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Post-Devolution Household Healthcare Expenditures in Rural Kenya

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Abstract

Introduction: Despite improvements in a country's income during the era of decentralization, catastrophic expenditures persist. This study aimed to establish the determinants of household healthcare expenditures in rural Kenya. **Methods:** The study utilized data from the Kenya Household Health Expenditure and Utilization Survey (2018). A multiple regression model was employed to estimate the impact of respective determinants on post-devolution health expenditures in rural Kenya. The Ordinary Least Squares (OLS) estimation technique was adopted. **Results:** The gender of respondents, marital status, medical insurance, and chronic illness were found to be positively related to health expenditures, whereas education levels (primary, secondary, and higher levels) and wealth index (second and third wealth quintiles) were significant predictors but had a negative relationship with health expenditures. **Recommendations:** The study suggests promoting gender equality in healthcare access and implementing incentives and training programs to encourage men to practice preventive care, thereby reducing hospital visits. Additionally, the study recommends the creation and implementation of awareness programs across organizations, schools, and government agencies. Empowerment programs should be established to help the population lower hospital visits, consequently reducing healthcare expenditures. Furthermore, the government should increase the number of public health facilities to enhance access to subsidized services in rural areas.

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Keywords: Household Healthcare, Expenditures, Rural, Post-Devolution, Kenya

Introduction

Improving population health outcomes and protecting households from illness-related financial catastrophes are primary goals of any healthcare system. In developing countries, significant strides have been made toward achieving Universal Health Coverage (UHC) and the Sustainable Development Goals (SDGs), particularly in increasing access to essential health services and providing financial risk protection (Ndikumana & Pickbourn, 2017). However, achieving these goals remains challenging, as many households continue to face catastrophic out-of-pocket (OOP) expenditures, which account for a large share of total health spending in low- and middle-income countries. For instance, OOP payments often constitute 60-80% of total health expenditure in such nations, leaving many households vulnerable to financial distress when they fall ill (Rodney, 2018; Hsu et al., 2018).

In Kenya, the 2010 Constitution marked a critical turning point for healthcare by introducing devolution, which aimed to decentralize service delivery and enhance equitable access to healthcare at the county level (Republic of Kenya, 2010). Devolution sought to improve governance and resource distribution, especially in underserved regions such as rural areas. Before devolution, healthcare in Kenya was largely centralized, leading to inefficiencies and inequities in service delivery (Tsofa, Molyneux, Gilson & Goodman, 2017). Following the constitutional change, counties assumed responsibility for healthcare provision and received increased budgetary allocations to strengthen health infrastructure and improve service delivery. In the fiscal year 2016/17, county health budgets accounted for up to 25% of their total budget, reflecting a significant shift from previous allocations, where the central government-controlled healthcare spending (Republic of Kenya, 2018).

Despite these efforts, healthcare expenditures remain a major concern for many households, particularly in rural areas. A significant portion of healthcare costs is still borne by households through OOP expenditures, which have the potential to lead to catastrophic health spending (Kimani, Mugo & Kioko, 2016). Catastrophic health expenditure occurs when a household's OOP payments exceed 40% of its capacity to pay, causing significant financial strain that may lead to impoverishment (Kimani et al., 2016). In Kenya, studies have shown that many households, particularly in rural areas, devote a large share of their income to healthcare, often sacrificing other basic needs in the process (Barasa, Maina & Ravishankar, 2017). The 2018 Kenya Household Health Expenditure and Utilization Survey (KHHEUS) highlighted that rural

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households spent an average of Ksh 1,446.94 per person annually on healthcare, with the highest OOP expenditure reaching Ksh 2,356.33 (KHHEUS, 2018).

The financial burden of healthcare has also been exacerbated by the limited reach of health insurance coverage, especially in rural areas. Insurance coverage in Kenya is skewed toward urban populations, with only 12.1% of rural residents having access to health insurance compared to 26.6% in urban areas (KHHEUS, 2018). As a result, rural households are more likely to rely on OOP payments, which can deter them from seeking healthcare altogether or force them to seek alternative, often informal, care options (Chuma & Maina, 2012). Additionally, the 2018 survey revealed that despite the increasing demand for healthcare services, many households still encounter financial barriers due to the high costs associated with chronic illnesses, consultations, and the purchase of medications (Barasa et al., 2017).

Devolution aimed to alleviate these financial burdens by decentralizing healthcare delivery and making it more accessible at the county level; however, disparities in healthcare expenditure persist across counties (Republic of Kenya, 2015). Counties with higher wealth indices, such as Nairobi and Kirinyaga, spend significantly more on healthcare per capita compared to poorer counties such as Turkana and Siaya, reflecting a continued divide in access to healthcare services (KHHEUS, 2018). This geographic variation has prompted concerns about the equity of healthcare spending and whether devolution has truly fulfilled its promise of improving access to healthcare for all Kenyans, particularly in rural areas (McCollum et al., 2019). The quality and availability of healthcare services in rural areas remain a pressing issue. Although public health facilities, which are generally more affordable, play a critical role in providing healthcare to rural populations, they often suffer from inadequate resources, poor infrastructure, and shortages of medical personnel and supplies (Republic of Kenya, 2018). Consequently, rural households often turn to private or religious health facilities, which tend to be more expensive and further contribute to the financial strain of healthcare (VanderWeele, 2017). Even with the introduction of free primary healthcare policies and subsidized services through government interventions, the overall cost of healthcare continues to rise, leaving many households struggling to afford necessary care (Owino, 2018).

The rising cost of healthcare has also been linked to the increasing incidence of chronic diseases such as diabetes and hypertension, which require continuous care and lead to higher healthcare expenditures (Wang, Li & Chen, 2015). Households with individuals suffering from chronic illnesses tend to incur significantly higher OOP expenses, further compounding their financial vulnerability (Barasa et al., 2017). This trend highlights the need for targeted interventions to address the healthcare needs of vulnerable populations,

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especially in rural Kenya, where access to quality healthcare services remains limited despite devolution (Kabia et al., 2018). This study, therefore, seeks to examine the determinants of household healthcare expenditures in rural Kenya, with a focus on post-devolution trends in OOP spending.

Methods

The theoretical framework of this study is based on the Grossman human capital approach to health (Grossman 1972; 2000). As per this model, services of health are sought because they improve the health status of an individual. According to Grossman model one inherits an initial stock of health which decreases with age but can be replenished through investments. In order to restore declining health conditions, it calls the decision to seek medical care as an ingredient to assist in preventing the natural depreciation of the health stock (Nixon & Ulmann, 2006). Other inputs include exercise, education, nutrition, and lifestyle choices. Unlike the normal buying of goods and services, medical care is unique in its own way as what you buy is good health as argued by Grossman. In addition to increasing productivity, better health ensures that there is sufficient time for the production of income as well as commodities (Orayo, 2014). Therefore, health is demanded simply because it enters into individual utility function in terms of consumption commodity at the same time it boosts the stream of health in terms of investment which increases the haven of healthy days that allows both markets as well nonmarket activities (Nixon & Ulmann, 2006, Muthaka, 2014). Therefore, the empirical model of estimation that uses the composition and determinants of health-care expenditure in rural areas was estimated through the specified model.

The study took into account the empirical model used by Qureshi (2008) in modeling and simulating public expenditure. Since this is a household decision-making behavior, our model follows Strauss and Thomas (1995) empirical modeling of household and family decisions. This therefore associates individual household spending with its factors which ease the usage of spending equations. In this study, an econometric maximizing individual model was developed centring on the expenditure of health decisions largely taken from the perspective of health production following the human capital model. Expenditure estimation function through the cross-sectional analysis for rural areas in this study was considered. Following general health expenditure model is expressed as follows;

$$HHEXP = F(X, W) \tag{1}$$

Where: $HHEXP$ household healthcare expenditure, X can be described as a group of variables which are explanatory that affect household expenditure on health while household income is represented as W.

 ISSN: 1857-7881 (Print) e - ISSN 1857-7431

The expenditure equation comprises a collection of household features that are associated with the extent of spending on health. These are family income, geographical location, family head level of education, number of children in the household as well as other characteristics that may have effects on household health spending decisions. Then, to empirically specify household health expenditure in rural Kenya; a multiple linear functional form is considered in the empirical specification as follows:$HHEXP = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \varepsilon$ (2)

Where: X_1 =Age; X_2=Gender; X_3=Educational Levels; X_4=Marital Status; X_5=Wealth Quintiles; X_6=Type of health provider; X_7=Medical Insurance; X_8=Chronic illness; and X_9=Distance to health facility. Also, $\beta_1 - \beta_9$ are coefficients to be estimated for the respective variables whereas β_0 and ε is the coefficient for constant and error terms respectively? Equation (2) was estimated using the Ordinary Least Squares (OLS) estimation technique, a standard econometric method for estimating the linear relationships between dependent and independent variables. OLS minimizes the sum of squared residuals (the differences between observed and predicted values) ensuring the best linear unbiased estimates (BLUE) of the coefficients under the Gauss-Markov assumptions.

OOP health spending to be estimated in the first objective can be expounded simply as at the point of receiving health services in the healthcare the payments made by households is what is referred to as OOP. In determining the level of household OOP expenditures, the study considers costs such as registration, consultation, drugs (including over-the-counter drugs and alternative and/or traditional medicine) vaccines, diagnosis, and medical check-up fees. This information is available. Transportation cost and opportunity cost of waiting time are excluded from the OOP payments because the data set does not have these two variables.

Healthcare use variable was measured by the number of medical trips made to a health care provider. The survey asked respondents to state whether any member of the household was sick during the one month preceding the survey and whether medical care was sought. If medical care was sought, the respondents were asked to state how many visits they made to the healthcare provider.

The study used KHHEUS, (2018) which is cross-sectional in nature. It consists of a national and county representative sample survey collected in post devolution era in Kenya. Of importance, the place of residence variable in this study was determined through a multistage sampling design used to choose clusters as representative and households who form the sample. The estimates of key indicators both for rural and urban regions were incorporated in this sample constructed.

 ISSN: 1857-7881 (Print) e - ISSN 1857-7431

Results

The results show that post-devolution, households in rural areas still experience significant out-of-pocket (OOP) expenditures, with average annual per capita spending on outpatient and inpatient care recorded at Ksh 975.39 and Ksh 692.95, respectively. These expenditures remain substantial, despite efforts to increase healthcare accessibility through devolved county budgets. For instance, counties like Turkana and Siaya, which have seen increased healthcare budget allocations, still report high OOP expenditures due to inefficiencies in healthcare service delivery (KHHEUS, 2018). The finding is as indicated in Figure 1.

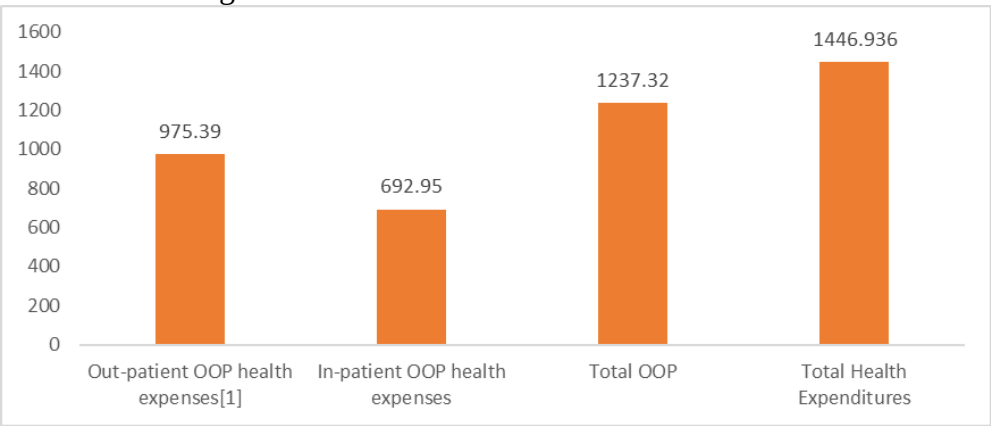

Fig 1: Average Out of Pocket Health Expenditures (*Kshs*) in Rural Kenya

The highest individual spent Kshs 1749.24 and Kshs 1299.93 on outpatient care and inpatient care respectively while the lowest spent around Kshs 10.46 and Kshs 15.19 for outpatient and inpatient respectively. Health expenditures for rural Kenya were used as the dependent variable in this study. Considering the OOP spending, the study revealed that residents in rural areas spent on average Kshs 1237.32 per person in seeking healthcare with the highest OOP expenditure being Kshs 1987.92 and the lowest spending being Kshs 100. It was established that, on average individuals spent about Kshs 1446.94 in seeking healthcare in the rural areas with the highest spending Kshs 2356.33 while the lowest spent Kshs 100.

Table 1: Annual Per Capita Out of Pocket Health Expenditures (*Kshs*) in Rural Kenya

Component of OOP	Observation	Mean	Std. Dev.	Min	Max
Out-patient OOP health expenses[1]	20,205	975.39	216.49	10.46	1749.235
In-patient OOP health expenses	20,205	692.95	134.88	15.19	1299.93
Total OOP	20,205	1237.32	284.59	100	1987.92
Total Health Expenditures	20,205	1446.936	989.0485	100	2356.325

[1] Routine expenses is part of outpatient OOP expenditures

 ISSN: 1857-7881 (Print) e - ISSN 1857-7431

Model Estimation

To achieve the main objective of this study, the probit model used underwent a thorough assessment of overall fitness via R-squared statistic and F test. The results of the p-value ($p<0.05$) imply that the variables used in the model explained the dependent variable significantly. Table 2 shows regression results.

Table 2: Multiple Regression Model (Dependent Variable: Health Expenditures)

Linear Regression
Number of observations = 10,134
F(14, 10119) = 24.01
Prob > F = 0.0000
R-squared = 0.0432
Root MSE = 0 .65781

***Ln* Health Expenditure**	**Coefficient**	**Std. Err.**	**t**	**P>t**	**[95% Conf. Interval]**	
Age	0.0035	0.0029	1.22	0.222	-0.0021	0.0092
Age Squared	-0.00004	0.00004	-1.14	0.253	-0.0001	0.00003
Gender	0.0601***	0.0150	4.02	0.000	0.0308	0.0894
Marital status	0.0513***	0.0171	2.99	0.003	0.0176	0.0849
Education levels						
Primary	-0.2453***	0.0239	-10.26	0.000	-0.2921	-0.1984
Secondary	-0.2162***	0.0274	-7.89	0.000	-0.2699	-0.1625
Higher	-0.1105***	0.0321	-3.44	0.001	-0.1734	-0.0476
Wealth Index						
Poorer	-0.0606***	0.0182	-3.33	0.001	-0.0963	-0.0250
Middle	-0.0200	0.0193	-1.03	0.301	-0.0578	0.0178
Richer	0.0288	0.0217	1.33	0.183	-0.0136	0.0713
Richest	0.0762**	0.0297	2.57	0.010	0.0180	0.1345
Type of health Provider	-0.0619***	0.0196	-3.17	0.002	-0.1002	-0.0236
Medical Insurance	0.0443**	0.02196	2.02	0.044	0.0013	0.0874
Chronic illness	0.0655***	0.02074	3.16	0.002	0.0248	0.1061
Constant	6.1220	0.0581	105.39	0.000	6.0082	6.2359

**Ln is natural logarithm*
Source: Computation Based on KHHEUS (2018)

From the regression results; the gender of the respondents, marital status, medical insurance and chronic illness were found to be positively associated with health spending. Variables such as education levels (primary, secondary and higher levels), and wealth index (second and third wealth quintiles) were found to be significant predictors but had a negative relationship with health expenditures.

Discussions

The results show that age and age squared were statistically non-significant in determining health expenditures in rural Kenya, with an extra year leading to only a 0.35% increase. This insignificance is consistent with some studies that find age to have a minimal effect on health expenditures,

 ISSN: 1857-7881 (Print) e - ISSN 1857-7431

particularly in rural settings where access to healthcare may be limited, regardless of age (Garg & Karan, 2009). However, other studies have found a significant positive relationship between age and health expenditures, particularly in urban areas where elderly populations may have better access to healthcare services, leading to increased costs as they age (Schokkaert & Van Ourti, 2012). This suggests that the relationship between age and healthcare expenditure may be context-dependent, with rural settings exhibiting different dynamics compared to urban areas.

Gender was found to be statistically significant, with males incurring 6.01% higher health expenditures compared to females. This finding is in line with studies by Grossman (2000) and Yiengprugsawan et al. (2010), which suggest that males, often household heads, may prioritize their own health or incur higher expenditures for their families. In contrast, Bayar and İlhan (2016) in their study on education expenditures found that gender was not a significant determinant, highlighting the contextual differences in expenditure types. Similarly, Sekhampu (2012) found that gender did not significantly affect food expenditure in South Africa. These differences across expenditure categories suggest that gender may play varying roles depending on the type of expenditure being analyzed, with healthcare being more gender-sensitive due to social and cultural factors influencing health-seeking behavior (Vlassoff, 2007).

Marital status was statistically significant, with married individuals experiencing 5.13% higher health expenditures. This result aligns with findings by Yiengprugsawan et al. (2010), who showed that married individuals tend to have larger households and more healthcare needs. It also resonates with studies in low-income settings where married couples are likely to spend more on healthcare due to family health needs (Agyemang-Duah, Peprah & Osei-Assibey, 2020). However, Sekhampu (2012) found that marital status had a negative influence on household food expenditures, suggesting that the relationship between marital status and expenditure varies across different types of consumption. For healthcare, married individuals may prioritize their families' health needs, leading to higher expenditures (Jowett et al., 2003).

Education was shown to play a significant role in reducing health expenditures. Higher levels of education (primary, secondary, and higher) significantly lowered health expenditures by 24.52%, 21.62%, and 11.05%, respectively. This is consistent with the Grossman (1972) theory of health capital, which posits that education improves individuals' capacity to maintain good health, reducing the need for frequent healthcare visits. Similar results were observed by Bayar and İlhan (2016), who found that higher education levels positively impact income and reduce unnecessary healthcare expenditures through better health management. Contrarily, Yiengprugsawan

 ISSN: 1857-7881 (Print) e - ISSN 1857-7431

et al. (2010) found that higher education levels in certain contexts could lead to increased healthcare spending, as educated individuals might seek higher-quality and more expensive healthcare services. The findings from this study, however, underscore that in rural settings with limited access to high-quality healthcare, education plays a protective role by reducing unnecessary health costs through preventive care.

The wealth index demonstrated a mixed effect on health expenditures, with individuals in the second wealth quintile spending 6.06% less on healthcare, while those in the fifth quintile spent 7.62% more. These findings are consistent with Kiplagat, Muriithi and Kioko (2013), who found that wealthier individuals are more likely to afford better healthcare services, leading to higher expenditures. On the other hand, poorer households tend to avoid high healthcare costs by either delaying care or seeking alternative treatments, as highlighted by studies in Ghana (Akazili et al., 2017) and Kenya (Barasa et al., 2017). This suggests that wealthier individuals can afford to invest more in healthcare, whereas poorer households are more likely to forgo care due to financial constraints, leading to lower expenditures but potentially worse health outcomes.

The type of health provider also had a significant impact on health expenditures, with those using public health facilities experiencing a significant reduction in their expenditures by 6.19%. This is consistent with Muthaka (2013), who found that public health facilities in Kenya offer subsidized services, resulting in lower out-of-pocket payments for patients. Similar findings were observed in studies from other developing countries, such as India (Sharma et al., 2017), where public health facilities were linked to reduced healthcare costs for low-income households. However, some studies suggest that the quality of care in public facilities may be lower, prompting wealthier individuals to seek private care despite the higher cost (Xu et al., 2007). The results of this study reinforce the idea that public health facilities provide a crucial safety net for reducing health expenditures, particularly for rural populations.

Medical insurance was found to significantly increase health expenditures by 4.43%, a result that can be explained by the concept of moral hazard. As noted by Jowett et al. (2003), individuals with health insurance are more likely to use healthcare services, even for minor ailments, leading to higher overall healthcare costs. This finding is consistent with Barasa et al. (2017), who found that insured households in Kenya were more likely to utilize healthcare services, contributing to increased expenditures. Studies from other contexts, such as Ghana (Akazili et al., 2017), also support the notion that insurance increases healthcare utilization and, subsequently, expenditures. This highlights the dual effect of insurance: while it increases access to healthcare, it can also lead to higher utilization and costs.

 ISSN: 1857-7881 (Print) e - ISSN 1857-7431

Chronic illness was found to significantly increase health expenditures by 6.55%, a finding consistent with studies across various settings. For example, Wang et al. (2015) demonstrated that households with chronically ill members in China experienced higher healthcare costs due to the continuous need for medical care. Similarly, Barasa et al. (2017) found that chronic illness in Kenyan households significantly increased the risk of catastrophic health expenditures. The results of this study align with these findings, reinforcing the fact that chronic illness is a key driver of healthcare costs, particularly in rural areas where access to long-term care and medication may be limited, necessitating frequent healthcare visits.

Conclusions

The primary objective of healthcare systems is to improve population health outcomes while protecting households from financial distress due to healthcare costs. In Kenya, despite improvements in income and the decentralization of health services following devolution, many households, especially in rural areas, still face catastrophic out-of-pocket expenditures. The findings of this study indicate that education plays a crucial role in reducing healthcare expenditures, likely due to the positive effect of education on health-seeking behavior and preventive care. In contrast, chronic illness and medical insurance are associated with higher healthcare expenditures, suggesting a need for better management of chronic diseases and refinement of insurance models to mitigate moral hazard. Additionally, the utilization of public health facilities appears to reduce OOP expenditures, underscoring the importance of strengthening public healthcare services at the county level.

Based on the findings, promoting gender equality in health-seeking behavior is essential. Men were found to incur higher healthcare expenditures compared to women, likely due to delayed care-seeking behavior. Counties should implement health campaigns and preventive care programs specifically aimed at men, encouraging regular health check-ups and early intervention. This could help reduce the higher costs associated with treating advanced health conditions and promote healthier lifestyles among men.

Reforming medical insurance schemes is necessary to control healthcare costs. Although insurance increases healthcare access, it also raises expenditures due to moral hazard. Counties, in collaboration with national authorities, should design insurance packages that promote preventive care and rational use of services. Co-payment systems for non-essential services could help curb excessive healthcare utilization without limiting access to necessary care. Public education on the appropriate use of medical insurance could also mitigate the rise in healthcare expenditures among insured households.

 ISSN: 1857-7881 (Print) e - ISSN 1857-7431

Enhancing family health programs would help address the higher healthcare expenditures associated with married individuals. Family health packages that cover essential services, such as maternal and child health, vaccinations, and preventive care, should be promoted. These packages can be made more accessible through county-level public health initiatives, reducing the financial burden on married households and improving overall family health. Counties should also invest in community-based health education programs targeting less-educated populations. These programs should focus on promoting healthy behaviors, such as proper nutrition, hygiene, and disease prevention, thereby reducing the need for frequent healthcare visits and lowering overall expenditures. To ensure equitable access, counties should provide targeted subsidies or vouchers for low-income households to reduce the burden of healthcare costs. Additionally, improving the quality of public health services would encourage wealthier individuals to use public facilities, thereby reducing reliance on more expensive private care.

Strengthening public health facilities is vital to reducing healthcare costs. Public facilities were associated with significantly lower healthcare expenditures, indicating their importance in providing affordable care. Counties must invest in expanding and upgrading these facilities, ensuring they are well-equipped, adequately staffed, and capable of providing high-quality services. This will not only reduce OOP expenses but also enhance the overall healthcare infrastructure in rural areas. Lastly, enhancing chronic disease management programs is necessary to mitigate the financial burden of chronic illnesses, which significantly drive-up healthcare expenditures. Counties should develop comprehensive chronic disease management strategies, including regular monitoring, access to affordable medication, and community support systems.

Disclaimer: The findings and conclusions presented in this paper are those of the author(s) and do not necessarily reflect the official position of the institution the author(s) are affiliated to.

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