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Uptake and Emerging Issues Surrounding Hospital Deliveries Services. Perspective of One General Hospital Located in Arid and Insecure Garissa County of North Eastern Kenya

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Abstract
Background: Increasing the percentage of births delivered in health facilities is important for reducing the relatively high maternal mortality ratio in Kenya. Despite the increasing availability in awareness, affordability, modernization of formal obstetric care in Kenya, the majority of births in Garissa County still occur at home assisted by unskilled traditional birth attendants (TBAs). The objective of this study was to determine the factors affecting uptake of hospital delivery services by attending or receiving various services at Garissa Provincial General Hospital (GPGH). **Methodology:** Data on place of delivery, reasons for place of delivery, and a range of potential explanatory factors affecting choice of place of delivery were collected by interviewer-led questionnaire among 338 women attending GPGH. Predictors of place of delivery were explored in an exploratory risk factor analysis using multiple logistic regression. **Results:** The mean age of the 338 women respondents was 27.03 (SD± 4.66) years, ranging from 17 to 48 years. The majority of the women, 71.6%, were aged between 21 to 30 years, 32.8% had tertiary level education, 86.1% were married, 62.4% attended the GPGH for antenatal care services, and 56.2% were currently pregnant. Three quarters (76.3%) had previously delivered at the GPGH. In multivariate analysis, women who were nulliparous (OR 0.2, 95% CI 0.09 to 0.6), delivered in the hospital in the last 2 years (OR 12.8, 95% CI 5.1 to 32.4) or 3 years ago (OR 13.1, 95% CI 4.9 to 34.4) or those who liked the cleanliness of the hospital (OR 1.9, 95% CI 1.1 to 3.7) and appreciated hospital due to availability of medical supplies (OR 1.8, 95% CI 1.1 to 3.3) were independently associated with utilization of the health facility.**Conclusion:** A high proportion of women from the county embraced hospital delivery. Among the factors positively affecting uptake of health services in the facility antenatal were hospital cleanliness, equipment and medical supply availability and improved privacy.
Keywords: Hospital Delivery, Uptake and emerging issues, Garissa County of North Eastern Kenya

INTRODUCTION

Reducing the global burden of preventable maternal, neonatal and child deaths is currently a major focus for the global health community (Hogan *et al*., 2010). Despite the WHO's Safe Motherhood Initiative, the 2014 Kenya Demographic and Health Survey (KDHS, 2014) showed that only about 61.2% occurred in hospitals assisted by skilled health. Further, the report shows that only 29.2% births in Garissa County in the North Eastern part of Kenya were delivered in a health facility (KDHS, 2014). Consequently, maternal mortality rates in Kenya are ranked top 18 highest in the world at 510 deaths per 100 000 births (WHO, 2015). Skilled assistance during childbirth, readily accessible appropriate care in case of complications and effective postnatal care within the first 24 hours of delivery are strategies that can improve perinatal outcomes for mothers and babies (Filippi *et al*., 2006; Adegoke & van den Broek, 2009; Liambila *et al*., 2014; Adebowale & Udjo, 2016).

Despite the concerted efforts in Sub-Sahara Africa to increase the proportion of deliveries conducted by skilled birth attendant, non-skilled birth attendants (traditional birth attendants (TBAs), neighbors and self) continue to play an important role during child birth (Liambila *et al*., 2014). In the 2014 KDHS, about 19.1% and 55% of all deliveries in Kenya and in Garissa County were conducted by TBAs (Liambila *et al*., 2013; KDHS, 2014). Consequently, maternal mortality deaths were among the highest in sub-Saharan Africa at 546 per 100,000 in the period 1990 and 2015 (WHO, 2015). In Kenya, the maternal mortality in the same period was estimated at 510/100,000 which is an increment from 2003 KDHS of 414/100,000 (KDHS, 2009). About 68.6% of these deaths occurs in the marginalized arid part of Kenya with Garissa County accounting for 55% of these deaths (KDHS, 2015).

In common with other regions of Africa, despite the increase child birth and complication awareness, a significant proportion of mothers in developing countries still deliver at home unattended by skilled health workers (Montagu *et al*., 2011; Liambila *et al*., 2014). Some of the reported factors associated with unsupervised deliveries include maternal age, parity, education level, marital status, family size, household wealth, community health infrastructure, region, rural/urban residence, available health facilities, and distance to health facilities (Hogan *et al*., 2010; Gabrysch *et al*., 2011; Ochako *et al*., 2011; Kitui *et al*., 2013; Liambila *et al*., 2014;

Adebowale & Udjo, 2016). The reasons for delivering at home between and within countries also vary widely (Sobel *et al*., 2010; Montagu *et al*., 2011).

The key pillars to achieving safe motherhood can only occur in a controlled hospital environment, with good hygienic conditions, skilled personnel and the availability of resources to manage any obstetric complications. Despite increased Kenyan government financial support due to devolution since 2010 and by other international programs such asthe United Nations Development Programme (UNDP) and United Nations Children Fund (UNICEF) there is little evidence of fundamental change in Kenyan maternal health statistics especially in the North Eastern part of Kenya (KDHS, 2015). Identifying community hospital deliveries awareness, practices and attitudes constitutes an important entry point for behavior change (National Institute for Health and Clinical Excellence, 2007). This study was conducted to evaluate views of women; pregnant and non-pregnant receiving various services at Garissa Provincial General Hospital (GPGH) on the attractions of and deterrents to hospital-based deliveries. The GPGH is located in the arid, marginalized and insecure part of North Eastern Kenya.

METHODS

Study design and Settings

This cross sectional study conducted between 2014 and 2015, recruited consenting women (pregnant and non-pregnant) of childbearing age, having given birth at least once in the last two years, lived in Garissa county for at least two years and attending various women related clinics (including antenatal care, immunization, family planning) in GPGH. Using the Lemeshow *et al.* (1990) formula for estimating the population proportion with specified relative precision and setting α at 0.05, and a hospital delivery of 29.2% in the North Eastern Kenya KDHS, Kenya National Bureau of Statistics (KNBS) and Intensive Case Finding (ICF), (Macro, 2009), a total of 320 women were recruited to achieve 0.90 power.

Data collection

Data was collected using structured face to face questionnaires which were pre-tested prior to the study. Both open and close ended structured questionnaires were administered to the individual women attending various clinics in GPGH. Those in maternity were interviewed on exit upon discharge from the hospital.

Ethical considerations

The research protocol was presented for scientific and ethical approvals by the Scientific Steering Committee and the Ethical Review Committee of Kenya Medical Research Institute (KEMRI) prior to commencement of field activities. Written informed consent was obtained from each participant. Confidentiality was maintained by assigning all participants with a unique identification number and all paper research records stored in a locked cabinet stationed in a secured room only accessible to the principal investigator. This research adhered to the STROBE guidelines for observational studies as outlined at: http://www.strobe-statement.org.

Statistical analysis

Quantitative data was analyzed using STATA version 13 (StataCorp LP, College Station, TX, USA). Descriptive statistics frequency (%), mean, standard deviation and medium (interquartile ranges at 25% and 75%) were used to express quantitative data. The overall uptake of hospital deliveries in GPGH was determined for all participants. In bivariate analyses, odds ratios (OR) and 95% confidence intervals (CI) for the association between uptake of hospital deliveries and socio-demographic, maternal and hospital characteristics were calculated using Poisson regression. In multivariate analyses, a manual backward elimination approach was used to reach the most parsimonious model including factors that were associated with uptake of hospital deliveries among women attending GPGH at the significance level of $P \leq 0.05$.

RESULTS

Socio demographic characteristics

In this study, all the 338 recruited participants responded to the structured questionnaire (100% response rate). As shown in Table 1, the mean (±SD) age of the participant was 27.03 ± 4.66 years ranging from 18 to 48. The majority 71.6% of the participants were aged between 21 to 30 years, 32.8% had tertiary level of education, 86.1% were married, 54.4% were unemployed while 62.4% attended GPGH for ANC services. More than half (56.2%) were currently pregnant with 60.9% having had between 1 to 3 live births.

Table 1: Baseline characteristics of study population (n = 338)

Socio-demographic variables	Sample size		p value
	No	%	
Age			
Mean (± SD)	***27.03***	***(± 4.66)***	
Median (IQR)	***27***	***(24-30)***	
Range	***30***	***(18-48)***	
<20	25	7.4	
21 - 30	242	71.6	0.001
31 - 40	68	20.1	
41 - 50	3	0.9	
Education level			
Primary	82	24.3	
Secondary	105	31.1	0.001
Tertiary	111	32.8	
Non-Formal	40	11.8	
Marrital status			
Single	37	10.9	
Married	291	86.1	0.001
Divorced/Widow	10	3	
Religion			
Christian	253	74.9	0.001
Muslim	85	25.2	
Occupation			
Employed	91	26.9	
Self employed	63	18.6	0.001
Unemployed	184	54.4	
Reasons for attending GPGH			
Antenatal care	211	62.4	
Delivery	27	8	
Family planing	49	14.5	0.001
PMTCT	15	4.4	
Other treatment	36	10.7	
Currently pregnant			
Yes	190	56.2	0.022
No	148	43.8	
Parity			
Mean (± SD)	***2.71***	***(± 1.91)***	
Median (IQR)	***2***	***(1-4)***	
Range	***7***	***(0-7)***	
Nulliparous	40	11.8	0.001
1 to 3	206	60.9	
>4	92	27.2	

No - Number; % - Percentage; df - Degree of freedom; P - Level of significance;
$P \leq 0.05$ indicates the relationship is significant

Maternal related characteristics

As summarized in Table 2, the majority of the study women (58.6%) had given birth at GPGH in the previous 1 to 2 years, with about 69.5% rating the hospital delivery services as good to excellent. Majority 86.4% stated that they were advised to deliver at GPGH. About 48.8% decided to deliver at the hospital on their own volitions while 41.7% were due to the influence of their spouses. Majority 88.2% stated that their cultural beliefs could not deter them from hospital delivery. There were 87% of the women who stated that they would advise other women to deliver their babies at the GPGH.

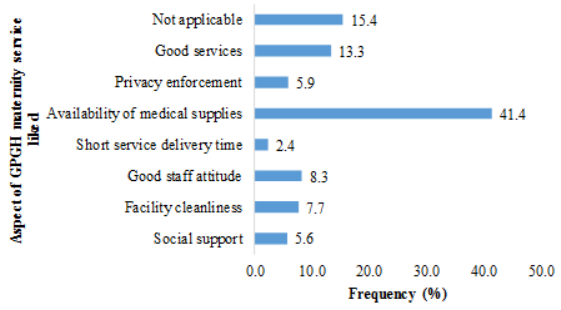
Table 2: Maternal related characteristics of the study population

Maternal variables	Sample size		p value
	No	%	
Time for previous GPGH delivery			
<2 years ago	198	58.6	
>3 years ago	55	16.3	0.001
None	85	25.1	
Rating of delivery services at GPGH			
Excellent	106	31.4	
Very good	89	26.3	
Good	40	11.8	0.001
Poor	4	1.2	
Not applicable	99	29.3	
Advice on GPGH delivery			
Yes	292	86.4	0.001
No	46	13.6	
Belief refrain GPGH delivery			
Yes	40	11.8	0.001
No	298	88.2	
GPGH delivery decision maker			
Self	165	48.8	
Spouse	141	41.7	0.001
Parents	17	5	
Others (Friends/relatives)	15	4.4	
Advice others to deliver at GPGH			
Yes	294	87	0.001
No	44	13	

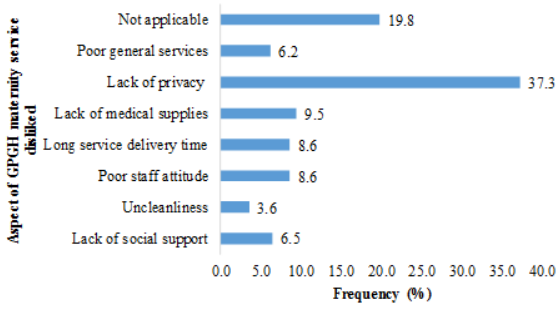
No - Number; % - Percentage; df - Degree of freedom; P - Level of significance;
$P \leq 0.05$ indicates the relationship is significant

Health facility characteristics

As shown in Table 3, 66% of the respondents resided within a 2 kilometer (Km) distance from the GPGH; with 64.5% residing within the reach of other hospital maternity facility nearby. About 68.6% of the women indicated that they would deliver in the nearest maternity. Most (81.7%) used vehicles as their mode of transport to GPGH. The majority (87.3%) were not charged for the hospital delivery services. About 70% of the respondents had no child gender preference with 88.5% of the respondents acknowledging that gender preference was not a hindrance to seeking hospital delivery. Most (86.4%) of the participants rated the attitude of GPGH as above good, while 71.9% recognized that the health worker's attitude might affect their future GPGH utilization. A high proportion (41.4%) of the participants were impressed by GPGH because of the availability of medical supplies. However, over one third (37.3%) disliked the facility due to lack of privacy in the hospital (Figure 1A and B).



1 A



1 B

Figure 1A and B. The distribution of the Aspect of GPGH maternity services that were liked (A) and disliked (B) by the women participants

Table 3: Utilization and attributes of family planning methods

Health facility variable	Sample size		p value
	No	%	
Distance to GPGH			
0-2 Km	223	66	0.001
>2.1Km	94	27.8	
Other maternity ward near by			
Yes	218	64.5	0.001
No	120	35.5	
Would deliver in the nearest maternity			
Yes	232	68.6	0.001
No	106	31.4	
Mode of transport to GPGH			
Walking	36	10.7	
Vehicle	276	81.7	0.001
Other mode	26	7.7	
Delivery charges			
Free	295	87.3	0.001
Some charges	43	12.7	
Settlement of delivery charges			
Government	208	61.5	0.001
Family	130	38.5	
Child Gender preference			
Yes	100	29.6	0.001
No	238	70.4	
Gender hindrance			
Yes	39	11.5	0.001
No	299	88.5	
General staff attitude during delivery			
Excellent	132	39.1	
Very good	118	34.9	
Good	42	12.4	
Fair	1	0.3	0.001
Poor	18	5.3	
Very poor	2	0.6	
Not applicable	25	7.4	
Attitude affecting future GPGH utilization			
Yes	243	71.9	0.001
No	95	28.1	

No - Number; % - Percentage; df - P - Level of significance; $P \leq 0.05$ indicates the relationship is significant

Uptake of GPGH delivery services

From the survey, a total of 258 out of 338 (76.3%) participants reported having had previous delivery assisted by skilled health practitioner at the GPGH.

Factors associated with utilization of facility delivery services

Socio-demographic factors

Table 4 summarizes the socio-demographic factors associated with uptake of GPGH delivery services. In the bivariate analysis, participants who were of Muslim religion (OR 1.9, 95% CI 1.3–2.7); those who visited the hospital for antenatal care (OR 1.8, 95% CI 1.3 - 3.1) or delivery (OR 1.9, 95% CI 1.1–3.7) services were more likely to deliver their babies at the GPGH. On the other hand, women who were nulliparous (OR 2.3, 95% CI 1.6 - 6.1) were less likely to utilize GPGH delivery services compared to women who had given birth to 4 or more times.

In multivariate analysis (Table 7), after adjusting for age, education level, marital status, religion, occupation, current pregnancy status and parity, only nulliparous women (OR 0.2, 95% CI 0.09–0.6) remained significantly associated with delivery at the GPGH.

Table 4: Socio-demographic factors associated with the uptake of GPGH delivery services

Socio-Demographic Characteristic	Sample size	Hospital delivery		P - value	Bivariate
		No	%		OR (95% CI)
≤ 20	25	14	56	0.362	0.6 (0.2 - 1.9)
21 - 30	242	178	73.6	0.598	0.7(0.2 - 2.3)
31 - 40	68	63	92.6	0.897	0.9(0.3 - 2.9)
41 - 50	3	3	100	Referent	Referent
Education level					
Primary	82	72	87.8	0.561	1.2(0.8 - 1.7)
Secondary	105	83	79	0.925	1.1(0.7 - 1.5)
Tertiary	111	72	64.9	0.407	0.8(0.5 - 1.3)
Non-Formal	40	31	77.5		
Marrital status					
Single	37	15	40.5	0.233	0.6(0.2 - 1.4)
Married	291	236	81.1	0.701	1.2(0.5 - 2.6)
Divorced/Widow	10	7	70	Referent	Referent
Religion					
Muslim	253	219	86.6	**0.001**	**1.9(1.3 - 2.7)**
Christian	85	39	45.9	Referent	Referent
Occupation					
Employed	91	74	81.3	0.765	1.1(0.8 - 1.4)
Self employed	63	44	69.8	0.792	0.9(0.7 - 1.3)
Unemployed	184	140	76.1	Referent	Referent
Reasons for attending GPGH					
Antenatal care	211	179	84.8	**0.038**	**1.8(1.3 - 3.1)**
Delivery	27	25	92.6	**0.045**	**1.9(1.1 - 3.7)**
Family planing	49	32	65.3	0.388	1.3(0.7 - 2.5)
PMTCT	15	8	53.3	0.927	0.9(0.4 - 2.5)
Other treatment	36	14	38.9	Referent	Referent
Currently pregnant					
Yes	190	159	83.7	0.187	1.2(0.9 - 1.5)
No	148	99	66.9	Referent	Referent
Parity					
Nulliparous	40	5	12.5	**0.001**	**0.2(0.06 - 0.4)**
1 to 3	206	168	81.6	0.349	0.9(0.7 - 1.2)
≥ 4	92	85	92.4	Referent	Referent

No - Number; % - Percentage; OR - Odds ratio; CI - confidence interval

Maternal related factors

Table 5 summarizes the maternal related factors associated with the uptake of GPGH delivery services. In bivariate analysis, participants who were more likely to deliver their babies at the GPGH were those who had pervious delivered at the hospital within the last two (OR 14.1, 95% CI 6.2–31.8) or three (OR 14.1, 95% CI 6.1–32.9) years; those who rated the GPGH delivery services as either excellent (OR 4.2, 95% CI 2.7–6.7), very good (OR 4.3, 95% CI 2.7–6.7), good (OR 4.1, 95% CI 2.4–6.9) or poor (OR 4.3, 95% CI 1.5 - 12).

In multivariate analysis (Table 7), only those participants who had delivered at the hospital within the previous two (OR 12.8, 95% CI 5.1–32.4) or three (OR 13.1, 95% CI 4.9–34.4) years remained associated with delivery at the GPGH.

Table 5: Maternal related factors associated with the uptake of GPGH delivery services

Maternal variables	Sample size	Hospital delivery		P - value	Bivariate
		No	%		OR (95% CI)
Time for previous GPGH delivery					
≤ 2 years ago	198	197	99.5	**0.001**	**14.1(6.2 - 31.8)**
≥ 3 years ago	55	55	100	**0.001**	**14(6.1 - 32.9)**
None	85	6	7.1	Referent	Referent
Rating of delivery services at GPGH					
Excellent	106	105	99.1	**0.001**	**4.2(2.7 - 6.7)**
Very good	89	88	98.9	**0.001**	**4.3(2.7 - 6.7)**
Good	40	38	95	**0.001**	**4.1(2.4 - 6.9)**
Poor	4	4	100	**0.001**	**4.3(1.5 - 12.)**
Not applicable	99	23	23.2	Referent	Referent
Advice on GPGH delivery					
Yes	292	227	77.7	0.456	1.2(0.8 - 1.7)
No	46	31	67.4	Referent	Referent
Belief refrain GPGH delivery					
Yes	40	35	87.5	0.39	1.2(0.8 - 1.7)
No	298	223	74.8	Referent	Referent
GPGH delivery decision maker					
Self	165	127	77	0.117	1.9(0.8 - 4.4)
Spouse	141	110	78	0.111	1.9(0.9 - 4.4)
Parents	17	15	88.2	0.101	2.2(0.9 - 5.7)
Others (Friends/relatives)	15	6	40	Referent	Referent
Advice others to deliver at GPGH					
Yes	294	239	81.3	0.456	1.2(0.8 - 1.7)
No	44	19	43.2	Referent	Referent

No - Number; % - Percentage; OR - Odds ratio; CI - confidence interval

Health facility related factors

Table 6, summarizes the hospital related factors associated with the uptake of GPGH delivery services. In bivariate analysis, participants who appreciated health facility that were clean (OR 1.8, 95% CI 1.1–3.1) and those that had sufficient medical supplies (OR 1.7, 95% CI 1.2–2.8) were more likely to deliver their babies at the GPGH

In multivariate analysis (Table 7), only those participants who appreciated health facility that were clean (OR 1.9, 95% CI 1.1–3.7) and those that had sufficient medical supplies (OR 1.8, 95% CI 1.1–3.3), remained associated with delivery at the GPGH.

Table 6: Hospital related factors associated with the uptake of GPGH delivery services

Health facility variable	Sample size	Hospital delivery		P - value	Bivariate
		No	%		OR (95% CI)
Distance to GPGH					
0-2 Km	223	167	74.9	0.164	1.6(0.8 - 2.9)
≥ 2.1Km	94	81	86.2	0.077	1.8(0.9 - 3.5)
Not applicable	21	10	47.6	Referent	Referent
Other maternity ward near by					
Yes	218	175	80.3	0.264	1.2(0.9 - 1.5)
No	120	83	69.2	Referent	Referent
Would deliver in the nearest maternity					
Yes	232	188	81	0.144	1.2(0.9 - 1.6)
No	106	70	66	Referent	Referent
Mode of transport to GPGH					
Walking	36	31	86.1	0.284	1.3(0.8 - 2.3)
Vihecle	276	212	76.8	0.203	1.4(0.8 - 2.8)
Other mode	26	15	57.7	Referent	Referent
Delivery charges					
Free	295	231	78.3	0.278	1.2(0.8 - 1.9)
Some charges	43	27	62.8	Referent	Referent
Settlement of delivery charges					
Government	208	165	79.3	0.425	1.1(0.9 - 1.4)
Family	130	93	71.5	Referent	Referent
Aspect of GPGH maternity service liked					
Social support	19	15	78.9	0.129	1.6(0.9 - 3.1)
Facility cleanliness	26	22	84.6	**0.049**	**1.8(1.1 -3.1)**
Good staff attitude	28	19	67.9	0.258	1.4(0.8 - 2.6)
Short service delivery time	8	7	87.5	0.161	1.8(0.8 - 4.2)
Availability of medical supplies	140	121	86.4	**0.008**	**1.7(1.2 - 2.8)**
Privacy enforcement	20	17	85	**0.07**	**1.9(0.9 - 0.95)**
Good services	45	32	71.1	0.143	1.5(0.9 - 2.5)
Not applicable	52	25	48.1	Referent	Referent
Child Gender preference					
Yes	100	71	71	0.467	0.9(0.7 - 1.2)
No	238	187	78.6	Referent	Referent
Gender hindrance					
Yes	39	32	82.1	0.664	1.1(0.7 - 1.6)
No	299	226	75.6	Referent	Referent
Attitude affecting future GPGH utilization					
Yes	243	193	79.4	0.298	1.2(0.9 - 1.5)
No	95	65	30	Referent	Referent

No - Number; % - Percentage; OR - Odds ratio; CI - confidence interval

Table 7: Adjusted factors associated with the uptake of GPGH delivery services

Variables	Sample size	Hospital delivery		P - value	Multivariate
		No	%		OR (95% CI)
Parity					
Nulliparous	40	5	12.5	**0.002**	**0.2(0.09 - 0.6)**
1 to 3	206	168	81.6	0.983	0.9(0.7 - 1.3)
≥ 4	92	85	92.4	Referent	Referent
Time for previous GPGH delivery					
≤ 2 years ago	198	197	99.5	**0.001**	**12.8(5.1 - 32.4)**
≥ 3 years ago	55	55	100	**0.001**	**13.1(4.9 - 34.4)**
None	85	6	7.1	Referent	Referent
Aspect of GPGH maternity service liked					
Social support	19	15	78.9	0.179	1.6(0.8 - 3.2)
Facility cleanliness	26	22	84.6	**0.042**	**1.9(1.1 - 3.7)**
Good staff attitude	28	19	67.9	0.299	1.4(0.7 - 2.8)
Short service delivery time	8	7	87.5	0.316	1.6(0.6 - 3.9)
Availability of medical supplies	140	121	86.4	**0.049**	**1.8(1.1 - 3.3)**
Privacy enforcement	20	17	85	0.238	1.5(0.8 - 3.1)
Good services	45	32	71.1	0.314	1.4(0.8 - 2.4)
Not applicable	52	25	48.1	Referent	Referent

No - Number; % - Percentage; OR - Odds ratio; CI - confidence interval

DISCUSSION

The health status of mothers and children points to the overall economic health of a country (United Nations, 2010). Maternal health is inseparably linked with the survival of newborns. For every woman who dies, another 30 suffer long-lasting injuries and illnesses such as obstetric fistula (UNDP, WHO, UNFPA, and World Bank, 2006). Provision of a continuum of care during pregnancy, labor and delivery, and the postnatal period results in reduced maternal and neonatal morbidity and mortality. In Kenya, the 2014 KDHS showed that although, 96% and 74.6% of pregnant women country-wide and Garissa County respectively, had at least one ANC visit during pregnancy, about 37% and 70.8% of deliveries country-wide, and Garissa County, respectively, took place outside health facilities (KDHS, 2014).This study was therefore among the very first to investigate the factors affecting the uptake oh hospital deliveries among women of reproductive age attending the GPGH in Garissa County; an arid, marginalized and insecure region in the North Eastern Kenya. The study was conducted two years post the 2013 devolution of political power and economic resources from the central government to the devolved county governments.

Contrary to the previous reports of (29.2%) of hospital delivery in Garissa County, a significant proportion of women (76.3%) had previous delivery assisted by skilled health practitioners at the GPGH. Other than the KDHS which focuses on a wider aspect of health, our study was unique because of its micro-level penetration within the initially marginalized region in The North Eastern Kenya. This study is in agreement with that of Mwangome *et al* (2012), who reported that compared to other regions of Kenya, higher levels of hospital deliveries (86.5%) was recorded in the coastal part of Kenya (Mwangome *et al*., 2012). On the contrary a lower level (3.1%) hospital deliveries were recorded in Kajiado Central District (Onyango, 2014). Compared to other countries, lower (39.5%) hospital deliveries were recorded in Birnin Kudu, North-west Nigeria (Ashimi and Amole, 2015), 57.7% in Ghana (Nakua *et al*., 2015). The difference in the proportion of women delivering at the hospital could be due to the design of these studies. This study recruited women both currently pregnant and those who were not pregnant. Not all of these women, especially the non-pregnant ones, may have provided accurate information.

Factors associated with uptake of hospital delivery

In this study, the Muslim women were more likely to deliver at the hospital compared to their Christian counterparts. Because of pregnancy complications, caesarian section is often preformed to save lives. Whilst caesarian section is seen as a highly appropriate intervention in the professional, biomedical arena, it may be seen as 'reproductive function failure' on part of the woman in the popular sector (i.e. communities) and a desire to experience vaginal delivery can become reason for hospital delivery - CS refusal (Okonofua, 2001; Chigbu *et*

al., 2007). R*eligious* providers seem to be re-shaping the ANC and delivery landscape by promising outcomes based on 'faith' and 'divine protection' rather than on child birthing skills (Udoma *et al*., 2008). Religious providers represent a diverse group of faith-based outlets ranging from birthing outlets linked to established churches and mosques to stand-alone small spiritual homes owned by individuals. These faith-based providers share a common feature of promising good delivery outcomes derived from divine/supernatural involvement. The religious environment together with socio-cultural, gendered pressures on women may drive women to faith-based birthing centers, mostly churches, in part out of hope that a divine or supernatural intervention will lead to a vaginal delivery (Olusanya *et al*., 2010). This kind of teaching is not so common to the Muslim religion. Further, given the current threat of attacks of Christians by terrorist groups, and given that the majority of the population in Garissa county are mainly Muslims, this could be a hindrance for the Christian faithful to seek hospitalization in health facilities owned or headed and operated by the Muslim faithful (Sinha, 2014; Ugwu and Kok, 2015).

Antenatal attendance was a key determinant of hospital delivery in this study. Similar results have been document by several authors (Silal *et al*., 2012). Regular antenatal care is helpful in identifying and preventing adverse pregnancy outcomes when it is sought early in the pregnancy and is continued until delivery. The World Health Organization recommends that women have at least four antenatal care visits during each pregnancy. It is possible during these visits to detect health problems associated with a pregnancy and to plan interventions. In the event of any complications, more frequent visits are advised, and admission to a health facility may be necessary (MOH, 2012). On the contrary, however, continuous use of unskilled deliveries in many communities suggests that merely making quality obstetric care services available is not enough to influence higher uptake of supervised delivery services (Carter *et al*., 2010; Magoma *et al*., 2010). Other studies have showed that other than ANC visits, which have not led to increased uptake of skilled deliveries, other factors such as acceptability to use health facilities during deliveries have been pointed as crucial (Silal *et al*., 2012).

Women who had given birth previously in a health facility were associated with current delivery under the assistance of a skilled health worker. As expected the initial experience has a significant bearing on the current decisions. In India Pratim *et al*., (2013) showed that late registered women often tend to go for public hospital deliveries. Those with initial birth experience known to them that late registration itself is not appreciable, and are given reasons to make informed choices and they often have preference to deliver in the hospitals (Pratim *et al*., 2013). The experience of the previous hospital delivery, has a significant bearing in the current decision regarding institutional delivery. Women with good prior experience were shown to have higher affiliation to deliver the successive children in hospitals compared to those who had negative experience (Moran *et al*., 2007). Birth-preparedness and awareness-raising programs during hospital visits have been shown to help mothers to seek and demand care. Perceived complications and health knowledge, and women's intention about where to deliver due to previous hospital experience, were associated with use of professional medical care in Bangladesh (Moran *et al*., 2007; Edmonds *et al*., 2012). Further studies are needed to assess the effect of birth-preparedness packages obtained at the health facilities on skilled attendance at birth in Kenya.

Perception of the services at the hospitals directly affect service uptake. Hospitals perceived to offer excellent services, and are clean, with all the necessary equipment and medical supplies, and those that observe patient confidentiality are generally accepted as good facilities, and this positively affects re-visit for old patients and referrals among the new patients (Kitui *et al*., 2013; Nakua *et al*., 2015). In other studies, some of the main reasons reported by mothers for choosing unskilled delivery over a skilled facility were poor attitude and verbal abuse from the skilled service providers. Negative previous experiences from service providers might have deterred some of the women from using skilled birth attendants (Mwifadhi *et al*., 2007; Warren, 2010). Training of staff on customer care and cross-culture communication can be used to enhance effective communication between health workers and clients to remove the latter's fear of unpleasant attitude of the former.

Limitations and Conclusions

Some other studies among women have identified other independent factors associated with uptake of hospital deliveries that were found not to be significant in this study, including physical accessibility, place of residence, distance to the health facility and transport availability (Chaudhary, 2005). Traditional beliefs and customs, linked with ethnicity and religion, can influence the effective use of maternity services, primarily the decision to seek care (De Broe, 2005; Harris *et al*., 2010). Mwifadhi *et al*. (2007) found lack of money, sudden onset of labour, tradition and culture as determinants for the place of delivery. Affordability and availability were previously reported (Nakua *et al*., 2015).

The cross sectional nature of this study, relatively small sample size of participant in the structured interviews, inadequate assessment of all potential factors associated with uptake of skilled delivery, could partly explain the observed lack of association between GPGH hospital delivery uptake and the above listed independent factors.

Given these limitations; in this arid, marginalized and insecure region of Kenya, contrary to previous notion,

a significant proportion of women actually preferred to deliver their children in hospitals assisted by skilled health practitioners. Ultimately for the improvement in the proportion of women embracing hospital delivery in this region of Kenya, concerted efforts must be undertaken to promote and to tackle both the socio-cultural, maternal and hospital associated deterrents of up take. Should this be achieved, this region is poised to record one of the highest up take of hospital delivery in Kenya.

Competing interests
The authors declare no competing interests.

Authors' contributions
This work was part of Master of Science degree for MD in public health at the Jomo Kenyatta University of Agriculture and Technology. MD, MON conceived and designed the study. MD conducted field work and collected data, MD and MON conducted data analysis and wrote the draft manuscript. EE and AM designed the study, advised and supervised data analysis and reviewed the manuscript. All authors read and approved the final manuscript.

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References
1. Adebowale SA, and Udjo E. Maternal Health Care Services Access Index and Infant Survival in Nigeria. *Ethiopian Journal of Health Sciences* 26.2 (2016): 131–144.
2. Adegoke AA, van den Broek N: Skilled birth attendance-lessons learnt. BJOG 2009, 116:33–40.
3. Ashimi AO, Amole TG. 2015. Prevalence, reasons and predictors for home births among pregnant women attending antenatal care in Birnin Kudu, North-west Nigeria. Sex ReprodHealthc. 6(3):119-25. doi: 10.1016/j.srhc.2015.01.004. Epub 2015 Jan 23.
4. Carter A, Jamal O, Odoch P, Mohammed K. Factors That Contribute to the Low Uptake of Skilled Care During Delivery in Malindi, Kenya. Health and Development program. Kenya: ISP Collection; 2010.
5. Chaudhary P. Accidental-out of- hospital deliveries: factors influencing delay in arrival to maternity hospital. Kathmandu Uni Med J. 2005;3(2):115-22.
6. Chigbu CO, Ezeome IV, Iloabachie GC. Caesarean section on request in a developing country. Int J ObstetGynaecol. 2007; 97:54–56.
7. De Broe S. Diversity in the use of pregnancy-related care among ethnic groups in Guatemala. J Fam PlannReprod Health Care. 2005;31(3):199-205.
8. Edmonds JK, Paul M, Sibley L. Determinants of place of birth decisions in uncomplicated childbirth in Bangladesh: An empirical study. Midwifery. 2012;28(5):554-60.
9. Filippi V, Ronsmans C, Campbell OMR, Graham WJ, Mills A, Borghi J, Koblinsky M, Osrin D: Maternal survival 5 - Maternal health in poor countries: the broader context and a call for action. Lancet 2006, 368(9546):1535–1541.
10. Gabrysch S, Cousens S, Cox J, Campbell O: Distance and quality of care strongly influence choice of delivery place in rural Zambia: A study linking national data in a Geographic Information System. J Epidemiol Community Health 2011, 65: A42–A42.
11. Harris A, Zhou Y, Liao H, Barclay L, Zeng W, Gao Y. Challenges to maternal health care utilization among ethnic minority women in a resource-poor region of Sichuan Province, China. Health Policy Plan. 2010;25(4):311-8
12. Hogan MC, Foreman KJ, Naghavi M, Ahn SY, Wang M, *et al*. (2010) Maternal mortality for 181 countries, 1980–2008: a systematic analysis of progress towards Millennium Development Goal 5. Lancet 375: 1609–23.
13. 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 and Childbirth 2013, 13:40
14. 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 and Childbirth*. 2013; 13:40.
15. Lawn JE, Blencowe H, Pattinson R, Cousens S, Kumar R, Ibiebele I, Gardosi J, Day LT, Stanton C: Stillbirths: Where? When? Why? How to make the data count? Lancet 2011, 377(9775):1448–1463.
16. Liambila W, Obare F, Undie C-C, Birungi H, Kuria NS, Wayua RM, Matekwa A. The community midwifery model in Kenya: expanding access to comprehensive reproductive health services. Afr J Midwifery Womens Health. 2013; 7:4.

17. Liambila WN, Kuria SN. Birth attendance and magnitude of obstetric complications in Western Kenya: a retrospective case–control study. *BMC Pregnancy and Childbirth*. 2014; 14:311.
18. Magoma M, Requejo J, Campbell O, Cousens S, Filippi V. High ANC coverage and low skilled attendance in a rural Tanzanian district: a case for implementing a birth plan intervention. BMC Pregnancy and Childbirth. 2010; 10:13.
19. Montagu D, Yamey G, Visconti A, Harding A, Yoong J: Where Do Poor Women in Developing Countries Give Birth? A Multi-Country Analysis of Demographic and Health Survey Data. PLoS One 2011, 6(2): e17155.
20. Moran AC, Winch PJ, Sultana N *et al*. Patterns of maternal care seeking behaviors in rural Bangladesh. Trop Med Int Health. 2007;12(7):823-32.
21. Mwangome FK, Holding PA, Songola KM, Bomu GK. 2012. Barriers to hospital delivery in a rural setting in Coast Province, Kenya: community attitude and behaviours. Rural and Remote Health 12: 1852.
22. Mwifadhi M, Joana AS, Adiel KM, Bright O, Hassan M, Marcel T, *et al*. Factors affecting home delivery in rural Tanzania. Trop Med Int Health. 2007;12(7):862–872.
23. Nakua EK, Sevugu JT, Dzomeku VM, Otupiri E, Lipkovich HR, Owusu-Dabo E. Home birth without skilled attendants despite millennium villages project intervention in Ghana: insight from a survey of women's perceptions of skilled obstetric care. BMC Pregnancy Childbirth. 2015 Oct 7; 15:243.
24. Nakua EK, Sevugu JT, Dzomeku VM, Otupiri E, Lipkovich HR, Owusu-Dabo E. Home birth without skilled attendants despite millennium villages project intervention in Ghana: insight from a survey of women's perceptions of skilled obstetric care. *BMC Pregnancy and Childbirth*. 2015; 15:243. doi:10.1186/s12884-015-0674-1.
25. National Institute for Health and Clinical Excellence. Behaviour change and population: community and individual levels. London: NICE/NHS, 2007
26. 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.
27. Okonofua F. Optimising caesarean-section rates in West Africa. The Lancet. 2001; 358:1289
28. Olusanya BO, Alakija OP, Inem VA. Non-Uptake of facility-based Maternity services in an inner-city community in Lagos, Nigeria: an observational study. J Biosoc Sci. 2010; 42:341–358.
29. Onyango C. 2014. Factors Associated with the Uptake of Health Facility Based Skilled Delivery Services in Kajiado Central District, Kenya. Universal Journal of Public Health. 2(7): 189-200
30. Pratim RM, Uday M, Kumar S, Kumar SJ, Kumar SA. Factors associated with the preference for delivery at the government hospitals in rural areas of Lucknow district in Uttar Pradesh Indian Journal of Public Health. 2013: 57: 268-271
31. Silal SP, Penn-Kekana L, Harris B, Birch S, McIntyre D. Exploring inequalities in access to and use of maternal health services in South Africa. BMC Health Services Res. 2012; 12:120.
32. Sinha AK. Integrating spirituality into patient care: An essential element of modern healthcare system. Indian Heart J. 2014 May; 66(3): 395–396.
33. Sobel HL, Oliveros YE, Nyunt-U S: Secondary analysis of a national health survey on factors influencing women in the Philippines to deliver at home and unattended by a healthcare professional. Int J GynecolObstet 2010, 111(2):157–160.
34. Udoma EJ, Ekanem AD, Abasiattai AM, Bassey EA. Reasons for preference of delivery in spiritual churchbased clinics by women of south-south Nigeria. Niger J ClinPract. 2008;11(2):100–103.
35. Ugwu NU and Kok B. Socio-cultural factors, gender roles and religious ideologies contributing to Caesarian-section refusal in Nigeria. Reprod Health. 2015; 12: 70.
36. United Nations (UN) Secretary-General. 2010. *Global Strategy for Women's and Children's Health*. New York: The Partnership for Maternal, Newborn and Child Health. New York. http://www.who.int/pmnch/knowledge/publications/fulldocument_globalstrategy/en.
37. United Nations Development Program (UNDP), World Health Organization (WHO), United Nations Population Fund (UNFPA), World Bank. 2006. "Causes of Maternal Death. A Systematic Review." The *Lancet* 367:1066-74.
38. Warren C. Care seeking for maternal health: challenges remain for poor women. Ethiopian J Health. 2010;24(special issue 1):100–104.
39. WHO: Neonatal and perinatal mortality: country, regional and global estimates.: World Health Organization; 2006.
40. WHO: Trends in Maternal Mortality: 1990 to 2015. Geneva: WHO, UNICEF, UNFPA & The World Bank; 2015. http://apps.who.int/iris/bitstream/10665/194254/1/9789241565141_eng.pdf. Accessed June 2016