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Gender Equality and Maternal Health Utilization: Perspectives from Kenya

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Gender Equality and Maternal Health Utilization: Perspectives from Kenya

Nancy Nelima Nafula

Kenya Institute for Public Policy
Research and Analysis

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Abstract

The paper investigates the implications of female household income on the utilization of modern maternal obstetric care (proxied by facility delivery) in Kenya. The study used a utility maximization model and a nationally representative dataset—Kenya Integrated Household and Budget Survey 2015/16. The results show that improving the share of female income relative to men (gender income equality) is strongly associated with the use of modern maternal healthcare. Other factors significantly correlated with modern maternal healthcare utilization include the mother’s age, insurance, years of schooling of the household head, and number of people living in a household. The study notes that income earned by the female members of a household is an important determinant in explaining whether a woman visits a health facility at the time of delivery or not. Similarly, women with access to insurance are likely to use modern maternal healthcare and thus reduce maternal mortality. Women who reside in rural areas are less likely to use modern maternal healthcare than those in urban areas. There is evidence to suggest that women from poor households are less likely to use modern maternal care relative to those from non-poor households. The government could consider investing in programmes that enhance the economic status of women. This empowerment is important for women’s decision making when seeking maternal health services at delivery.

Abbreviations and Acronyms

ANC	Antenatal Care
CHVs	Community Health Workers
COVID-19	Coronavirus 2019
Ksh	Kenya Shilling
MDGs	Millennium Development Goals
MMR	Maternal Mortality Ratio
OLS	Ordinary Least Squares
PNC	Post-Natal Care
SDGs	Sustainable Development Goals

Definitions

Maternal death: The death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management (from direct or indirect obstetric death), but not from accidental or incidental causes.

Pregnancy-related death: The death of a woman while pregnant or within 42 days of termination of pregnancy irrespective of the cause of death.

Maternal mortality ratio (MMR): The number of maternal deaths during a given period per 100,000 live births during the same period.

Mortality rate: Number of maternal deaths divided by person-years lived by women of reproductive age.

Maternal mortality: The proportion of deaths among women of reproductive age that are due to maternal causes.

Gender: Socially constructed norms, behaviours, activities, relationships, and attributes that a given society considers appropriate for men and women.

Gender equity: Fairness and justice in the distribution of benefits and responsibilities between men and women

Gender equality: Equal chances or opportunities for women and men to access and control social, economic, and political resources within families, communities, and society at large, including protection under the law (such as health services, education, and voting rights). Gender equality is defined as equal status, opportunities, outcomes, and rights for females and males, including in decision-making.

Gender sensitivity: In health, it refers to perceptiveness and responsiveness concerning the difference in gender roles, responsibilities, challenges, and opportunities in the function of health systems including collection and analysis of evidence, programming, policies, and the delivery of healthcare services.

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1. Introduction

Each year, more than 280,000 women around the world die from complications of childbirth and pregnancy. More specifically, one (1) woman dies every two (2) minutes during pregnancy or childbirth (Kassebaum et al., 2013; World Health Organization, 2021). For every woman who dies of pregnancy-related causes, another 20-30 women suffer from acute or chronic morbidity, sometimes with permanent health effects that limit their productivity, and physical and mental well-being (World Health Organization, 2018; Firoz et al., 2013; Requejo and Bhutta, 2015). The World Health Organization (WHO) estimates that over two (2) million women living in developing countries remain untreated for obstetric fistula, a devastating injury of childbirth (World Health Organization, 2018).

As of 2019, global estimates showed that there were two (2) million stillbirths, half of which occurred during labour and childbirth (World Health Organization, 2021). Another 2.7 million neonatal deaths occur each year (United Nations, 2015; World Health Organization, 2018). In totality, approximately 99 per cent of all maternal deaths occur in low-income countries and middle-income countries. More than half of these deaths occur in Sub-Saharan Africa (SSA) and one-third in South Asia; together, they account for 87 per cent of all maternal deaths (World Health Organization, 2018; Kassebaum et al., 2013).

Over time, statistics have shown that the causes of these maternal deaths are indeed numerous and complex among women aged 15-49 (Say et al., 2014). They include severe bleeding (27%), indirect causes (27%), pregnancy-induced high blood pressure (14%), infections (11%), other direct causes (10%), abortion (9%), and embolism (obstruction of an artery-blood clot or air bubble) (3%) (Say et al., 2014). The nature and intensity of these causes, however, vary from one country to another, and even within a given country, they vary from one region to another. Of extreme concern is that the COVID-19 pandemic has caused major disruptions in the health sector, a situation that is likely to increase such risks, particularly for the most vulnerable households (World Health Organization, 2021).

Evidence from research indicates that maternal health outcomes are affected by social and economic inequalities (Paruzzolo et al., 2010; Singh et al., 2011). Further evidence has shown that behind these maternal deaths, gender inequality has a major role to play (Singh et al., 2011). These inequalities combined are realized through inappropriate household preferences and from failures in how markets and institutions function (World Bank, 2011). Specifically, these failures often occur in institutions that fail to deliver the required medical care and services to expectant mothers and within households where women's and girls' rights are violated due to their low status.

Several studies examining the relationship between gender inequality and maternal health have shown that gender-related factors have an effect on maternal health outcomes; that is independent of education, economic status, religion, and other social factors (Singh et al., 2011; Morgan et al., 2017; Namasivayam et al., 2012; Paruzzolo et al., 2010). The domains of gender inequality that have been found to influence maternal health outcomes include beliefs and attitudes

about gender roles; norms about the way women and men relate with each other in intimate partnerships; women's autonomy (decision-making, independent access to economic resources, and freedom of movement), and attitudes about or experience of gender-based violence. While norms that delay women from getting prompt medical assistance during childbirth may be contributing factors, the solution requires interventions in the institutions that deliver these services (World Bank, 2011).

These interventions affect the realization of the health-related commitment to which Kenya is a signatory. For instance, at the Millennium Summit in 2000, States committed to achieve a set of targets by 2015, relative to a baseline of 1990. At the core of the Millennium Development Goals (MDGs), goal number four (4) on the reduction of child mortality (by two-thirds), and goal number five (5), on the improvement of maternal health through a reduction of maternal deaths (by three quarters) and universal access to reproductive health, were key targets to be attained by 2015. Further, to build on the progress realized through the implementation of the MDGs, the United Nations and multiple world leaders agreed to the Sustainable Development Goals (SDGs) in 2016. The purpose of the SDGs is to contribute to the well-being of women, newborns, families, communities, nations, and the global community. The SDG theme is to ensure that no one is left behind.

The 17 SDGs range from no poverty, universal education, universal health coverage, gender, environment, and peace among others (Requejo and Bhutta, 2015). Specifically, SDG three (3) aims to ensure healthy lives and promote well-being for all ages with target 3.1 having to reduce the global maternal mortality ratio to less than 70 per 100,000 live births, and target 3.2 seeking to reduce the neonatal mortality rate to 12 per 1,000 live births. SDG five (5) aims to achieve gender equality and empower all women and girls.

Although substantial progress has been achieved in reducing maternal and child deaths, the rate of reduction is much slower in developing countries relative to developed countries. For instance, in Sub-Saharan Africa, the maternal mortality ratio is estimated at 500 per 100,000 live births compared to 95 per 100,000 in East Asia. Similarly, Africa as a continent faces the slowest annual rates of decline in maternal mortality (Bhunnoain and Mc Carthy, 2015). Disparities are clear between countries. For instance, for every 100,000 live births in 2013, Sierra Leone had an MMR of 1100, the Central Africa Republic had 880, South Sudan had 730, Nigeria had 560 and Ghana had 380. In Kenya, as in other low-income countries and middle-income countries, complications during or after childbirth and during pregnancy are major sources of morbidity and mortality among women and girls. According to the Kenya Demographic and Health Survey (KDHS) 2014, the national maternal mortality ratio declined from 488 per 100,000 live births in 2008 to 362 per 100,000 live births in 2014. Further statistics show that there are persistent disparities within counties, ranging from 189 per 100,000 in Elgeyo-Marakwet to over 1,000 per 100,000 in four counties (Mandera, Marsabit, Wajir, and Turkana) where women live beyond the reach of health facilities. Further, neonatal deaths account for 23 newborn deaths per 1,000 live births.

Evidence from previous research shows that maternal death is not a fact of life but can be prevented (Bauserman et al., 2015). Reducing maternal mortality is dependent upon ensuring that women have access to quality healthcare before, during, and after childbirth. Specifically, studies have shown that skilled attendance at birth is critical for reducing maternal and neonatal mortality (Gabrysch and Campbell, 2009; Namasivayam, Osuorah, Syed, and Antai, 2012; Campbell and Graham, 2006). One of the ways in which prevention can take place is through a coordinated and deliberate effort by the government, healthcare professionals, and civil society to articulate effective policies and ensure that those policies are backed up by clear budget commitments (International Monetary Fund, 2018).

This study is focused on investigating the implications of gender income equality on the utilization of maternal health services. Specifically, the study evaluated the effect of income share of female household members on the choice of the place of delivery. Delivery in a health facility is analyzed as an indicator of utilization of maternal health services and, therefore, a proxy measure for maternal mortality.

Section two (2) of this paper provides the chronology of various government maternal health programmes in Kenya; a review of literature is presented in Section three (3) and methodology and data are in Section four (4). Section five (5) discusses the results while Section six (6) concludes the paper.

2. Government Initiatives/Affirmative Actions for Maternal Healthcare

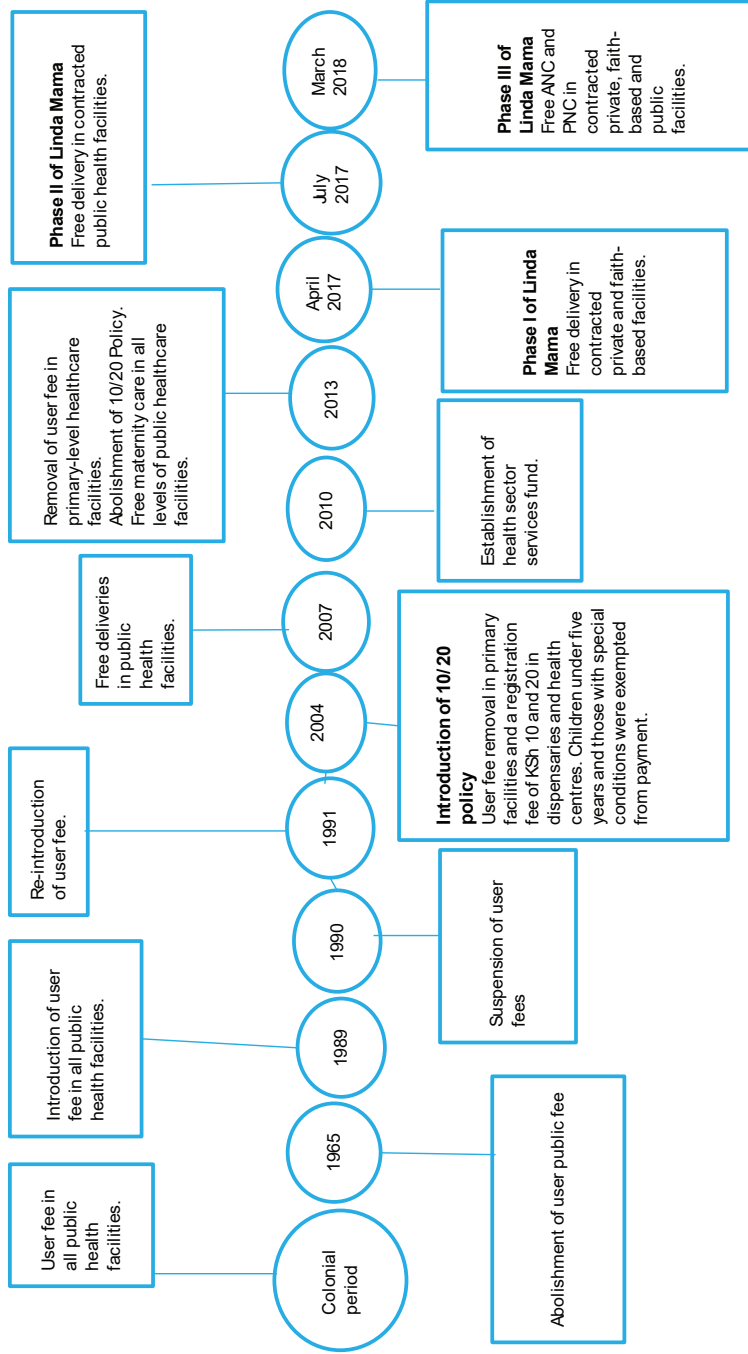
The Government of Kenya has had several reforms in the service delivery sectors including the health sector. According to Sessional Paper No. 10 of 1965, the government outlined concerted efforts to address poverty, disease, and ignorance. The purpose was to achieve social justice, human dignity, and economic welfare for all. While the sessional paper does not single out maternal health services in the health sector, it indicates that health services were unaffordable and a majority of poor Kenyans could not afford them. As such, in the same year, the government abolished user fees from all public facilities. As a form of financing mechanism, user fee was found to be retrogressive, limited access to services, and increased inequities (Orangi et al., 2021). In Kenya, like all the low-income and middle-income countries, the abolition of user fees recorded significant improvements in antenatal clinic visits and facility deliveries (Dzakpasu et al., 2014).

In 1989, user fee was re-introduced in all public facilities, suspended in 1990, and re-introduced again in 1991. In 2004, user fee was abolished in primary health facilities, and a registration fee of KSh 10 and 20 was introduced in dispensaries and health centres, respectively. Children under five (5) years and those with special conditions were exempted from payment. In 2007, the government introduced free delivery in all public health facilities (see Figure 2.1).

2.1 Free Maternity Care

Free maternity care was introduced across all public health facilities on 1st June 2013. The goal of this programme was to increase the demand for skilled delivery services at health facilities. As such, the programme exempted women from paying maternity fees in public health facilities. To access free maternity care, an expectant mother is required to produce their national identification card for registration, a guardian's identification card, or use antenatal care records for expectant mothers under the age of 18 years. Mothers who need to benefit from this programme are required to register with the National Health and Insurance Fund (NHIF). This programme was later transformed into the *Linda Mama* Programme.

Figure 2.1: Timeline of health user fee reforms in Kenya



Data source: Orangi et.al (2021)

Key: ANC, antenatal care; PNC, postnatal care

2.2 Beyond Zero Campaign

Following the need to address maternal mortality, in January 2014, the Beyond Zero campaign initiative by the First Lady, Mrs Margret Kenyatta, was launched in partnership with the government. The project aimed to promote maternal and newborn health while at the same time controlling the prevalence of HIV. The initiative targeted to provide a mobile clinic to each of the 47 counties.

2.3 Linda Mama

Linda Mama, formerly Free Maternity Services, is a *boresha jamii* programme funded through the exchequer. It is a health initiative targeting expectant mothers and infants. The programme was launched in October 2016. The goal of the programme is to ensure that women and infants have access to quality and affordable health services. This is to achieve universal access to maternal and child health services and consequently contribute towards universal health access. The programme is intended to encourage women to seek maternity services before and after delivery to reduce maternal mortality in the country.

The government pays an annual premium of Ksh 6,000 per mother. However, mothers can opt to make Ksh 500 monthly contributions to benefit from a comprehensive cover. The programme benefits include both inpatient and outpatient services for the mother and newborn for one year. The services include an antenatal care package, delivery, postnatal care, and emergency referrals for pregnancy-related conditions and complications.

The redesigned initiative includes all government hospitals and a network of health providers from faith-based facilities and some private hospitals. The facility reimbursements are coordinated through the National Health Insurance Fund (NHIF).

3. Review of Literature

According to the United Nations (2015), the reduction of the global maternal mortality ratio to less than 70 per 100,000 live births and neonatal mortality to at least as low as 12 per 1,000 live births falls under the third Sustainable Development Goal set to be achieved by 2030. To achieve this, access to maternal healthcare services has widely been discussed as a determining factor (Karanja et al., 2018). This chapter presents a review of the literature about gender equality and access to maternal healthcare services.

Gender refers to societal beliefs about the appropriate roles, duties, rights, responsibilities, accepted behaviours, and opportunities of people based on their sex. It refers to the status of women and men in relation to each other (WHO, 2010). The measures of socially acceptable behaviour for men and women vary widely between societies, are dynamic over time in the same place, and have far-reaching implications on health status. Gender equality, on the other hand, refers to chances or opportunities for women and men to access and control social, economic, and political resources within families, communities, and society at large, including protection under the law (such as health services, education, and voting rights).

The framework postulated by ecological systems theory (Namasivayam et al., 2012) identifies empowerment as the process of gender equality, where empowerment entails achieving change in rights, norms, and social position of women and men (Strauss and Thomas, 1998; Wolton and Schbley, 2014).

Gender equality can affect education and health outcomes, which are critical components of human endowment and human capital formation. Enhancing human capital requires equitable access to and outcomes from health and education services. Access to information, services, training, and opportunities in other sectors is also critical (Asian Development Bank, 2013). Similarly, economic empowerment focuses on reducing gender inequalities in access to and control over productive resources, services, and assets, such as land, employment, income, information, financial services, and other economic opportunities.

Women's specific health needs related to pregnancy, childbirth, contraception, and abortion contribute to increased spending among women. Paying for delivery care and other reproductive health services places a high financial burden on women. Childbirth services, which are the majority of women in the reproductive age group, are unaffordable to many women even in cases where services are 'free' (World Health Organization, 2010).

Deliberate fiscal allocations in the budget process towards health is one of the policy variables that can influence gender equality. Increased allocations towards maternal health care can reduce households' out-of-pocket expenses and, in turn, increase women's access to quality and affordable health services and subsequently increase the proportion of births attended by skilled health professionals. This in turn can reduce the number of mothers who die while giving birth. Further, increased access to facilities and skilled delivery can reduce the number of women and girls who end up with disability due to complicated delivery. Similarly, the

number of infant deaths could decline as a result of skilled delivery. Safe delivery is associated with lower maternal mortality and higher labour market participation, leading to the social and economic well-being of households and consequently shared prosperity.

Gender inequality is defined and perpetuated by socio-cultural beliefs and attitudes about gender roles, norms on how women and men relate to each other in intimate partnerships, women's autonomy including decision-making power, independent access to economic resources, freedom of movement, and attitudes about gender-based violence is gender equality domains that have been observed to influence health outcomes. In addition, advocating for policies that promote gender equity and gender equality has proven to reduce maternal deaths (Namasivayam et al., 2012; World Health Organization, 2010; United Nations, 2015).

Much of the literature on gender measures in developing countries has focused on Asia. Only a few studies have looked at the association between gender measures and health outcomes and health service utilization for African women.

The relationship between education and health behaviours reinforces the important role that education plays in improving the utilization of maternal health services. While professional health education has proved to contribute positively to the health behaviour of women, the influence of gender equality strongly complements health outcomes. Professional health education posits that:

- (i) Expectant mothers will be motivated by risk-related information to change their health behaviour and that this motivation is enough for health behaviour change;
- (ii) Multiple health behaviours can be addressed simultaneously; and
- (iii) Changes will lead to improved outcomes, despite little being known about the timing of influence and relative importance of behaviours (Olander et al., 2018).

A mother's level of education and delivery practices are important factors, with educated women being more likely to deliver in a healthcare facility (Gebregziabher et al., 2019; Machira and Palamuleni, 2017). Vallières et al. (2013) assert that not only is the mother's education vital, but also the education level of the head of the household, who in most instances is usually a man. Access to knowledge on pregnancy complications and antenatal care (ANC) awareness are also important educational influences on the decision to deliver in a healthcare facility as supported by Ameyaw et al. (2020), Abdulai and Adams (2019), Gebregziabher et al. (2019), Bishanga et al. (2018), and Machira and Palamuleni (2017).

The long distances between the place where a mother resides and the healthcare facility discourage mothers from seeking assistance from skilled personnel during delivery (Dotse-Gborgbortsi et al., 2020; Machira and Palamuleni, 2017; Vallières et al., 2013). Long distances result in a high cost of transportation which, in rural areas, discourages expectant women from deciding to deliver in healthcare facilities (Scott et al., 2018; Tebekaw et al., 2015). When distance becomes a

barrier, most women end up having earlier labour than expected and more often than not, deliver from home. In an experimental study, Morgan et al. (2017) found that using vouchers to cater for transportation costs to a health facility increased women's access to institutional delivery by 150 per cent (Banda et al., 2016).

According to the United Nations Human Rights Commission (UNHRC) report, "maternal mortality and morbidity is a consequence of gender inequality, discrimination, health inequity and a failure to guarantee women's human rights". The WHO stated that high maternal mortality rates not only result from ineffective health systems but are also a consequence of deep-seated gender inequalities that hinder women from active participation in decisions that influence aspects of their health and general welfare. Several other studies have proved that the use of reproductive health services by women is determined by the availability of facilities and gender inequalities that influence women's access to social and economic resources, freedom of movement, and decision-making in matters that are significant to their well being (Banda et al., 2016; Morgan et al., 2017; Namasivayam et al., 2012).

Research by Namasivayam et al. (2012) and Singh et al. (2015) has shown that gender inequities have a negative effect on maternal health and maternal healthcare access and utilization. Specifically, gender division of labour, lack of access to and control over resources (for example finances, information, transport, supplies), gender norms, limited autonomy, and lack of decision-making power limit women's ability to access maternal health care services (Morgan et al., 2017). A few studies examining the effect of gender equality (women's autonomy, decision making, and freedom of movement) on the utilization of obstetric care services found a strong effect among the middle to least-poor households, while the results were strongly counter-intuitive among the poorest women (Fotso et al., 2009; Tiruneh et al., 2017).

Abdulai and Adams (2019) concluded that health insurance coverage contributes to improved access and utilization of maternal healthcare services, with 66.5 per cent of the respondents who had health insurance delivering in a health facility. A similar conclusion is strongly supported by Were et al. (2020) and Tebekaw et al. (2015).

According to Atukunda et al. (2020), Bishanga et al. (2018), Machira and Palamuleni (2017), and Tebekaw et al. (2015), wealth disposition in a household has a great influence on the decision to deliver in a healthcare facility or at home. Further, Machira and Palamuleni (2017) and Tebekaw et al. (2015) concluded that the choice between public healthcare facilities and private healthcare facilities is largely determined by the wealth quintile of a household.

Dunlop et al. (2018), in their study, proved that in Sub-Saharan Africa (SSA), being older was associated with a higher likelihood of facility-based delivery, with above 50 per cent of older women who were giving birth for the first time being much more likely to have a facility-based delivery. This perspective is also supported by (Tebekaw et al., 2015).

Gebregziabher et al. (2019), Bishanga et al. (2018), and (Machira and Palamuleni, 2017) also added that the order of childbirth was seen to influence the decision to have a facility-based delivery. According to Gebregziabher et al. (2019), mothers whose last child's birth order was 4th - 6th were less likely to deliver at health facilities.

Other factors that influence access to maternal healthcare services include socio-cultural norms. Atukunda et al. (2020) posit that cultural understandings of pregnancy and childbirth, established traditions, birth expectations, and perceptions of control, which are majorly psychological and socio-cultural where they are expected to give birth within the culturally set guidelines acted as a major hindrance to access to maternal health, especially in rural areas.

The assumption that all household members pool their resources and share equally is rooted in the unitary model of household behaviour, which treats the household as if it were a single individual (Becker, 1974). While this condition may be suitable in some instances, it can result in substantial bias in assessing income inequality between men and women (Ponthieux et al., 2015). There is evidence that even where a household pools all its income resources and grants adult members equal access and control over income/money resources in a household, the income is likely to be retained by the individual contributing to it. The adult household member who either contributes less or no economic resources is likely to be vulnerable when financial support is withdrawn for one reason or another (Silvia and Popova, 2021). Studies that analyzed the economic consequences of union dissolution have found large negative consequences, particularly among some women (AndreB et al., 2006).

In this analysis, we assume that individuals retain all income received in a personal capacity. This assumption is justified based on three considerations. First, a consistent finding of the empirical literature on intrahousehold allocation is that the woman's consumption/living standard in a household is strongly correlated with her share of earnings/income (Bonke, 2015; Cantillon, 2013). Second, the assumption in this study is consistent with non-unitary models of household decision-making. Third, individual income captures gender equality in consumption in addition to several other aspects that are important to individual well-being, such as status, personal autonomy, and control over one's life beyond gender equality in consumption (Silvia and Popova, 2021; Pahl, 2005).

This paper follows Silvia and Popova (2021) in documenting gender income equality with slight modification, as the share of female income to total household incomes.

4. Methodology and Data

4.1 Analytical Framework

The approach used in this study to distinguish between women who visit a health facility during delivery and those who choose to deliver at home follows a facility delivery decision modelled using a probit model to determine the relationship between the facility delivery and characteristics of the woman (Greene, 2002).

Considering the discrete facility visit choice faced by women at delivery, an expectant mother is faced with two choices: to deliver their child at a health facility or deliver at home. Having to deliver at a health facility comes with a cost. These costs (direct and opportunity costs) associated with facility delivery lower resources available for household consumption.

This household choice may be cast in terms of utility functions.

Utility conditional on a facility visit is:

$$U_i = U(y, c_i) \tag{1a}$$

Where U_i is the indirect utility expected from a facility visit; y is household income; c_i is the price paid to make one visit to a health facility.

The associated budget constraint is:

$$y = c_i + p \tag{1b}$$

Where p is the total money cost of non-health goods, so that the household budget, y , is exhausted by health and non-health expenditure.

The indirect utility associated with not visiting a modern facility for delivery is:

$$U_o = (c_o, p) \tag{2a}$$

Where, c_o is the cost of home delivery.

Given the indirect utilities associated with both options, women choose the option that yields the highest utility.

The solution to the utility maximization problem can thus be stated as:

$$U^* = \max(U_i, U_o) \tag{3}$$

Where U^* is equal to whichever of U_i and U_o is higher, so that women who choose home deliveries are those for which $U_o > U_i$.

Facility attendance is defined as a dichotomous variable, a , where $a=1$ if a woman visits a facility for delivery and 0 if not (a woman delivers at home), that is, $a=U_i > U_o$.

4.1.1 Empirical Model

The purpose is to analyze the factors that influence the utilization of maternal health services (facility delivery) because the type of obstetric care received at the time of delivery is an important determinant of maternal mortality.

In linear form, the indirect utility obtainable from a delivery at a health facility, conditional on a visit is:

$$U = \beta_1 y_w + \beta_2 c_1 + \beta_3 X + \varepsilon \quad 4a$$

Where X is a set of other variables of interest, such as age, marital status, area of residence, and educational achievement;

y_w = a woman's income as a proportion of the total income of the household.

We assume that ε is normally distributed and write a woman's probability of visiting a health facility for delivery as:

$$P(a = 1|Z) = \Phi(\beta_o + \beta_1 y_w + \beta_2 c_1 + \beta_3 X + \varepsilon)$$
 is the sample Probit,

Where:

a = observed choice of place of delivery, which, as noted earlier, is equal to one if a modern health facility is chosen and zero if otherwise;

Z = a vector of regressors in Equation (4a), including the disturbance term, and

$\Phi(.)$ is the cumulative standard normal distribution function.

It is important to note that the estimated coefficients of y_w , c_1 , ... are used to predict the indirect utility from a health facility, conditional on a visit, which in turn influences $\Phi(.)$ so that the marginal effect of a change in y_w on P (probability of attending a health facility for delivery care) is:

$$dP/dy_w = (dP/d\Phi) * d\Phi/dy_w \quad 4b$$

The estimable form of the equation is:

First stage:

proportion_female = f (cluster_age_head, age, age squared, loghead_yrs_sch, health_insure, household size residence, poor)

Second stage:

Facility_delivery =f (proportion_female_income, proportion_female_residual, age, age-squared, loghead_yrs_sch, health_insure, household size, residence, poor)

4.2 Data

4.2.1 Definition and Measurement of Variables

Dependent variable

Women who had a birth in the last five (5) years preceding the survey were asked, “Where did you give birth (name)? The response categories of the hospital, health centre, clinic/dispensary, and maternity home were considered facility deliveries. Delivery at home was considered non-facility delivery. The dependent variable in facility delivery equation 1 was facility delivery. It is defined as one (1) if a woman delivered in a health facility or zero (0) if delivery took place elsewhere other than a health facility.

Explanatory variables

Our main explanatory factor (the treatment variable) is the female house member’s share of income in the total household income.

The control variables (exogenous determinants of facility delivery) included demographic characteristics such as age, household size, years of education, health insurance, and region of residence.

4.2.2 Data Description and Sample Statistics

Data

The empirical work in this paper was based on the Kenya Integrated and Household Budget Survey (KIHBS) dataset collected in 2015-2016. The KIHBS sample was drawn from the fifth National Sample Survey and Evaluation Programme (NASSEP V) household sampling frame. The sample size was determined independently for each county, resulting in a national sample of 24,000 households. A total of 21,773 households were interviewed across all the counties.

For this study, the sample in the analysis was restricted to only female household members who had given birth in the last five (5) years preceding the survey. This leaves a sample of 10,254 households.

The multipurpose survey gathered information on a variety of dimensions, including income and consumption, education, general health characteristics, child survival, housing conditions, nutrition, household income, and transfers. The survey contains detailed information on the health of all household members, including expenditure on health.

4.2.3 Summary Statistics

Table 4.1 shows descriptive statistics for the sample data used in this study. On average, 63.6 per cent of deliveries occurred in a health facility. Over 26 per cent of the respondents benefitted from free maternal and child care. Only 36 per cent

of the total household income was earned by female household members. The average age of the mothers who had given birth in the last five years preceding the survey was 30 years. The average years of education for heads of households was 7, which translates to an attainment level of primary education. The household size was about six members. About 65 per cent of the sample population resided in rural areas with only 16 per cent having health insurance coverage.

Table 4.1: Descriptive statistics

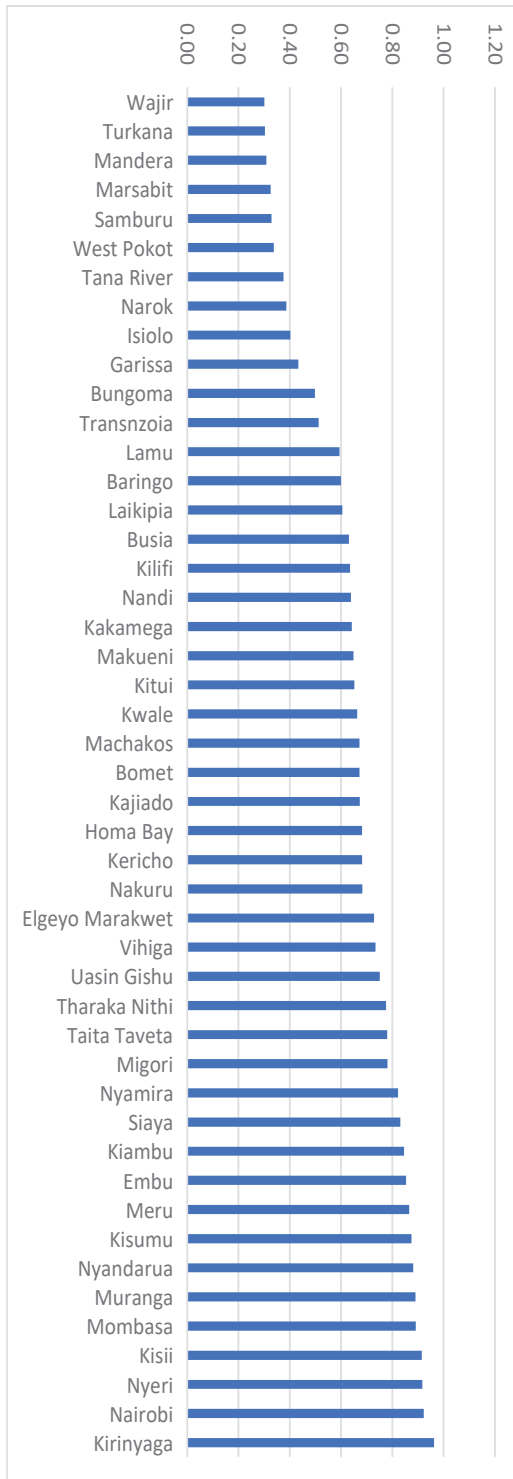
Variable	No. of Obs	Mean	Std deviation
Deliver in a health facility (=1 if delivery took place in a health facility, 0 if otherwise)	10,171	0.636	0.481
Accessed free maternal and child care (=1 if accessed, 0 if otherwise)	10,171	0.261	0.439
Proportion of female income in total household income	10,171	0.361	0.381
Cluster age of household head	10,171	45.12	13.30
Facility health worker	10,171	0.658	0.474
Age of mother (in years)	10,171	29.5	7.01
Head years of education	10,171	7.793	4.567
Health insurance (=1 if the respondent has insurance, 0 if otherwise)	10,171	0.164	0.371
Household size	10,171	5.937	2.363
Region of residence (=1 if rural, 0 if otherwise)	10,171	0.649	0.477
Poor	10,171	0.400	0.490

Data source: KNBS (2016), Kenya Integrated Household Budget Survey 2015/16

Proportion of women who delivered in a health facility

There are socio-economic factors that affect a woman’s decision to use maternal health facilities. Also, gender inequalities mainly driven by the norms and culture of how a woman is perceived vary from one county to another and play a bigger role in influencing the decisions of the household. Figure 4.1 shows the proportion of women who visited a health facility at delivery. The counties in the arid and semi-arid regions were likely to be disadvantaged by various circumstances such as remoteness, poor infrastructure, lack of skilled personnel, and women having little or no education and being economically disempowered. These counties include Garissa, Isiolo, Narok, Tana River, West Pokot, Samburu, Marsabit, Mandera, Turkana, and Wajir. Several counties had a higher advantage over others with over 80 per cent of the women visiting a health facility by virtue of enjoying the benefits of economic development characterized by good infrastructure and economic empowered populatis. These counties include Nyamira, Siaya, Kiambu, Embu, Meru, Kisumu, Nyandarua, Murang’a, Mombasa, Kisii, Nyeri, Nairobi, and Kirinyaga.

Figure 4.1: Proportion of women who visited a health facility at delivery



Data source: Computed using KIHBS 2015/16 data

5. Results and Discussion

5.1 Reduced Form Estimates for the Share of Female Income in the Household

Table 5.1 shows Ordinary Least Squares (OLS) estimates of the income share of female household members. The estimates in column one (1) exclude the county dummies while column two (2) includes the county dummies. The cluster-level mean of age of the household enters the equation as an instrument for the share of female income as the variable is endogenous in the facility delivery equation.

The three properties of an instrument state that: first, an instrument is deemed relevant if its effect on a potentially endogenous explanatory variable is statistically significant. Second, a strong instrument depicts large effects in terms of its size. Finally, the instrument is exogenous if it is not correlated with the structural error term (Mwabu, 2008). The results in Table 5.1 show that using the mean age of the household head at the cluster level as an instrument for the share of female income in the household is valid.

Table 5.1: Reduced form parameter estimates for the share of female income in the household (gender equality)

Explanatory variables	Estimation method	
	OLS - Without county dummies (1)	OLS - With county dummies (2)
Cluster_age of household head	0.0006 (1.81)*	0.0005 (1.54)
Mother's age	0.0024 (0.56)	0.0115 (2.81)**
Mother's age squared	0.0001 (1.38)	-0.0001 (-0.83)
Log of head years of schooling	0.0012 (0.26)	-0.0528 (-10.46)***
Health insurance	0.0188 (1.78)*	0.01421 (1.32)
Household size	-0.0209 (-11.08)***	-0.0155 (-8.16)***
Rural	0.0446 (5.52)***	0.0094 (1.41)
Poor	0.0032 (0.39)	-0.0018 (-0.22)
County dummies	No	Yes
Constant	0.2674 (3.96)	0.4036 (11.60)
F-statistic[p-value]	35.10[0.0000]	28.73[0.0000]

Explanatory variables	Estimation method	
	OLS - Without county dummies (1)	OLS - With county dummies (2)
R-Square	0.0304	0.1115
No. of observations	10,171	10,171

Data source: KNBS (2016), Kenya Integrated Household Budget Survey 2015/16

Note:

- Absolute *t* statistics in parentheses.
- Critical *t*-values: 1%=2.58, 5%=1.96 and 10%=1.65

5.2 Relevance, Strength, and Exogeneity of Instruments

The quality of the instrument is assessed using tests proposed by Bound, Jaeger and Baker (1995). As such, the instrument should have a significant effect on the share of female income in the household. In addition, evidence of the strength and validity of this instrument is tested using the Shea formula (Nevo and Rosen, 2008; Staiger and Stock, 1997). The first stage F-statistic (35.10) is greater than 10 and statistically significant. These results suggest that the mean cluster age of household heads is a good instrument for the share of female income in the household. Further, evidence of difficulties in obtaining a good instrument is well-documented (Bound, Jaeger and Baker, 1995). An instrument can be exogenous but weak or exogenous but irrelevant in the statistical sense as stated earlier.

5.3 Reduced Effect of Share of Income on Utilization of Delivery Services at a Health Facility

Table 5.2 shows regression results of the association between the share of income earned by female members of a household (a measure of gender equality) and health facility delivery (a measure of utilization of maternal health services). Column one (1) presents OLS estimates of health facility delivery with an endogenous regressor, such that the estimates are biased. Column two (2) depicts consistent instrumental variable (IV) estimates of health facility delivery. The cluster age of the head of a household is used to instrument a share of female income in total household income. The estimations in both OLS and IV exclude location dummies, but results with location dummies are presented in the Appendix Table 1.

From the results, county controls erode the effect of gender equality on the utilization of maternal health services. This means that many other factors affect the decision a woman takes at the time of delivery. These factors are embedded within the counties. For policy purposes, the discussions will be based on the specifications without county controls.

In both the OLS and IV results, the share of female income in the household is a significant factor in determining whether a woman visits a health facility for delivery or not. The share of female income in the household is positively associated with the decision to deliver at a health facility. Further, the results depict that the size of the estimated coefficient on the share of female income differs across the two specifications.

Table 5.2: Effect of share of female income in a household on the utilization of maternal health services (Dependent variable=facility delivery)

	Estimation methods		
	OLS (Without controls for endogeneity and heterogeneity) (1)	Two-stage least squares	
		First stage regression - Dependent variable = Share of Female Income (2)	Second stage regression- dependent variable = Facility delivery (3)
Share of female income	0.0283 (2.52)**	-	3.238 (5.87)***
Cluster_age of household head		0.0005702 (1.81)*	
Mother's age	-0.0240 (-5.11)***	0.0024 (0.56)	-0.0314 (-6.46)***
Mother's age squared	0.0003 (4.53)***	0.0001 (1.38)	0.0000 (0.34)
Log-head_years of schooling	0.1340 (26.58)***	0.0012 (0.26)	0.1304 (25.57)***
Health_insurance	0.1305 (12.69)***	0.0188 (1.78)*	0.0714 (4.92)***
Size	-0.0089 (-4.15)***	-0.0210 (-11.08)***	0.0575 (4.97)***
Rural	-0.1985 (-21.98)***	0.0446 (5.52)***	-0.3484 (-12.55)***
Poor	-0.1100 (-10.98)***	0.0032 (0.39)	-0.1190 (-11.78)***
Constant	0.9791 (13.40)***	0.2674 (3.96)	0.0436 (0.25)
F-Statistic[p-value]	506.2[0.0000]	35.10[0.0000]	507.9[0.0000]
R-Square	0.22	0.0304	0.2254
No. of observations	10,171	10,171	10,171

Note: *, **, and *** denotes 10%, 5%, and 1% significance levels; t-statistics in parenthesis.

Data source: KNBS (2016), Kenya Integrated Household Budget Survey 2015/16

Columns one (1) and two (2) accounting for endogeneity means taking into account other factors that affect the decision taken by a woman to visit a health facility

at delivery other than the share of female income. These factors may be either those that we can observe or not. When we control these factors in our equation, the magnitude of the coefficient on the share of female income increases. The IV estimate in column three (3) takes this into account. The coefficient on the share of female income in column one (1) implies that a percentage increase in the share of female income in the household increases the probability of visiting a health facility for delivery care by 0.0003 per cent. Consistent with the literature, this effect is biased downwards for the OLS estimate in column 1 (0.00028%) and the IV estimate in column three (3) where the effect is 100 times larger, that is, 0.03 per cent. This means that the OLS estimate of the coefficient on the effect of female income share in households is biased.

The diagnostic tests presented in Table 5.3 show that the share of female income in the household is endogenous. As shown in column (3), the coefficient of the residual share of female income is statistically significant at 1.0 per cent (p-value = 0.0000). These results mean that the OLS estimates are not reliable for inference. A comparison of the results in Table 5.2 and Table 5.3 shows that using IV and using Two-Stage Predictor Substitution (2SPS) and Two-Stage Residual Inclusion (2SRI) give the same results. These results, however, do not show whether the changes in the decision to visit a health facility vary from one woman to another; that is, heterogeneity. Column four (4) shows results from the Control Function Approach (CFA). This approach helps in testing for heterogeneity. The coefficient of the share of female income interacted with its residual is not significant. This means that there are no unobservables that may cause differences between one woman and another.

Columns five (5) and six (6) present results from non-linear models. CFA probit and CFA logit results show similar output as usual marginal effects. The results show that estimating a non-linear model gives better results. The coefficients on the share of female income are bigger in the logit model compared to the probit model and both are much bigger than the IV results.

Table 5-3: Estimating the effect of the share of female income on facility delivery

	Control Function Approach				Probit (5)	Logit (6)
	OLS (LPM) No controls for endogeneity (1)	OLS(LPM) 2SPS (controls for endogeneity) (2)	OLS 2SRI (controls for endogeneity) (3)	CFA (controls for endogeneity and heterogeneity) (4)		
Share of female income	0.0283 (2.52)**	-	3.2381 (5.87)***	3.2635 (5.91)***	3.3118 (4.65)***	3.5087 (4.31)***
Predicted probability of share of female income		3.238142 (5.87)***				
Residual_share of female income			-3.21101 (-5.82)***	-3.2054 (-5.81)***	-3.2848 (-4.61)***	-3.4834 (-4.27)***
Share of female income *Residual				-.0508 (-1.21)		
Square_residual share of female income						
Mother's age	-0.0240 (-5.11)***	-0.0314 (-6.46)***	-0.0314 (-6.46)***	-0.0316 (-6.50)***	-0.0294 (-6.12)***	-0.0305 (-6.27)***
Mother's age squared	0.0003 (4.53)***	0.0000 (0.34)	0.0000 (0.34)	0.0000 (0.35)	-0.0000 (-0.07)	-0.0000 (-0.16)
Log-head_years of schooling	0.1340 (26.58)***	0.1304 (25.57)***	0.1304 (27.59)***	0.1294 (25.01)***	0.1081 (26.21)***	0.1042 (26.01)***
Health_insurance	0.1305 (12.69)***	0.0714 (4.92)***	0.0714 (4.92)***	0.0708 (4.99)***	0.1101 (5.69)***	0.1161 (5.35)***

	Control Function Approach					
	OLS (LPM)	OLS(LPM) 2SPS (controls for endogeneity) (2)	2SRI (controls for endogeneity) (3)	OLS CFA (controls for endogeneity and heterogeneity) (4)	Probit (5)	Logit (6)
Household size	-0.0089 (-4.15)***	0.0575 (4.97)***	0.0575 (4.97)***	0.0576 (4.88)***	0.0591 (3.97)***	0.0635 (3.74)***
Rural	-0.1985 (-21.98)***	-0.3484 (-12.55)***	-0.3484 (-12.55)***	-0.3494 (-12.59)***	-0.3540 (-10.31)***	-0.3677 (-9.39)***
Poor	-0.1100 (-10.98)***	-0.1190 (-11.78)***	-0.1190 (-11.79)***	-0.1189 (-11.78)***	-0.1104 (-12.12)***	-0.11046 (-12.20)***
Constant	0.9791 (13.40)***	0.0436 (0.25)	0.0436 (0.25)	0.0488 (0.28)		
F-Statistic[p-value]	506.20 [0.0000]	507.90 [0.0000]	456.16 [0.0000]	412.11 [0.0000]		
Wald Chi ²					2078.09	1831.10
R-Square	0.2200	0.2254	0.2258	0.2259		
Pseudo R-squared					0.1889	0.1889
No. of observations	10171	10171	10171	10171	10171	10171

*Note: *, **, and *** denotes 10%, 5%, and 1% significance levels; t-statistics in parenthesis*

The coefficient increases from 0.0324 (IV) to 0.0331(CFA Probit) to 0.0351 (CFA Logit). Remarkably, the coefficients on the residuals in columns 3, 4, 5, and 6 remain statistically significant, indicating that the share of female income in total household income is endogenous. As such the inclusion of residual terms in the facility equation as shown in Table 5.3 is necessary for consistent estimation of structural parameters.

The results further show that the mother's age has a strong explanatory power for the use of maternal health services during delivery for all the regressions presented. Young mothers are less likely to use maternal health services at delivery compared to older mothers. These results are observed as the age of the mother increases as captured by the variable age squared. The results are statistically significant at 1.0 per cent level for all estimations in columns 1-6. The results concur with other studies that show that maternal age has a significant effect, either negative or positive, on the place of delivery for women. Specifically, the results concur with a study in Ethiopia that found that an increase in a year of age reduces the odds (0.9 times) of delivery at home compared to a health facility (Tebekaw et al., 2015) and another study in Malawi that found that older women have lower odds of delivering in a public health facility (Machira and Palamuleni, 2017). In Kenya, a study by Mwangi et al. (2018) also found that younger women had higher odds (2.3 times) of delivery in a health facility compared to older mothers. However, the study differs from a study by Dunlop et al. (2018) covering 34 Sub-Saharan Africa (SSA) countries which revealed that the odds of a woman delivering in a health facility increase with age, with older women >25 years having higher odds of 1.9 times delivering in a health facility compared to younger women 15-19 years. Similarly, in Bangladesh, Ameyaw et al. (2020) found that maternal age increased the odds of delivery at a facility by at least 1.5 times to 3.6 times for women between 15-19 years and 35-39 years of age, respectively.

The study found that an additional year of schooling of the household head significantly increases the probability of a female member of the household delivering in a health facility by 3.0 per cent. The results are highly significant for all estimation models as shown in columns 1-6. The effect is much higher for results from IV. This is consistent with other studies, such as a study in Uganda which found that household heads with at least a secondary level of education had higher odds of female members in their household delivering in a health facility compared to household heads with a primary level of education. In Kenya, a study by Mwangi et al. (2018) found that an increase in the education level increases the odds of delivering in a health facility, with women from household heads with at least a primary level of education having 2.1 odds of delivering in a health facility compared to those with none. In Ethiopia, Tebekaw et al. (2015) found that being uneducated increases the odds of delivering at home by 3.56 times compared to those with at least a secondary level of education, and Dunlop et al. (2018) study which found that older women were 1.88 times more likely to deliver at a facility in their first birth.

The findings of this study show that having insurance coverage significantly increases the probability of delivering in a health facility for all estimations. The effect is much higher in non-linear models at 11 per cent and 11.6 per cent in columns 5 and 6, respectively. The results agree with Were et al. (2020) who revealed that having the National Hospital Insurance Fund (NHIF) cover increased the odds of delivery in a health facility by 2.34 times and increased the odds of seeking services from a skilled birth attendant by 5.08 times in Kenya. This also concurs with Abdulai and Adams (2019) study in Ghana, which found that having health insurance improves access to maternal health services by 66.7 per cent. In the

Philippines, Gouda et al. (2016) found that having insurance coverage increases the likelihood of facility-based delivery by 5-10 per cent for the general population and 9-11 per cent for rural and poor women.

Households with larger household sizes are more likely to use maternal healthcare at the facility. An increase in household size significantly increases the probability of delivering in a health facility. The results are significant at 1.0 per cent level. This is contrary to other studies. A study in Zambia found that 42 per cent of women who have at least five (5) children were likely to deliver at home compared to those giving birth for the first time – lower than 31.1 per cent of women who deliver at a facility with at least five (5) children (Scott et al., 2018). In Tanzania, 40.4 per cent of women who deliver from home have at least five (5) children compared to 59.7 per cent of those who deliver from a facility. More women with one child (79.9%) deliver in a health facility compared to 20.2 per cent who deliver at home (Bishanga et al., 2018).

Residing in rural areas significantly reduces the probability of delivering in a health facility for all the regressions. The coefficients are highly statistically significant. This concurs with a study by Dunlop et al. (2018), which found that women from urban areas were 2.03 times more likely to seek services in a health facility compared to those from a rural residence; people living in urban areas are deemed wealthier and more educated compared to those from rural areas. A study in Bangladesh found that women from rural areas were less likely (adjusted odds ratio 0.65) to deliver in a health facility due to factors such as distance, information, and availability of services during odd hours (Ameyaw et al., 2020). Similar findings in Ghana revealed that distance and expected mode of delivery influenced the choice of home or facility-based delivery (Dotse-Gborgbortsi et al., 2020).

Being poor significantly reduces the probability of delivery in a health facility by 11 per cent. These results are well presented in columns 1-6. Further, all the coefficients are significant at 1.0 per cent level. This is consistent with a study by Gebregziabher et al. (2019) in Eritrea, which found that a household's wealth status had a significant influence on facility-based delivery, with middle and rich households having 3.78 times and 1.77 times odds of seeking services in a health facility compared to those from poor households. Dunlop et al. (2018) found that the odds of seeking delivery in a health facility increase with the wealth class of a household, with the odds of seeking services in a facility being 2.13, 2.92, and 6.06 times for women from the middle class, richer class and richest class, respectively, compared to women from the poorest wealth quintile class. Tebekaw et al. (2015) on Ethiopia found that the wealth class of the respondents influenced their preferred place of delivery, with women from low wealth quintile having lower odds (odds ratio 0.56) of delivering in a health facility compared to those from the high-wealth quintile and those from a middle-class wealth quintile were 2.79 times more likely to deliver at home compared to the household with high-class wealth quintile. Atukunda et al. (2020) on Uganda found that 60 per cent of women in Uganda prefer giving birth at home due to financial dependency, expectations of normal childbirth, dissatisfaction with health facilities, and access to traditional birth attendance.

6. Conclusion and Policy Implications

6.1 Conclusion

This study estimated a structural model of modern maternal obstetric care (facility delivery) using KIHBS 2015/16. In this paper, facility delivery has been used as a proxy for maternal mortality while the share of female income in total household income is a measure of gender equality. It is argued that improving the economic status of a woman in a household is associated with a high likelihood of using modern maternal obstetric care. Consistent with the literature, the OLS estimates of the coefficient on the share of female income were biased downwards and were about 15 times smaller than the IV estimate. This bias is likely to occur as a result of the correlation of the share of female incomes with unobserved factors inherent in a woman. Such unobservables are known to be the sources of endogeneity of the share of female income in the facility delivery equation.

The IV estimate, which is assumed to be the preferred estimate as per the literature, is also shown to be understated. This is because IV does not fully address the endogeneity of facility delivery since the unobserved difference in the use of modern maternal care that stems from cultural barriers inherent in a woman is not addressed. However, the IV estimate is derived under the assumption that the utilization of modern maternal care does not vary from woman to woman. We use CFA to correct this bias (heterogeneity bias). The corrected estimated coefficient on the share of female income is 10 per cent larger than the IV estimate (0.0351 versus 0.0323).

These results are positive, meaning that gender equality (proportion of female income in the total household income) is an important factor in explaining the use of maternal healthcare services at delivery. Seemingly, women still suffer from low pay, thus compromising their autonomy in the household to make decisions that affect them.

While insurance is majorly a private affair for most people, it increases deliveries at health facilities and hence reduces maternal and child health. Women from poor households are less likely to deliver at a health facility. Other factors such as education, age, household size and region of residence are also important in explaining the use of maternal healthcare services.

This study did not examine the quality of services provided at the facility due to the unavailability of data on the quality of services. There is need for further studies to analyze the effect of quality of services.

Data on free access to maternal and child care suffer from fewer observations and hence make further analysis impossible. Future studies may consider using the Kenya Demographic and Health Surveys, which mainly interview female members of the household and specifically on maternal health aspects.

6.2 Policy Implications

Given that maternal health care benefits go beyond the individual, women must be economically empowered. Both national and county governments may consider exploiting opportunities that empower women economically.

There is a need to compensate women's unpaid work and pay of low value to women to enhance women's earnings/incomes.

Universal health coverage should target to avert maternal deaths through financial risk pooling (more so among the poor). As such, the government should channel adequate resources to support the implementation of the agenda.

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Appendix

Appendix Table 1: Pairwise correlation of factors influencing delivery in a facility

	Facility delivery (1=Yes, 0=No)	Proportion female (Female wage/ total HH wage)	Free maternity (1=Yes, 0=No)	Age (years)	Ever attended school (1=Yes, 0=No)	Health insurance (1=Covered, 0=Not covered)	Household size (Number)	Residence (1=Rural, 0=Urban)	Poor (1=, 0=)	Assisted by a health worker (1=Yes, 0=No)	Quantiles (Fifths)
Facility delivery (1=Yes, 0=No)	1										
Proportion female (Female wage/ total HH wage)	0.027	1									
Free maternity (1=Yes, 0=No)	0.060	-0.020	1								
Age (years)	-0.076	0.141	-0.089	1							
Ever attended school (1=Yes, 0=No)	0.395	0.102	0.097	-0.144	1						

	Facility delivery (1=Yes, 0=No)	Proportion female (Female wage/ total HH wage)	Free maternity (1=Yes, 0=No)	Age (years)	Ever attended school (1=Yes, 0=No)	Health insurance (1=Covered, 0=Not covered)	Household size (Number)	Residence (1=Rural, 0=Urban)	Poor (1=, 0=)	Assisted by a health worker (1=Yes, 0=No)	Quantiles (Fifths)
Health insurance (1=Covered, 0=Not covered)	0.222	0.039	0.017	0.043	0.204	1					
Household size (Number)	-0.190	-0.075	-0.027	0.265	-0.202	-0.137	1				
Residence (1=Rural, 0=Urban)	-0.264	0.042	-0.013	0.068	-0.160	-0.159	0.148	1			
Poor (1=, 0=)	-0.248	-0.019	-0.072	0.091	-0.271	-0.227	0.296	0.059	1		
Assisted by a health worker (1=Yes, 0=No)	0.901	0.022	0.050	-0.078	0.403	0.214	-0.181	-0.271	-0.254	1	
Quantiles (Fifths)	0.365	0.019	0.061	-0.102	0.324	0.330	-0.393	-0.340	-	0.364	1

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