care user fee exemption policy on institutional maternal deaths in the central and volta regions of Ghana. Ghana Medical Journal. 2007; 41(3):118-24.
10. Mpembeni RN, Kiliewo JZ, Leshabari MT, Massawe SN, Jahn A, et al. Use pattern of maternal health services and determinants of skilled care during delivery in Southern Tanzania: implications for achievement of MDG-5 targets. BMC Pregnancy Childbirth. 2007;7:29.
11. Allegri MD, Ridde V, Louis VR, Sarker M, Tiendrebeogo J, Ye M, et al. Determinants of utilization of maternal care services after the reduction of user fees: a case study from rural Burkina Faso. Health Policy. 2011;99(3):210-8.
12. Griffiths P, Stephenson R. Understanding users perspectives of barriers to maternal healthcare use in Maharashtra, India. J Biosoc Sci. 2001;33(3):339-59.
13. Ridde V, Robert E, Messen B. A literature review of the disruptive effects of user fee exemption policies on health systems. BMC Public Health Policy. 2012;12:289.
14. Kenya national bureau of statistics. Kenya population and housing census 2009-population distribution by age, sex, and administrative units. 2010;1c.
15. National coordinating agency for population and development kilifi district strategic plan 2005-2010 for implementation of the national population policy for sustainable development. 2005.
16. Idris SH, Gwarzo UMD, Shehu AU. Determinants of place of delivery among women in a semi-urban settlement in Zaria, Northern Nigeria. Annals of African Medicine. 2006;5(2):68-72.
17. Lwelamira J, Safari A. Choice of place for childbirth: prevalence and determinants of health facility delivery among women in Bahi district, Central Tanzania. Asian J Med Sci. 2012;4(3):105-12.
18. Mrisho MM, Schellenberg JA, Mushi AK, Obrist BM, Mshinda H, Tanner M, et al. Factors affecting home delivery in rural Tanzania. Tropical Medicine and International Health. 2007;12(7):862-72.
19. Eijk AMV, Bles HM, Odhiambo F, Ayisi JG, Blokland IE, Rosen DH, et al. Use of antenatal services and delivery care among women in rural Western Kenya: a community based survey. Reprod Health. 2006;3:2.
20. Wanjira C, Mwangi M, Mathenge E, Mbogua G, Ng'anga Z. Delivery practices and associated factors among mothers seeking child welfare services in selected health facilities in Nyandarua South District, Kenya. BMC Public Health. 2011;11:360.
21. World Health Organization. The global health observatory. http://www.who.int/gho/en-WHO 2015 Accessed on 16th October 2015.
22. Kenya National Bureau of Statistics (KNBS), and ICF Macro. Kenya demographic and health survey 2014. Calverton, Maryland. 2015;127-9.
23. Chimanker DA, Sahoo H. Factors influencing the utilization of maternal health care services in Uttarakhand. Ethano Med. 2011;5(3):209-16.
24. Mekonnen MG, Yalaw KN, Umer JY, Melesse M. Determinants of delivery practices among Afar pastoralists of Ethiopia. Pan Afr Med J. 2012;13 (Suppl 1):17.
25. Mengesha ZB, Biks GA, Ayele TA, Tessema GA, Koye DN. Determinants of skilled attendance for delivery in northwest ethiopia: a community based nested case control study. BMC Public Health. 2013;13:130.
26. Tsegay Y, Gebrehiwot T, Goicolea I, Edin K, Lemma H, Sebastian MS. Determinants of antenatal care and delivery care utilization in tigray region, ethiopia: a cross sectional study. Int J Equity Health. 2013;12:30.
27. Tann CJ, Kizza M, Morrison L, Mabey D, Muwanga M, Grosskurth H, et al. Use of antenatal services and delivery care in Entebbe, Uganda; a community survey. BMC Pregnancy and Childbirth. 2007;7:23.
28. Dahal RK. Factors influencing the choice of place of delivery among women in eastern rural nepal. IJMCH. 2013;1(2):30-7.
29. Kitui J, Lewis S, Davey G. Factors influencing place of delivery for women in kenya:an analysis of the kenya demographic and health survey, 2008-2009. BMC Pregnancy Childbirth. 2013;13:40.
30. Ochako R, Fotso JC, Ikamari L, Khasakhala A. Utilization of maternal health services among young women in kenya: insights from the kenya demographic and health survey 2003. BMC Pregnancy Childbirth. 2011;11:1.
31. Choulagai B, Onsa S, Subedi N, Mehta S, Bhandari GP, Poudyal A, et al. Barriers to using skilled birth attendant’s services in mid and far western nepal: a cross sectional study. BMC Int Health Hum Rights. 2013;13:49.
32. Raghupathy S. Education and use of maternal health care in Thailand. Soc Sci Med. 1996;43(4):459-71.
33. Magadi M, Diamond I, Rodrigues RN. The determinants of delivery care in Kenya. Soc Biol. 2000;47(3-4):164-88.

Cite this article as: Mwinyikione SW, Kombe Y, Makworo D. A quantitative study on the determinants of utilization of skilled birth attendance, Bamba division, Kilifi. Int J Community Med Public Health