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Decomposing Rural-Urban Variations in Maternal Healthcare Utilisation Among Women of Reproductive Age in Tanzania. Evidence from the 2022 Tanzania Demographic Health Survey

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Abstract

This study analysed the factors influencing the utilisation of maternal healthcare services among women of reproductive age in Tanzania, using data from the 2022 Tanzania Demographic and Health Survey (TDHS). A Fairlie decomposition technique was employed to decompose differences in maternal healthcare service utilisation between rural and urban areas in Tanzania. The findings revealed that rural women, on average, have a lower probability of utilising maternal healthcare services compared to urban women. The decomposition analysis showed that the rural-urban gap in maternal healthcare utilisation is primarily explained by differences in household wealth index (37.2%), women's education level (18.1%), distance to health facilities (12.6%), exposure to media (8.7%), insurance coverage (3.9%), and occupational status (4.1%). The study recommends targeted interventions to improve maternal healthcare utilisation, including empowering women through enhanced access to resources and opportunities. Key strategies include promoting girls' education beyond primary school through scholarships or vocational training to improve socio-economic outcomes. Moreover, leveraging mass media to raise awareness, streamlining insurance enrolment, and reducing out-of-pocket maternity care expenses are emphasized. The study suggests reliable transportation, expanded telehealth services, and the establishment of satellite clinics in underserved areas to enhance access.

Keywords: Maternal Healthcare Utilisation, Fairlie Decomposition Method

1. Introduction

Maternal health encompasses the well-being of women throughout pregnancy, childbirth, and the postpartum phase. Access to healthcare during these stages is crucial for safeguarding mothers' and infants' health and survival. Antenatal care (ANC) is vital in minimising health risks by monitoring pregnancies and identifying potential complications for early intervention. Similarly, timely Postnatal Care (PNC) helps detect and address any issues following delivery and provides an opportunity to guide mothers on self-care and newborn care practices.

The Andersen Model is a theoretical framework designed to help understand why individuals choose specific health services or types of healthcare utilisation (Kabir, 2021). Tesfaye *et al.* (2018) applied the Andersen-Newman model of health care utilization to understand antenatal care use in Ethiopia and

employed multivariate logistic regression to examine the predisposing, enabling and need factors associated with antenatal care utilisation. The result showed that educational status, previous use of antenatal care and best friend's use of maternal care were significant predisposing factors associated with at least one antenatal care visit. Type of kebele, wealth index and husband's attitude towards antenatal care were significant enabling factors associated with at least one antenatal care consultation. Health Extension Workers providing home visits, perceived importance of ANC and awareness of pregnancy complications were significant need factors associated with at least one antenatal care consultation. The husband's attitude towards ANC, the head of the household, awareness of pregnancy complications, and history of abortion were predictors of attending four or more antenatal care visits.

Since the turn of the millennium, improving maternal and child health has been a key priority in global development. Efforts to reduce maternal and child mortality have been central to the Sustainable Development Goals (SDGs), driving international initiatives. As a result, significant improvements in population health have been achieved globally, with maternal mortality decreasing by one-third (WHO, 2024). In 2020, the World Health Organization reported approximately 287,000 maternal deaths globally, with an estimated 800 women dying each day from preventable causes, equivalent to 223 deaths per 100,000 live births. Thirteen countries experienced extremely high maternal mortality ratios in 2020, ranging from 500 to 999 deaths per 100,000 live births. Of these, two nations were in the Eastern Mediterranean Region and eleven were in the African Region. In Southern Asia, the maternal mortality ratio was 117 deaths per 100,000 live births (World Health Statistics, WHS, 2023). Studies in India's most populous state identified several significant factors, including women's literacy and unemployment, as being associated with higher odds of utilising antenatal care (Sridharan *et al.,* 2017).

The slow progress in reducing maternal mortality is one of the most critical issues in global health (Guerrera, 2015). In alignment with Sustainable Development Goal (SDG) 3.1, the aim is to reduce the global maternal mortality ratio to less than 70 per 100,000 live births by 2030 (WHO, 2024), emphasizing the urgent need to address barriers hindering access to quality maternal healthcare services. Achieving this target requires a comprehensive understanding of the complex factors influencing maternal healthcare utilisation. In Southern Ethiopia, results showed that women who reported that their pregnancy was planned and were aware of pregnancy danger signs had a higher likelihood of attending ANC services (Gurara *et al.,* 2023).

Maternal healthcare in sub-Saharan Africa remains a significant concern due to persistently high maternal mortality rates. As Ovikuomagbe (2017) pointed out, reproductive healthcare has remained a significant challenge in sub-Saharan Africa because of the high maternal mortality rate. Despite the potential of maternal healthcare services to mitigate this issue, their utilisation remains low (Ovikuomagbe, 2017). For instance, the PNC service utilisation rate in Papua New Guinea was 26.6%, significantly lower than the sub-Saharan Africa average of 52.5% (Li *et al.,* 2023). This underscores the urgent need to address these regions' underlying factors contributing to low maternal healthcare utilisation.

Moreover, the African Region exhibits significant intraregional disparities in the coverage of essential maternal health interventions, such as ANC, as

highlighted by the World Health Organization. These disparities underscore the need to explore further the factors affecting access to maternal healthcare, particularly in Africa. In Togo, women in the highest wealth quintile, particularly in rural areas, exhibited increased odds of attending adequate ANC visits and delivering in health facilities compared to those in the poorest quintile. Further, women with higher education displayed increased odds of attending adequate ANC visits compared to those without formal education. Conversely, higher parity and indigenous beliefs, particularly in rural areas, were associated with decreased odds of utilizing healthcare services. (Kota *et al.,* 2023).

The utilisation of maternal healthcare services among young women in sub-Saharan Africa (SSA) was 55.2%, with antenatal care and PNC rates at 40%, respectively, showing significant inter-country variations (Bain *et al.,* 2022). This stark discrepancy in utilisation rates highlights the importance of understanding the factors influencing healthcare-seeking behaviours, particularly among specific demographics within SSA. Kangbai *et al.* (2022) showed that location, education, and distance to health facilities were more likely to increase the odds of utilising PNC in Sierra Leone. Zimbabwe stands out as a reference point due to its notable achievement in completing four or more Antenatal Care (ANC) visits, compared to other nations. In contrast, Ethiopia had the lowest rate of completed visits among East African countries, a disparity attributed to differences in sociodemographic characteristics and healthcare systems (Tessema, 2021). In Kenya, disparities at both individual and community levels contribute to low maternal healthcare utilisation. Kamau (2016) emphasized the urgent need to reduce maternal mortality as part of Kenya's Vision 2030. Despite efforts like the government's free maternal health programme, only 61% of deliveries occur in health facilities, according to the latest demographic health survey. These figures underline the need to address individual and community factors to improve maternal healthcare use in Kenya (Kamau, 2016).

Habonimana and Batura (2021) analysed socioeconomic determinants of maternal health service utilisation in Burundi using 2016–2017 DHS data and a multivariate regression model. Findings showed that occupation, marital status, and wealth increased ANC likelihood. Married and educated women were likelier to seek ANC and have assisted births. Endawkie *et al.* (2024) investigated predictors and the number of ANC visits among reproductive-age women in Sub-Saharan Africa using demographic and health survey data from 2017–2023. Zero-inflated negative binomial regression revealed an average of 4.08 ANC visits, with 7.3% attending eight or more. Significant maternal health service utilisation factors included age, maternal and partner education, birth order, and wealth.

Sabo *et al.* (2024) examined determinants of ANC service utilisation among women of childbearing age in Nigeria using binary logistic regression. Results showed 92.5% awareness of ANC, with 57.8% attending at least four visits. Factors associated with higher ANC attendance included age, education, occupation, knowledge of pregnancy danger signs, and spousal support. Musona *et al.* (2024) investigated ANC service utilisation among pregnant youths in Zimbabwe using 2015 DHS data and multivariate analysis. Results showed 67.6% ANC utilisation, with wealth significantly influencing usage. Poorer women were more likely to use ANC, while education impacted tetanus vaccination uptake.

Adejoorin (2024) examined maternal health facility utilisation and rural

women's well-being using Nigeria's 2018 DHS data and extended ordered logit models. Findings indicated moderate maternal health service use and moderate well-being among rural women.

Household size and maternal employment in agriculture influenced maternal health service use and well-being. Daniels-Donkor *et al.* (2024) analysed factors associated with timely ANC initiation in The Gambia using 2019–2020 GDHS data and multilevel logistic regression models. Results showed a 43% prevalence of timely ANC initiation, with higher odds among married women, those aged 30–34, and wealthier households. Rural women had higher odds than their urban counterparts.

Awoke *et al.* (2024) examined spatial patterns and determinants of low utilisation of delivery care and postnatal check-ups in Ethiopia using bivariate analysis and 2016 DHS data. Findings highlighted significant low delivery and postnatal care clustering in regions such as Liben and Borena. The study reported high home delivery and low postnatal check-up rates, which could affect targeted interventions. Using logistic regression, Galgalo et al. (2024) analysed maternal healthcare service utilisation among pastoralist communities in Kenya. Key findings included higher ANC, facility delivery, and postnatal care use among women near health facilities, mobile phone users, and those in monogamous marriages.

Using DHS data, Shanto et al. (2023) examined maternal healthcare service utilisation and associated risk factors in 37 low- and middle-income countries. Multivariate logistic regression showed that higher wealth, women's age, and education were associated with better maternal healthcare utilisation. Urban residence, autonomy, and media exposure were positive factors, while larger family sizes were negative. Asumah *et al.* (2023) explored maternal determinants of postnatal care utilisation in Ghana using logistic regression. Findings revealed that mothers aged 25–39 and those with higher education were more likely to use postnatal care. Barriers included waiting time, health worker attitudes, and lack of family support. Temesgen and Netangaheni (2024) investigated maternal healthcare service utilisation in Addis Ababa, Ethiopia, using 2016 DHS data. Results indicated 70.8% service utilisation, with significant factors including travel and wait time. Women with at least four ANC visits had higher service use.

The Government of Tanzania has implemented various policies and programmes that prioritize enhancing maternal healthcare and reducing maternal mortality. Tanzania Vision 2025 highlights "access to quality reproductive health services for all" and the reduction of infant and maternal mortality as key health goals. The national post-MDG agenda emphasizes improving maternal, newborn, and child health as a primary focus. The Primary Health Service Development Programme (PHSDP/MMAM 2007–2017) (Ministry of Health and Social Welfare-MoHSW, 2007) underscores the importance of equity by advocating for expanded access to quality primary healthcare, including maternal health services, particularly in rural and remote areas. Moreover, the Health Sector Strategic Plan V 2021–2026 (HSSP V) (MoHCDGEC, 2021) reaffirms the commitment to reducing maternal and child morbidity and mortality. Other initiatives introduced by the Government of Tanzania, such as the National Plan for Reproductive, Maternal, Newborn, Child, and Adolescent Health & Nutrition (2021/2022 - 2025/2026), have been launched to address this issue. The Ministry of Health's Reproductive Health Department emphasized the need for increased coverage and improved

quality of maternal health services in rural and remote areas (TDHS, 2022).

The results indicate that between the 1996 TDHS and the 2015–16 TDHS-MIS, the Pregnancy-Related Mortality Ratio (PRMR) showed no clear trend, with estimates ranging from 494 to 612 deaths per 100,000 live births. In contrast, the 2022 TDHS-MIS reported a significantly lower PRMR of 104 deaths per 100,000 live births. The recent estimate reflects a statistically significant and unexpectedly substantial decline in the PRMR compared to the 2015–16 TDHS-MIS. Furthermore, the percentage of women attending the recommended four or more ANC visits increased from 38% in the 2010 TDHS to 48% in the 2015–16 TDHS-MIS and 65% in the 2022 TDHS-MIS. Similarly, the proportion of women seeking ANC during the first trimester rose from 13% in the 2010 TDHS to 22% in the 2015–16 TDHS-MIS and 34% in the 2022 TDHS-MIS. In addition, the percentage of women with a live birth in the two years preceding the survey who received a postnatal check-up within two days of delivery increased from 34% in the 2015–16 TDHS-MIS to 51% in the 2022 TDHS-MIS

Maternal healthcare utilisation in Tanzania varies significantly between rural and urban areas. The research underscores a pronounced disparity, with rural areas demonstrating much lower utilisation rates than urban regions (Langa, 2023). This rural-urban gap reflects the limited access to essential maternal healthcare services in rural Tanzania. Moreover, insufficient research has been conducted on how these disparities exacerbate socio-economic inequalities in maternal healthcare utilisation (Langa & Bhatta, 2020).

Bridging the gap in maternal health utilisation between rural and urban areas is essential to achieving equitable access to maternal healthcare services across Tanzania, irrespective of geographic location or socio-economic status. Shao (2022) identified several factors influencing maternal healthcare utilisation in Tanzania, including higher education levels, urban residence, accessing health facilities for family planning, male involvement in postnatal care, the quality of health infrastructure, and satisfaction with maternal healthcare services. Similarly, Mpembeni *et al.* (2019) found that occupation and education level were significantly associated with awareness of access rights; women aware of their rights were nearly five times more likely to use skilled birth attendants than those unaware. Thobias *et al.* (2022) highlighted regional disparities in antenatal and delivery care utilisation, with higher rates in the Eastern and East-Central regions and lower rates in the Northern and North-western regions. Moreover, maternal age, education level, wealth status, and the number of children were key predictors of antenatal and delivery care use. These findings underscore persistent challenges in achieving consistent maternal healthcare utilisation and highlight how these disparities contribute to the slow progress in reducing maternal mortality rates.

Tibenderana *et al.* (2024) analysed the proportion and distribution of ANC service coverage and factors associated with ANC utilisation among women of reproductive age using data from the 2022 Tanzania Demographic and Health Survey (DHS). Modified Poisson regression was applied to estimate factors influencing adequate ANC reception. Significant factors associated with maternal health utilisation in Tanzania included education, wealth index, age, residence, number of ANC visits, and birth order. Similarly, Adinani *et al.* (2024) explored the prevalence and determinants of early PNC in Tanzania using the 2015/16 DHS data. Poisson regression analysis revealed that the

prevalence of early PNC was 36%, with higher utilisation observed among women with access to media, cesarean delivery, and facility-based delivery. Significant factors included geographical zones, residence, media access, and mode of delivery, with lower utilisation in rural areas and in the southwest and lake zones.

Eliufoo *et al.* (2024) utilised 2015-16 TDHS-MIS data and multivariate logistic regression to analyse determinants of adequate ANC visits in Tanzania. Their findings indicated that early booking for ANC, parity, and exposure to the Internet were positively associated with completing recommended visits. Conversely, women who experienced partner violence were less likely to attend adequate ANC visits. Mobile phone use for health matters slightly improved attendance. Muya *et al.* (2024) assessed factors affecting Delivery Care (DC) and PNC utilisation using data from the 2022 TDHS and Malaria Indicator Survey (MIS). Binary logit models revealed significant predictors of DC, including residence, wealth index, region, educational level, and occupation. For PNC, significant predictors were the woman's age, region, education, wealth index, DC, and partner's education. Orwa *et al.* (2019) examined factors influencing maternal healthcare outcomes in Mwanza Region, Tanzania, using generalized estimating equations. Their findings showed that urban women were more likely to complete ANC4+ visits and have facility-based deliveries, with education and early ANC visits linked to better maternal healthcare service uptake.

Langa (2024) examined changes in the effect of Socioeconomic Status (SES) on maternal healthcare utilisation in Tanzania. The study revealed significant disparities in healthcare use based on SES and location, with rural and lower-SES women facing less access to maternal services. Disparities were more pronounced between residential areas than regions, emphasizing the influence of economic dependency in the Global South. Ntegwa *et al.* (2023) applied Fairlie Decomposition Analysis to explore rural-urban disparities in maternal healthcare using 2015/16 TDHS data. Results indicated significant rural-urban gaps, primarily driven by household wealth. Other influential factors included media exposure, women's employment status, and proximity to healthcare facilities.

Kasagama *et al.* (2022) analysed data from the 2004–2016 TDHS using Poisson regression and Poisson decomposition to examine changes in ANC visits. The proportion of women with adequate ANC visits increased from 43% in 2010 to 51% in 2015/16, largely due to changes in population structure (66.2%) and maternal characteristics (33.8%). Early ANC initiation significantly contributed to these improvements. Bintabara and Mwampagatwa (2023) analysed socioeconomic inequalities in maternal healthcare in Tanzania using TDHS data from 2004, 2010, and 2016. The concentration curve and index highlighted significant inequalities in maternal service utilisation, with wealthier, educated women having higher utilisation rates.

Ngowi (2023) examined factors influencing focused ANC utilisation in the Simiyu Region, Tanzania, finding that only 34% of women with at least one ANC visit completed four or more. Self-decision-making and visiting dispensaries were negatively associated with completing four visits, while education and planned pregnancies were marginally significant. Massenga *et al.* (2023) used mixed-effect logistic regression to examine factors affecting ANC component receipt in the Mara and Kagera regions of Tanzania. Results showed lower counselling likelihood among uneducated women and those with fewer than four ANC visits. Privacy

and secondary education were linked to better counselling, while joint decision-making and knowledge of danger signs were associated with receiving care. Ndifwa *et al.* (2022) used 2015/16 TDHS data and multivariate Oaxaca-Blinder decomposition to analyse rural-urban postnatal care differentials. The study's findings revealed that place of delivery, childbirth size, and distance to health facilities were critical for low postnatal care. High postnatal care utilisation was associated with ANC visits, media exposure, health insurance, maternal education, and wealth.

Despite various policies and programmes implemented by the Government of Tanzania to improve maternal health utilisation, the 2022 TDHS reports a maternal mortality rate of 104 per 100,000 live births, still above the SDG target of less than 70. In addition, significant disparities in maternal healthcare utilisation persist between urban and rural areas. According to the 2022 TDHS, 76% of urban women attended four or more ANC visits compared to 61% in rural areas, and 40% of urban women sought ANC in the first trimester, compared to 32% of their rural counterparts. These findings highlight the substantial rural-urban divide in maternal healthcare service usage, with rural areas lagging behind. This study aims to analyse and decompose these disparities into two components: differences due to women's characteristics (endowments) and differences due to predictors (coefficients effects), using the 2022 TDHS and a multivariate decomposition model.

This study provides valuable insights into the rural-urban disparities in maternal healthcare utilisation in Tanzania by identifying factors driving the gap, distinguishing between disparities due to women's characteristics and the effects of predictors, and informing targeted policy interventions. The findings contribute to advancing methodological approaches, supporting equity goals, and monitoring progress in maternal healthcare, making it a critical resource for addressing inequalities and improving health outcomes.

2. Materials and Methods

2.1 Study area

This study focuses on the United Republic of Tanzania in East Africa at coordinates 6.3690° S, 34.8888 E. According to the 2022 Population and Housing Census, Tanzania has a population of 61,741,120, consisting of 30,053,130 males and 31,687,990 females (NBS, 2022). The study area was selected due to notable fluctuations in maternal healthcare utilisation among women of reproductive age, prompting an investigation into the factors contributing to this issue.

2.2. Research Design

This study used a cross-sectional research design to examine the determinants of maternal healthcare utilisation among women of reproductive age in Tanzania. The target population is all women of reproductive age in Tanzania in 2022. The accessible population is represented by women of reproductive age who participated in the 2022 Tanzania Demographic Health Survey. The study used secondary data from the Tanzania Demographic Health Survey (TDHS) conducted in 2022 by the National Bureau of Statistics.

The 2022 DHS pregnancy and postnatal recode file, containing data from 7,281 women who participated in the survey, was utilised. This dataset represents women from all regions of Tanzania. The flow of participants is summarised in Figure 1. The final study sample comprised 7,281 women who reported being pregnant or having given birth within two years before the survey, conducted between February 24, 2022, and July 21, 2022.

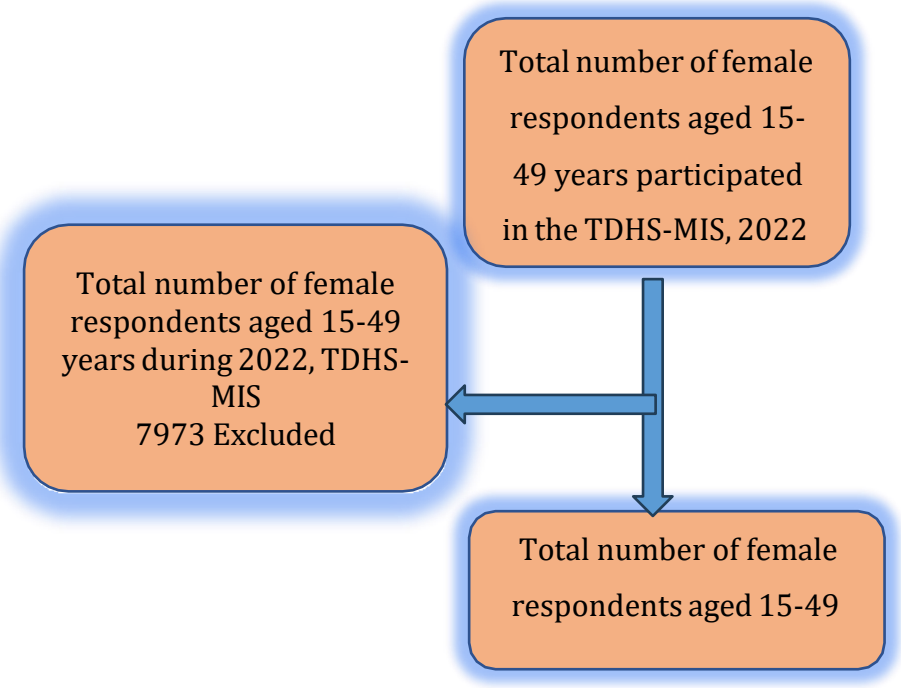

Figure 1: Flow of the Participants included in the Study from TDHS-MIS, 2022 data.

2.3. Study Variables

In this study, maternal healthcare utilisation served as the dependent variable and was assessed using a binary scale. The measurement considered the number of antenatal care (ANC) visits and the timing of postnatal check (PNC) visits. A value of 1(utilised) was assigned to respondents who met both of the following criteria: had four or more antenatal visits and who had a postnatal check by a health provider during the first 2 days or less after giving birth (WHO, 2022). Those who did not meet both of these criteria were coded as 0 (not utilised). Independent variables included in the analysis were selected based on empirical evidence from similar studies and their availability in the 2022 TDHS.

Table 1: Measurements of Study Variables

Dependent Variable	**Measurements**	**Scale**
Maternal healthcare utilisation (MHU)	0= Not utilized 1= Utilized	Categorical
Independent Variables	**Measurements**	**Scale**
Distance to a health facility	0= No problem 1=Problem	Nominal
Maternal education	0=No education 1=Primary, 2=Secondary 3=Higher	Ordinal
Insurance coverage	0=No 1=Yes	Nominal
Location	0= Rural 1=Urban	Nominal
Media exposure	0=No exposure 1= Exposed	Nominal

Dependent Variable	Measurements	Scale
Wealth index	1 = poor 2 = middle 3 = rich	Ordinal
Occupation	0 = Not working 1= Working	Nominal
Marital status	1= Single 2= Married 3= Living together 4= Separated, widowed, or divorced	Nominal
Maternal age	1= 15-19 2= 20-24 3= 25-29 4= 30-34 5=35-39 6=40-44 7=45-49	Nominal

Source: Own computation from DHS (2022)

2.4. Modelling and Empirical Strategy

The study employed the Fairlie decomposition technique to decompose differences in binary outcomes (maternal healthcare utilisation with categories utilised and not utilised) between two groups (rural and urban). It is an adaptation of the Blinder-Oaxaca decomposition for non-linear models, such as logistic regression or probit regression. It quantifies how much of the difference in outcomes between groups can be attributed to differences in observed characteristics versus unexplained factors.

Fairlie Decomposition Method

The difference in average probabilities between groups (Δ) is decomposed into:

$$\boldsymbol{\Delta} = [\frac{1}{N_A}\sum_{i=1}^{NA} F(X_{iA}\beta_A) - \frac{1}{N_B}\sum_{i=1}^{NB} F(X_{i\beta}\beta_A)] + [\frac{1}{N_B}\sum_{i=1}^{NB} F(X_{i\beta}\beta_A) - \frac{1}{N_B}\sum_{i=1}^{NB} F(X_{i\beta}\beta_B)]$$

- The first term represents the contribution of characteristics (endowments effect).
- The second term represents the contribution of coefficients (unexplained effect).

The Fairlie decomposition method evaluates how differences in maternal healthcare services utilisation between rural and urban areas can be attributed to the variables included in the analysis. Moreover, it estimates the contribution of each variable to the explained difference in utilisation between these areas. A logit regression model was used to assess the impact of each variable on maternal health-care services utilisation. The decomposition technique was then applied to determine the rural-urban difference in utilisation, the explained portion of the difference, and the contribution of individual variables to the explained difference. In this technique, a negative coefficient contributes positively to rural-urban inequality in maternal health-care utilisation when the inequality is negative, as observed in this study. On the other hand, a positive coefficient contributes negatively to inequality, reducing it when negative, as is also the case in this study.

3. Results

3.1. Characteristics of the Respondents

Table 2 presents the profile of 7,281 women, representing 47.7% of the total female respondents from the 2022

Tanzania Demographic and Health Survey (TDHS). Of these, 28.3% utilised maternal healthcare, while 71.7% did not. The results indicate that most respondents (90.7%) were aged 39 years or younger, with 25.1% belonging to the 25-29 age group. A significant proportion (51.0%) had primary education, while only 1.2% had attained higher education. In terms of marital status, 60.7% of the women were married, and 7.1% were single at the time of the survey. Regarding access to healthcare, 69.2% of respondents reported that distance to health facilities was not a major issue, while 30.8% identified it as a significant problem.

Moreover, most respondents (71.3%) lived in rural areas, while 28.7% resided in urban areas. Wealth distribution was uneven, with 38.8% of households classified as the poorest and 40.7% in the wealthiest category. 65.0% of respondents reported being employed, whereas 35.0% were not working. Furthermore, only 4.5% of the women had medical insurance, whereas 95.5% did not. Furthermore, media exposure was assessed; the findings show that 56.8% of respondents reported no media exposure, while 43.2% reported media exposure.

Table 2: Socio-economic and Demographic characteristics of respondents

Variable	N (7,281)	Percent (%)
Maternal Healthcare Utilisation		
Not utilised	5223	71.73
Utilised	2058	28.27
Maternal Age		
15 – 19	525	7.21
20 – 24	1808	24.83
25 – 29	1828	25.11
30 – 34	1382	18.98
35 – 39	1057	14.52
40 – 44	532	7.31
45 – 49	149	2.05
Location		
Urban	2087	28.66
Rural	5194	71.34
Maternal education		
No education	1409	19.35
Primary	3712	50.98
Secondary	2074	28.49
Higher	86	1.18
Insurance coverage		
Yes	6951	95.47
No	330	4.53
Wealth index		
Poorest	2823	38.77
Middle	1495	20.53
Richer	2963	40.69
Media Exposure		

Variable	N (7,281)	Percent (%)
No	4132	56.75
Yes	3149	43.25
Distance to a health facility		
No Big Problem	2240	30.77
Big Problem	5041	69.23
Occupation		
Not working	2549	35.01
Working	4732	64.99
Marital status		
Single	519	7.13
Married	4416	60.65
Living together	1669	22.92
Separated, widowed or Divorce	677	9.3

Source: Own compilation from DHS (2022)

3.2. Results from the Binary Logistic Regression Analysis

The results in Table 3 show that the odds ratio for women with secondary education is 1.8, indicating that, holding other variables constant, women with secondary education are 1.8 times more likely to utilise maternal healthcare than those without education. Similarly, the odds ratio for women with higher education is 2.6, suggesting they are 2.6 times more likely to utilize maternal healthcare compared to women with no education. Women with primary education have an odds ratio of 1.4, meaning they are 1.4 times more likely to utilise maternal healthcare compared to those with no education. These findings emphasize that as women's education levels increase, so does their likelihood of utilizing maternal healthcare services.

In addition, the odds ratio for women in the middle wealth quantile is 1.2, indicating that they are 1.2 times more likely to utilize maternal healthcare than women in the poorest wealth quantile. For women in the richest wealth quantile, the odds ratio is 1.4, showing that they are 1.4 times more likely to utilize maternal healthcare than those in the poor wealth quantile. This reinforces the trend that women in higher wealth categories tend to use maternal healthcare services more than those in lower wealth categories.

Regarding health insurance coverage, the odds ratio is 1.6, indicating that women with health insurance are 1.6 times more likely to utilize maternal healthcare than those without insurance. Regarding media exposure, the odds ratio is 1.2, showing that women exposed to media are 1.2 times more likely to utilize maternal healthcare than those who are not. Moreover, women who do not face significant barriers in accessing a health facility have an odds ratio of 1.4, meaning they are 1.4 times more likely to utilize maternal healthcare compared to those who experience difficulties in accessing a health facility.

Further, the odds ratio for women residing in rural areas is 0.865, indicating that holding other variables constant, they are 1.1 times (the reciprocal of 0.865) less likely to utilize maternal healthcare than women in urban areas. Furthermore, the odds ratio for women who are employed is 1.3, indicating that, holding other variables constant, they are 1.3 times more likely to utilize maternal healthcare than women who are not employed.

Table 3: Estimation for Binary Logistic Regression Model

Variable	Response	Odd Ratio	p-Value	Lower	Upper
Maternal Age					
Reference	15-19				
	20-24	1.004	0.973	0.816	1.281
	25-29	0.98	0.864	0.812	1.282
	30-34	0.893	0.355	0.746	1.2
	35-39	0.895	0.385	0.748	1.23
	40-44	1.013	0.928	0.763	1.346
	45-49	0.437	0.002**	0.259	0.738
Place of Residence					
Reference	**Urban**				
	Rural	0.865	0.036**	0.755	0.991
Maternal Education					
Reference	**No education**				
	Primary	1.382	0.000**	1.176	1.624
	Secondary	1.752	0.000**	1.452	2.113
	Higher	2.4612	0.000**	1.517	3.993
Insurance coverage					
Reference	No				
	Yes	1.598	0.000**	1.255	2.037
Media exposure					
Reference	Not Exposed				
	Exposed	1.178	0.007**	1.046	1.327
Distance to a health					
Reference	**A big problem**				
	Not a big problem	1.35	0.000**	1.189	1.533
Wealth index					
Reference	**Poor**				
	Middle	1.221	0.000**	1.047	1.424
	Richer	1.426	0.000**	1.208	1.683
Marital status					
Reference	**Single**				
	Married	0.88	0.225	0.715	1.082
	Living together	1.021	0.853	0.818	1.276
	Separated/widowed/divorced	0.913	0.489	0.704	1.183
Occupation					
Reference	**Not working**				
	Working	1.339	0.000**	1.195	1.501
Constant		0.172	0.000**	0.124	0.238
	A number of obs. =	7281	LR chi2(12)	=	371.62
	Log-likelihood =	-4149.6	Prob >χ^2	=	0.000
	Pseudo R^2 = 0.0429				

Significant at 5% level: **Source: Own compilation from DHS (2022)

3.3. Decomposition of the Variations in Maternal Healthcare Utilisation between Rural and Urban

Table 4 provides the results of the Fairlie decomposition analysis examining rural-urban disparities in maternal health care services utilisation. It details the contributions of various factors, including differences in distance to health facilities, access to media, women's age, education level, wealth index, insurance coverage, marital status, and occupation, to the observed variation.

The difference in maternal health care utilisation between rural and urban women was estimated at -0.12097, indicating that rural women, on average, have a lower probability of utilizing maternal health care services than urban women. The decomposition analysis revealed that the rural-urban gap in maternal health care utilisation is primarily explained by differences in household wealth index (37.2%), followed by women's education level (18.1%) and distance to health facilities (12.6%). The higher wealth index was associated with an increasing gap in utilisation between urban and rural areas. As anticipated, the most significant contributing factor to this disparity was the household wealth index, which accounted for -0.0260 (21%) of the rural-urban gap, highlighting the significant role of higher wealth levels in explaining differences in maternal health service utilisation. Moreover, distance to health facilities contributed 12.6% to the gap, while women's media access accounted for 8.7%, both of which were statistically significant.

In addition, working women contributed 4.1% to the widening gap in maternal health care utilisation, while insurance coverage accounted for 3.9%, both of which were also statistically significant. However, women's age and marital status were found to have minimal influence on the observed disparity.

Table 4: Decomposition of the Variations in Maternal Healthcare Utilisation between Rural and Urban

Variable	**Probability**				
Rural	0.24798				
Urban	0.36895				
	Difference				
Rural-Urban Gap	-0.12097				
Contribution from rural-urban difference					
Variable	**Coefficient**	**Std. Err.**	**z**	**P>z**	**Percentage**
Distance	-0.0152	0.0032	-4.74	0.0000	12.55
Media	-0.0105	0.0045	-2.35	0.0190	8.71
Age	0.0001	0.0001	0.89	0.3720	-0.11
Education Level	-0.0219234	0.0047606	-4.61	0.0000	18.12
No education	**Reference**				
Primary	0.0062	0.0013	4.85	0.0000	-5.16
Secondary	-0.0213	0.0045	-4.69	0.0000	17.60
Higher	-0.0028	0.0021	-1.34	0.1810	2.28
Wealth Index	-0.0449604	0.0105237	-4.27	0.0000	37.17
Middle	**Reference**				
Poor	-0.0196	0.0078	-2.51	0.0120	16.19
Higher	-0.0260	0.0127	-2.05	0.0410	21.46
Insurance Coverage	-0.0047	0.0019	-2.42	0.0160	3.85

Marital Status	0.0006164	0.0005664	1.09	0.2760	-0.51
Single	**Reference**				
Married	-0.0026	0.0020	-1.35	0.1760	2.19
Divorced	0.0003	0.0008	0.43	0.6690	-0.27
Occupation	0.0050	0.0009	5.54	0.0000	-4.14

Source: Own compilation from DHS (2022)

4. Discussion

The study examined various factors impacting Maternal Healthcare Utilisation (MHU) among women of reproductive age, revealing several significant associations. Binary logistic regression revealed that women residing in rural areas are less likely to utilize maternal healthcare compared to those in urban areas. This disparity is likely due to the greater availability of healthcare services in urban settings, as supported by Muya *et al.* (2024) and Langa (2024), who noted that urban areas offer more social and health services, contributing to higher healthcare utilisation. Maternal education also plays a crucial role in MHU. The study indicated that women with higher levels of education are more likely to utilize maternal healthcare services. Educated women tend to understand better the benefits and importance of maternal healthcare, a finding that aligns with Bain *et al.* (2022). Their research highlights that formal education is associated with higher antenatal and postnatal care utilisation rates.

Health insurance coverage significantly impacts MHU. Women with health insurance are nearly twice as likely to use maternal healthcare compared to those without insurance. Insurance provides financial protection, making healthcare services more accessible. This result is consistent with Bain *et al.* (2022), who found that health insurance increases the likelihood of utilising maternal healthcare by mitigating financial barriers. Exposure to media also influences MHU. Women who have access to media are more likely to utilise maternal healthcare services. Media is crucial in raising awareness and providing information about healthcare options, encouraging utilisation. This is supported by Li *et al.* (2023), who identified media exposure as a significant factor in increasing the likelihood of using maternal health services.

The study revealed that the distance to health facilities affects maternal healthcare utilisation. Women who do not face significant difficulties accessing healthcare facilities are more likely to use maternal services. This finding highlights the impact of transportation and geographic accessibility, consistent with Li *et al.* (2023), who found a positive correlation between proximity to healthcare services and utilisation. Further, women from wealthier households are more likely to utilise maternal healthcare compared to those from poorer households. This correlation suggests that financial resources significantly affect healthcare utilisation, as poorer women may struggle with the costs associated with maternal care. This finding is supported by Langa and Bhatta (2020) and Bain *et al.* (2022), who found that higher household wealth correlates with increased maternal healthcare utilisation.

Furthermore, employed women are more likely to use maternal healthcare services than those who are not employed. Employment can provide financial stability, which facilitates access to healthcare services. This result aligns with Li *et al.* (2023), who found that employment significantly predicts higher utilisation rates for antenatal care.

The Fairlie decomposition technique was employed to analyse rural-urban disparities in maternal healthcare utilisation (MHU) and the factors contributing to these differences. The results revealed a significant gap, with MHU levels in rural areas being markedly lower than in urban areas. These findings align with earlier studies by Yaya *et al.* (2016) and Ntegwa *et al.* (2023). The decomposition analysis identified household wealth status as a key driver of the rural-urban disparity, consistent with previous research in Sub-Saharan Africa and Tanzania. The findings suggest that women in urban areas utilise maternal healthcare services more frequently than their rural counterparts. While wealth inequalities affect MHU across both rural and urban settings, rural areas tend to have a higher concentration of poor women, exacerbating the disparity. This is consistent with studies showing that economically advantaged women are more likely to seek and utilise maternal healthcare services. Without improvements in rural women's socioeconomic status, these inequalities will likely persist or even widen (Ntegwa *et al.,* 2023).

Moreover, women's education level also contributes to the rural-urban gap in MHU, as educated women are more likely to understand the importance and benefits of maternal healthcare. However, this finding contradicts the conclusions of Ntegwa *et al.* (2023). Distance to healthcare facilities is another critical factor widening the gap, often compounded by limited service availability, poor facility conditions, distant locations, a shortage of trained healthcare providers, lack of motivation, inadequate public transport, and limited awareness of the benefits of MHU in rural areas (Yaya et al., 2016; Ntegwa *et al.,* 2023). Many rural women incur additional transportation costs to access healthcare, which hinders their service utilisation.

Furthermore, media access and exposure in rural areas have increased MHU uptake, narrowing the rural-urban gap. In Tanzania, media exposure has been linked to improved MHU utilisation (Ntegwa *et al.,* 2023; Ndifwa *et al.,* 2022), as it influences attitudes, behaviours, and knowledge about maternal health and encourages male participation in maternal healthcare. Therefore, increasing rural women's exposure to maternal health information through media should be prioritized. Furthermore, the findings indicate significant inequalities in MHU between working and non-working women, as working women are generally more financially stable and able to afford maternal healthcare services. However, the study found that a woman's age and marital status do not influence the rural-urban variation in MHU, consistent with Ntegwa *et al.* (2023).

5. Conclusions

The study aimed to decompose rural-urban variations in maternal healthcare utilisation among women of reproductive age in Tanzania. The findings concluded that rural women, on average, have a lower probability of utilising maternal healthcare services compared to urban women. Wealth index, women's education, distance to a health facility, access to mass media, insurance coverage, and occupational status appeared to favour urban women compared to their rural counterparts. The study recommends the need for targeted interventions to improve maternal healthcare utilisation, including tailored policies that empower women by enhancing their access to resources and opportunities. Enhancing educational opportunities for girls, extending beyond primary education, is also crucial for long-term improvements in maternal healthcare utilisation by providing scholarships or vocational

training to empower them economically. This would improve their socio-economic outcomes. Advocacy for leveraging mass media platforms to promote maternal healthcare services, streamlining the insurance enrolment process for pregnant women, and minimising out-of-pocket expenses for maternity care is also emphasized to encourage higher utilisation. To further improve access to care, reliable transportation, expanded telehealth services, and establishing satellite clinics in underserved areas are recommended.

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