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Does Free Maternal Services Provide Access to Skilled Birth Attendants?: A Case of Level 5 and 6 Public Hospitals in Kenya

Mercy Kasina
Principal Nursing Officer, M.Sc. Health Economics and Policy, School of Economics,
University of Nairobi, Kenya
Dr. George Ruigu
Senior Lecturer, School of Economics, University of Nairobi, Kenya

Abstract:
Pregnancy and motherhood are natural processes in lives of women of reproductive age. These processes are supposed to be fulfilling experiences. However maternal mortality during the process is still a major public health problem. The progress of reducing these preventable deaths is still low especially in developing regions. In the absence of complications, pregnancy is a simple and natural process that requires little external intervention. Due to unpredictability of birth outcome, skilled attendance at delivery is recommended in a healthy facility. Therefore, the main objective of this study is to identify the challenges associated with free maternity services in levels 5 and 6 public health facilities in Kenya. The specific objectives include; first, to identify ratio of specialized staff to pregnant women and secondly, to investigate the staff and infrastructure on utilization of free maternity services. The study adopted cross sectional descriptive design. Also, facility based secondary data was used and the random effects GLS regression model was employed. The study results showed significant increased utilization of services in hospitals with more obstetricians, ambulances and beds. The proportion of specialized staff to deliveries was very low implying challenges to service provision given the provision of free maternity services. Based on results, the study concluded that there is a need for the government to consider increasing funding to secure more and better good infrastructure facilities like ambulances and beds. Finally, there is a need of government and stakeholders of developing a policy and policy guidelines to guide counties in implementation of free maternity services.

Keywords: Free maternal services, Access, skilled birth attendants and Public hospitals

1. Background
Kenya has been struggling with high rate of maternal mortality and low level of child births by skilled attendants'. The Country is among the developing countries that never achieved MDG 5 a & b which were to reduce maternal mortality by three quarter of the 1990 maternal mortality and achieve universal access to reproductive health by 2015. The end of MDGs generated Sustainable Development Goals (SDG) with a new agenda for maternal health towards ending preventable maternal mortality. Target 3.1 of SDG 3 is to reduce the global MMR to less than 70 per 100 000 live births by 2030 (WHO, 2015). Kenya was one of the eighteen countries in the sub Saharan with very high estimate of maternal mortality, at 500 deaths per 100,000 live births by the end of MDGs, 2015 (WHO 2015). The most recent strategy Kenya took was to introduce free ante natal, intra-natal and postnatal care in all Government hospitals in June 2013.The aim was to increase hospital child deliveries by skilled personnel.

1.1. Maternal Health Services
Health services are a concept of interaction between services and the recipients of the services. Interaction is the relationship between service capacity and service output. It is a process from resource allocation to achievement of desired results. According to Tanahashi, 1978, achievement of results is made possible through four major factors, namely availability of resources, accessibility, acceptability and effectiveness contact. Access is timely use of service according to need (Peters et al, 2008). Five dimensions of access are approachability, availability and accommodation, appropriateness, affordability and acceptability (O'Donnell, 2007, Levesque et al,2013). These dimensions have five corresponding abilities of the consumer which are to perceive, seek, reach, pay and engage (Levesque et al, 2013). Measurement of utilization and access have a prominent role in policy and outcome of service delivery.
Pregnancy related mortality is preventable but still remains a major public health problem. This is mainly attributed to inability of women to access care by skilled health personnel during ante natal, intra-partum and post-partum period in Kenya. Child birth can be a very simple procedure requiring no intervention but the uncertainty of outcome calls for attendance by skilled personnel. About 80 per cent of maternal deaths are as a result of direct obstetric complications which are preventable. These are haemorrhage, sepsis, abortion complications; pregnancy induced hypertension and obstructed labour (WHO, 2015). Kenya is rated seventh among the ten countries that contribute to 60%, maternal deaths globally (WHO, 2015). According to UNFPA report of 2016, the maternal mortality

rate (MMR) in Kenya is 362 per 100,000 live births in 15 out of 47 Counties accounting for 98.7 % of total maternal deaths (UNFPA, 2016). The report analyzed several international frameworks that exist to guide the implementation of the right to health in general and the right to reproductive health in particular. Health services must be available with sufficient health facilities and trained health professionals, The Committee on Economic, Social and Cultural Rights (CESCR, 2000). The Committee on Elimination of Discrimination against Women (CEDAW) requires that women have appropriate services in connection with pregnancy, childbirth, and post-natal care, including family planning and emergency obstetric care. The health of women is an important non-income poverty indicator. The Kenya Constitution 2010 Article 43 (1) talks of rights to highest attainable health standard including reproductive health, while Article 43(2) highlights rights to emergency treatment.

Free maternity services were introduced to improve access to maternal health services and reduce inequality and maternal mortality (WHO, 2010). Delivery by skilled birth attendants have been known to be the single most resolution to reduce maternal mortality (WHO, 1999). Skilled care is defined as quality care to a woman during pregnancy, childbirth and postpartum period by some skilled personnel supported by an enabling environment and a functional referral system (WHO, 2004). In Kenya free maternity services were introduced in June 2013 as it was one of the Government promises to Kenyans in the 2013 manifesto. The mechanism of its implementation were hurriedly put in place to achieve the Rapid Results Initiative (RRI) within a hundred days of its implementation. At the same time the devolution of health services took place and there was no clarity on the roles different levels of Government were to play in the implementation of free maternity. Funds come from National Government while staff management and supervision as well as the maternal healthcare services are under the County Government. The MOH has not come up with policy and policy guidelines for the implementation of then free maternity services policy leaving each of the 47 Counties of Kenya to have individual implementation mechanisms as found in the implementation assessment report of 2015. Despite the free maternity services, utilization has not been fully achieved. About 40 per cent of pregnant women still deliver at home with unskilled traditional birth attendants. The factors attributed to home deliveries include culture, poverty, fear of being mistreated and distance from home to health facilities (WHO, 2010). Kenyan public health facilities have long been plagued by reports of abuse, mistreatment and negligence of patients at the hands of staff, a problem enhanced by poor supervision and understaffing (Kenya National Commission of Human Rights, 2013).

Production of health services requires input mainly drugs, equipment, infrastructure and qualified health providers. These elements should be present in the same facility at the same time (Service Delivery Indicators Survey 2010) Midwives are frontline specialized skilled providers of free maternity services. They are expected to be present at all levels of care in order to facilitate referrals of mothers who may develop complications (UNFPA, 2011). Acute shortage of midwives has been reported in most developing countries (WHO, 2011). The midwives work in unconducive environment, heavy workloads, poor remuneration, inadequate supportive supervision, equipment and supplies in addition to weak management. All these factors cause stress, frustration, negative attitudes and burnout (Holmes & Goldstein, 2012). Obstetricians are few in Kenya and unevenly distributed with most of them working in urban set ups. According to the Kenya Health Sector Strategic & Investment Plan (2012-2018) current staff levels are estimated to meet only 17% of minimum requirements needed for effective operation of the health system. The introduction of free maternity services made the situation even worse. Nurses have also reported becoming overburdened due to the new policy, with nearly all of them working overtime. As few as three nurses attend to 20 mothers at a time. Frequent strikes and lock outs have been experienced. The main complaints have been poor remunerations, poor working environments, shortage of supplies and equipment.

1.2. Supply and Demand of Health Services

User fee elimination policies are driven by the fact that market prices determine demand for the commodity or health services (Ensor& Cooper, 2004). Grossman analyzed individual investment and consumption decisions to improve health and utilize healthcare (Grossman, 2000). The model indicates that community, price of medical care and other goods determine the individual decision to seek healthcare. Demand is determined by quality, accessibility, price, waiting time and knowledge of healthcare needed (Ensor & Cooper, 2004).[1]

Supply is determined by factors from healthcare production function which interact to produce effective healthcare services. Factor prices are items required to produce treatment like staff time, capital equipment and buildings, drugs and consumables and staff efficiency. The theory explains that the product may change in quality as the price drops. Reduction of direct financial barriers results in increased utilization of services, workload and consumption of supplies (Witter *et al*., 2013). Also scarcity of resources results in delays, long waiting time and compromised quality (Ensor & Cooper, 2004).[2]

Transportation costs and price of substitutes and alternative health services also determine a woman's decision to deliver in a health facility or at home. Maternal health programs require governments to address various factors that affect maternal outcome in addition to finance (USAID, 2014). Determining factors of demand and supply of maternal healthcare services may constitute barriers to utilization unless addressed. According to Hatt *et al*. (2013) the impact of user fee reductions on population health outcomes depend on demand for and quality of services.

Women identify being treated with dignity as a benchmark of quality (Moore et al 2002). Privacy is crucial owing to activities that surround labour progress and child birth. Adequate infrastructure with available water, electricity, transport and time a health provider spends with a woman needing service, in addition to other supplies are linked to quality of care (Hatt, 2013). Overcrowding has been reported with free maternity services with women sharing beds, some delivering on the floors and being discharged before 24 hours

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[1] Quantity demanded: Qd = D (individual/household factors, community factors, prices).

[2] Quantity supplied: Qs = S (factor prices/availability, technology, prices management).

have elapsed the period in which a woman with normal delivery should be observed for any complication. Where the women are not sharing beds, extra beds have been congested in the wards leaving no working space and exposing the patients and the staff to risk of cross infections and disease outbreaks. Overcrowding is a barrier to adequate utilization of Kenyan public health facilities.

After introduction of free maternity services in 2013, facilities were overwhelmed with National Referrals and Pumwani maternity getting over 100 percent increase in child deliveries (Burbonis, 2013). Death in facilities is still occurring. Timeliness of intervention is crucial in ending maternal mortality but the third type of delay which is receiving adequate emergency care at facility remains a challenge. A study done by MoH, (2014) to assess status of implementation of free maternity services program in the devolved health system reviewed an increase of neonatal deaths by 27 percent and maternal deaths by 10 percent. There was least client satisfaction (0.09 out of 1) on staffing and quality of care with inadequate documentation which is key in assessing quality of care. Another study by Mugambi (2014) looked into socio economic factors influencing utilization of free maternity services in Nyatike District in Kenya. The study found that most of the mothers who accessed the free maternity services lived near the facilities and walked between 30 minutes to one hour.

Researches have shown that focus has been mainly on financial barriers but strategies and policies on access are limited (Michael *et.al.*, 2013). How accessible and effective free maternity services are to women still remains a question to be answered. There is little evidence on cause and barriers to access from side of provider. Evidences and causes of underutilization of free maternity service is missing in most studies. This study explores relationship existing between access to free maternity services and their actual utilization. The objectives include; to determine the ratio of specialized staff to pregnant women in levels 5 and 6 public health facilities in Kenya and secondly to investigate the influence of staff and physical facilities on utilization of free maternity services in Kenya.

2. Methodology and Data

The study used cross-sectional descriptive design in investigating the challenges faced by Level 5 and 6 free maternity service providers. The study examined the effect of different variables in relation to delivery by skilled birth attendants. To determine the challenges faced by pregnant mothers in accessing free maternity services in level 5 and 6 health facilities, the following empirical model was used.

$Y_{it} = \beta_0 + \sum_1^k \beta_j X_{jit} + \varepsilon_{it}$;

Where;

Y_{it} is a measure of consumption of free maternity services in health facility i in time t

X_{jit} are observed explanatory variables for health facility i in time t

β_0 is the constant term

β_j are the parameters to be estimated

ε_{it} is the idiosyncratic disturbance term for health facility i in time t with a zero mean and variance of one.

Multiple regressions were used to analyse this relationship

$HD_{ij} = \beta_0 + \beta_1 OBS_{it} + \beta_2 MID_{it} + \beta_3 BED_{it} + \beta_4 AMB_{it} + \beta_5 MAT_{it} + \varepsilon_{i,t}$

Where;

HD_{ij} is the number of hospital deliveries of facility $_i$ where j=1, 2 where j is the mode of delivery.

$\beta_{0\ is}$ the constant or the Y intercept

$\beta_{1...}$ β_5 are the coefficients of regression

OBS_{it} is the number of the obstetrician to client ratio of facility $_i$ in time $_t$

MID_{it} is the number of midwives to client ratio of facility $_i$ in time $_t$

BED_{it} is the number of beds to client ratio facility $_i$ in time $_t$

AMB_{it} is the number of ambulances to hospital facility $_i$ in time $_t$

MAT_{it} is the number of maternity theatres in facility $_i$ in time $_t$

$\varepsilon_{i,t}$ is the error term

While analysing the information collected, diagnostic tests were done to check for the presence of Multicollinearity as well as normality of data collected to avoid spurious estimates. Further the study adopted Hausman specification test where the fixed effects model specification was compared to the random effects model determine the best fitting model. The null hypothesis was that the differences in coefficients are not systematic.

Secondary data used was obtained from the Ministry of Health (MoH, 2014) which collected information on trends on utilization of maternity services (caesarean and spontaneous vertex delivery) before and after policy announcement across level 5 and 6 public health facilities in Kenya. Further the data has the key information per health facility on the actual total number of beds, the level of the hospital based on classification rules, the number of trained obstetricians and nurse midwives, total number of available ambulances, actual number of theatres and the respective location.

3. Study Results

From the study findings indicated in table 1, the ratio of pregnant women to midwife was found to be very high with over 61.54. 50%, 53.85%, 69.23% and 53.85% of facilities having a ratio of more than expected (i.e. 100 deliveries per midwife) in the years 2011, 2012, 2013, 2014 and 2015 respectively. According to the WHO, the required ratio is 1:1 in delivery room and 1:5 in antenatal and post-natal wards. WHO (2011) and RCN (2003) claim that the acute shortage in most countries compromised quality of healthcare. Increased workload with shortage of midwives leads to burnout which is associated with negative attitude (Gilson *et al.*, 1993).

Studies by Aiken *et al* (2002) and Needleman *et al*., (2002) demonstrated that high mortality levels were due to poor staffing. Ashcroft *et al* (2003) in their study reported unreported near misses due to shortage of midwives. The increased workload in the health facilities may be as a result of free maternity care provided under the new government policy. The table below shows the trends in the workload of midwives.

Hospital	2011	2012	2013	2014	2015
COAST	210.78	141.47	98.93	150.63	123.59
EMBU	98.37	55.94	63.11	61.76	56.03
GARISSA	337.34	146.2	116.58	152.63	118.2
JOOTRH	130.73	140.77	110.95	123.97	126.86
KAKAMEGA	114.93	87.33	106.05	122.79	94.17
KISII	113.52	85.22	114	128.63	102.62
KNH	9.15	-	61.03	75.70	66.23
MACHAKOS	76.63	64.29	77.39	72.96	78.22
MERU	229	92.32	95.33	129.63	81.29
MTRH	88.2	112.18	128	158.39	128.72
NAKURU	136.73	128.83	147.43	142.62	114.62
NYERI	77.77	45.52	43.65	63.12	46.98
THIKA	154.76	178.28	211.72	195.13	171.8

Table 1: Deliveries per mid-wife
Source: Authors tabulation

The ratio of Obstetrician to women of reproductive age is above the standard given by WHO, 1:1000. The study found that on average, 92.3% of the health facilities had high ratio far beyond expected ratio with Kenyatta National Hospital being the only facility with ratio below the threshold (see Table 2). Kenyatta National Hospital is a training center for postgraduate students doing obstetrics and this raises the number of obstetricians. High level of obstetricians was associated with accurate interventions and continuity of care in India (Joyce *et al*., 2004). Literature indicates inappropriate use of oxytocin, undiagnosed complications, third and fourth degree tears where there were no obstetricians or were doing calls (Ashcroft, 2008). The trends observed especially in the last three years may be as a result of free maternity services in various health facilities. Table 2 shows the trends in the workload of Obstetricians.

Hospital	2011	2012	2013	2014	2015
COAST	4480.5	3761.5	2597	2232.25	2439.5
EMBU	2589.5	4162	2251	2506.5	2269.5
GARISSA	3383	2676	1394.5	3722	-
JOOTRH	5034	2561.5	1274.75	1920.33	1393.5
KAKAMEGA	5972	2406.5	1754.67	2339.68	2850
KISII	2420	2563	6217	7048	3170.5
KNH	-	-	801.94	778.16	752.63
MACHAKOS	2741	2265.5	6045	7409	3826.5
MERU	5582	1869.5	4086	1820.33	1200
MTRH	522.75	878.33	1201.67	1276.5	1139
NAKURU	4013	6959	4309.5	5500.5	4611
NYERI	5180	1852.5	1139	2472.5	1896
THIKA	6303	6100	7093	8066	3476

Table 2: Trends in work load per obstetricians
Source: Authors tabulation

In model selection, the study compared fixed effects and random effects where the former assumes that the real effect size is the same in all 13 health care facilities. The null hypothesis was that the differences in coefficients are not systematic. Consequently, on conducting the test, it was shown that P-value of 0.7590 implied that the individual level effects are best modelled using the random effects method. The results are indicated in table 3.

Variables	Coefficients of Fixed Effects (F)	Coefficients of Random Effects (R)	Difference (F-R)	S. Error
midwives	97.6682	96.19857	1.469633	25.87677
Obstetricians	-315.2369	-92.11337	-223.1236	159.6245
Theatres	792.7552	794.3271	-1.57185	166.5965
Ambulances	84.71498	123.0924	-38.37741	64.5086
Beds	9.124896	4.06357	5.061326	5.672498
Free maternal policy	734.0635	730.1274	3.936131	194.8409
Chi2(10) = 3.39 Prob>chi2 = 0.7590				

Table 3: A Test for Model selection
H$_o$: Difference in Coefficients not systematic
Source: Author's calculation based on the available data

The Hausman test preferred random effects model to fixed effects model which allows estimation effects of the mean of the distribution effects rather than estimating one true effect.
The adoption of random effects model was based on different health facilities which may not have shared the common effect size in terms of accessibility to free maternity service and the core objective of establishing the challenges leading to utilization of free maternity policy. After undertaking model selection, the random effects variant is valid for interpretation. The findings are as indicated in Table 4.

	Robust			
	Coefficients	**Std. Err.**	**Z**	**P>z**
D. Midwives	18.47692	31.01607	0.60	0.551
Obstetricians	401.3856***	80.78392	4.97	0.000
Theatres	676.1637	535.551	1.26	0.207
Ambulances	173.5276***	62.04794	2.80	0.005
D. Beds	24.77156***	8.194773	3.02	0.003
Free maternal policy	1154.029***	392.3107	2.94	0.003
Constant	2976.197	586.2053	5.08	0.000
Number of Observations = 43; Number of Groups = 13				
R-Squared: Within = 0.4591, Between = 0.7216 and Overall = 0.6755				
Wald Chi2(6) = 221.54				
Prob > Chi2 = 0.0000				
Durbin-Watson statistic (*d*) = 1.9801				
Sigma_u=2051.5987; Sigma_e = 827.77697 and Rho= 0.8599966				

Table 4: Random-Effects GLS Regression (Dependent Variable: Hospital Delivery)
NB: D represents first differences[3]
Source: Author's calculation based on the available data

As shown in table 4, the total variations explaining accessing and utilizing maternal health care services in levels 5 and 6 health facilities were 67.55%, 72.16% of the variations explain accessing free maternity services in between the panels while 45.91% of the variations explain the usage of free maternal health care within levels 5 and 6 health facilities in Kenya. Further, the overall p values of 0.000 (overall P value is less than 5% significant level). This is an indication that the independent variables used significantly explained the dependent variable, utilization of maternal services (proxied by total deliveries) across level five and six health facilities in Kenya. Despite all variables having joint significance, not all of them are significance in explaining hospital delivery. Example is midwives and theatres which are statistically insignificant. From table 4, the coefficients of the obstetricians, ambulances and free maternity policy were statistically significant since all of their p-values were significant at 1% significant level well, none of their confidence intervals included zero. The standard deviation of residuals within groups was 2051.6 and variance attributable to the differences across the panels was 0.86. On the other hand, the standard deviation of residuals between groups is 827.78. Therefore, there is no correlation between the error terms and the regressors.

4. Discussion of the Study Results from Random Effects Model
A positive and significant relationship implies that increase in the number of obstetrician encourages hospital deliveries among pregnant women in Kenya. This agrees with the study results of Joyce *et al.*, (2004) and Ashcroft, (2008) who found that high level of obstetricians was associated with accurate interventions defined by higher level of caesarean sections and high positive outcomes. There was also continuity of care in hospitals with regular obstetricians.
Literature in Ghana by Buors, (2003) and Tornui *et al.*, (2007) indicated that loss of user fees revenue at health facilities led to stock-outs of drugs and supplies which negatively affected the quality of care provided. Interestingly, there was inaccessibility in some regions due to distances. The positive relationship established by infrastructural facilities such as ambulances and beds concurred with the literature. Collins *et al.*, (2013) found that, there was an increase in the proportion of women giving birth in a health facility where there were adequate drugs, good and adequate infrastructure in Nepal. According to DHS (2010) in Columbia, the improvement of roads, communication, education and increase of health facilities led to reduction of maternal mortality. This move was attributed to increased and strengthening of the referral systems.
Free maternity policy significantly increased utilization of hospital care by pregnant women. Implementation of free maternity services was found to be weakened by inappropriate reimbursement and allocation of funds for free maternity services. This compromises the quality and usage of maternity services. This finding was consistent with the study results obtained by El-Khoury *et al.*, (2012) In Mali waived fee was replaced by Medecins Sans Frontieres (MSF). The quality of care was maintained with consistency

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[3] These was as a result of addressing high correlation indicated by midwives and beds implying presence of Multicollinearity

in drug supply (Ponsar *et al.*, 2011). The outcome was decreased post-caesarean maternal and neonatal deaths (El-Khoury *et al.*, 2012). In Columbia the equity funds were provided to reduce financial barriers. Charges were replaced by donor funds and maintained the quality of care with consistency drug supply as indicated by Ponsar *et al.*, (2011).

5. Conclusion and Policy Recommendations

Timeliness of intervention is crucial in ending maternal mortality but the third type of delay which is receiving adequate emergency care at facility remains a challenge. The 2015 MOH report on assessment of status of implementation of free maternity services program reviewed an increase of neonatal deaths by 27% and maternal deaths by 10%. The study concludes that a policy need to be made on staffing and physical health facilities which significantly influence the usage of free maternity services among pregnant women in level 5 and 6 hospitals in Kenya. The ratio of midwives to deliveries remained highly unacceptable. By doing so, successful implementation of free maternity services in Kenya will level that of her Nepal counterpart including Columbia, and Mali among others. Based on the findings, the study recommends the following;

1. Employment of more staff to meet the demand funds being made available.
2. Develop a policy and policy guidelines to guide Counties in implementation of free maternity services.
3. The National and County Governments put mechanisms of reporting maternal mortality with aim of monitoring the success of the policy.
4. Construction of maternity units to decongest the existing ones.

6. References

i. Aiken, L., Lindah,H., Sean,P.C., Sloane,D.(2002).Hospital nurse staffing and patient mortality: nurse burnout and job dissatisfaction. Journal of American Medical Association. 2(16), 1987-1993.
ii. Ashcroft B., Elstein M., Boreham N. & Holm S. (2003). Prospective semi structured observational study to identify risk attributable to staff deployment, training, and updating opportunities for midwives. British Medical Journal, (327), 584.
iii. Bourbonnais N. (2013) Implementing Free Maternal Health Care in Kenya: Challenges, Strategies and Recommendations.
iv. Ensor T, & Cooper S. (2004). Overcoming barriers to health service access: influencing the demand side. Journal of Health Policy Planning. 2(19), 69–79.
v. Gilson L, Kitange H. & Teuscher T. (1993). Assessment of process quality in Tanzanian primary care. Journal of Health Policy Planning 2(26), 119-39.
vi. Hatt,L .E.,Makinen, M., Madhavan,S. & Conlon,C.M. (2013).Effects of User Fee Exemptions on the Provision and Use of Maternal Health Services.
vii. Holmes, D., Chan M. (2012: committed to increased health coverage.
viii. Joyce R., Webb R. & Peacock JL. (2004). Associations between perinatal interventions and hospital stillbirth rates and neonatal mortality. Journal of Archives of Disease in Childhood: Fetal and Neonatal Edition, (89), 51–56.
ix. Levesque,J.F.,Harris, M.F.& Russel,G.(2013).Patient centered access to health care: Conceptualising access to the interface of health systems and population.
x. Michael, T. & Katharina C.K. (2013).Access to health services-Analyzing non- financial barriers in Ghana, Rwanda, Bangladesh and Vietnam using household survey data.
xi. MOH (2014.) Public Expenditure Tracking and Survey Delivery indicator Survey 2013.
xii. MOH (2015).Status of Implementation of Free Maternity Services Program in the devolved health system in Kenya. A Comprehensive Assessment Report.
xiii. MOH,(2013).Kenya Service Availability and Readiness Assessment Mapping (SARAM) Report,2013.
xiv. Moore, M., Armbruster D, Graeff J. & Copeland R.(2002). Assessing the caring behaviours of skilled maternity care providers during labor and delivery: experience from Kenya and Bangladesh.
xv. Mugambi, C. (2014).Determinants of utilization of free maternal health care in Muhuru and Nyatike Divisions, Nyatike Sub-County, Kenya.
xvi. Needleman, J.,Buerhaus P.,Shane V.P.,Leibson C.L.,& Harris M.(2011).Nurse staffing and inpatient hospital mortality.
xvii. O'Connell, T. (2012). National Health Insurance in Asia and Africa: Advancing Equitable Social Health Protection to Achieve Universal Health Coverage. UNICEF.
xviii. O'Donnel,O.,Doorslael,E., Wagstaff,A.,Lindelow,M.(2007).Analyzing Health Equity using Household Survey Data.
xix. Peters, D .H,Garg,A.Bloom,G.,& Brieger,W.R (2008).Poverty and Access to Health Care in Developing Countries.
xx. Ponsar, F., Van Herp M., Zachariah R., Gerard S, Philips M, &Jouquet G. (2011) Abolishing user fees for children and pregnant women trebled uptake of malaria-related interventions in Kangaba, Mali.
xxi. Tanahashi, T. (1978). Health service coverage and its evaluation. Bulletin of the World Health Organization, 2(56), 295-303.
xxii. UNFPA (2016).Summary Report of the Assessment of UNFPA's Advocacy Campaign ot End Preventable Maternal and New-Born Mortality in Kenya.
xxiii. UNFPA (2011) .Trends in maternal mortality,1990-2010 .
xxiv. UNICEF (2009). Maternal and Child Health: The Social Protection Dividend.
xxv. WHO (1999).Reduction of maternal mortality. A joint WHO/UNFPA/UNICEF/World Bank statement. Geneva.
xxvi. WHO (2004). Making pregnancy safer: the critical role of the skilled attendant. A joint statement by WHO, ICM and FIGO. Geneva .

xxvii.   WHO (2011).More Midwives needed to improve Maternal and Newborn Care.
xxviii.   WHO (2015). Building a future for women and children. The 2012 report on the countdown to 2015.
xxix.   WHO (2014).Trends in maternal mortality:1990 to 2013. Estimates by WHO, UNICEF, UNFPA, the World Bank and the United Nations Population Division.
xxx.   Witter,S.,Ensor,T.,Fustukin,S.,Mcpake,B,Chirwa,Y.,Newlands,D.(2013). Removing of financial barriers to access reproductive, maternal and newborn health services: the challenges and policy implications for human resources for health. Journal of Human Resources for Health. (11), 11-46.
xxxi.   World Bank.(2004). World development report: Infrastructure for development. New York: Oxford University Press.