

BMJ Open Improving access to healthcare for women in Tanzania by addressing socioeconomic determinants and health insurance: a population-based cross-sectional survey

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ABSTRACT

Objective This study was performed to explore the factors associated with accumulation of multiple problems in accessing healthcare among women in Tanzania as an example of a low-income country.

Design Population-based cross-sectional survey.

Setting Nationwide representative data for women of reproductive age obtained from the 2015–2016 Tanzania Demographic and Health Survey were analysed.

Primary outcome measures A composite variable, ‘problems in accessing healthcare’, with five (1–5) categories was created based on the number of problems reported: obtaining permission to go to the doctor, obtaining money to pay for advice or treatment, distance to a health facility and not wanting to go alone. Respondents who reported fewer or more problems placed in lower and higher categories, respectively.

Results A total of 13 266 women aged 15–49 years, with a median age (IQR) of 27 (20–36) years were interviewed and included in the analysis. About two-thirds (65.53%) of the respondents reported at least one of the four major problems in accessing healthcare. Furthermore, after controlling for other variables included in the final model, women without any type of health insurance, those belonging to the poorest class according to the wealth index, those who had not attended any type of formal education, those who were not employed for cash, each year of increasing age and those who were divorced, separated or widowed were associated with greater problems in accessing healthcare.

Conclusion This study indicated the additive effects of barriers to healthcare in low-income countries such as Tanzania. Based on these results, improving uptake of health insurance and addressing social determinants of health are the first steps towards reducing women’s problems associated with accessing healthcare.

INTRODUCTION

Despite the substantial decline in global maternal mortality ratio (MMR), low-income countries have not seen the same decline in MMR as those with higher incomes.^{1 2} This situation is described as an ‘area of shameful

Strengths and limitations of this study

- This is the first study to show additive effects of problems in accessing healthcare and associated factors among women in Tanzania.
- The study used a nationally representative sample with high response rate and robust sampling procedure.
- As a cross-sectional study design was used, causality assumptions could not be made. Therefore, the results should be interpreted with caution.

failures of development’.^{3 4} Current statistics show that the MMR has increased significantly by more than 20% over the past 5 years in Tanzania, despite the governmental efforts to strengthen the health system by increasing the coverage of healthcare facilities.^{5–7} Each ward now has at least one dispensary and/or health centre, each district has at least one hospital, while each region has at least one referral hospital. Regardless of differences in the levels of these facilities in terms of function, expertise, availability of services and population coverage, all are expected to provide basic maternal health services together with basic emergency obstetric care.⁷ This resulted in an increase in coverage of maternal health services, such as antenatal care by skilled providers (96%–98%), delivery at a healthcare facility (50%–63%) and births assisted by skilled providers (51%–64%) between 2010 and 2016.^{5 6} Persistent high MMR (556 maternal deaths per 100 000 live births) in Tanzania raises concerns about whether the country can achieve the Sustainable Development Goals target of less than 140 maternal deaths per 100 000 live births by 2030.^{8 9} The majority of avoidable and unnecessary maternal deaths experienced

in this region likely result from poor utilisation of skilled maternal health services.¹⁰

Many social, cultural and geographical factors as well as education level and poverty have been reported to play roles in the poor utilisation of health services.^{11–13} Access to healthcare has been highlighted as the major barrier towards the utilisation of maternal health services in low-income countries, especially in sub-Saharan Africa (SSA).^{10 14 15} Access to healthcare can be broadly defined based on availability, affordability, accessibility and acceptability,¹⁶ but is simply referred to as the timely use of health services to achieve the desired health outcomes. Despite agreement that access to healthcare must be universal and guaranteed for all on an equitable basis,¹⁷ women continue to face significant inequities in accessing and using healthcare particularly in low-income countries.¹⁸

In relation to the problems experienced by women in accessing healthcare, the following four major problems have been addressed in previous studies: obtaining permission,^{19 20} obtaining money,²¹ distance to the health facility²² and not wanting to go alone (lack of spouse or family member escort).^{23 24} Although it is unclear whether women with multiple problems encounter greater difficulties in accessing healthcare, most previous studies assessed and discussed each of these four problems independently. The limited evidence regarding whether women facing multiple problems have less access to healthcare suggested the need to create a composite variable that includes all four problems to identify groups of women at a greater disadvantage. A similar approach has been used to assess the severity of problems in accessing healthcare among individuals with disability in four African countries.²⁵ Moreover, recent studies indicated that age, education, residence, possession of health insurance, socioeconomic status and occupation are strongly linked to access to healthcare.^{26–30} The present study was performed to explore the factors associated with accumulation of multiple problems in accessing healthcare among women in Tanzania.

METHODS

Data sources

The present study used data from the 2015–2016 Tanzania Demographic and Health Survey and Malaria Indicator Survey (TDHS-MIS) conducted by the National Bureau of Statistics and the Office of Chief Government Statistician, Zanzibar, in collaboration with the Ministry of Health, Community Development, Gender, Elderly and Children of the Tanzania Mainland and the Ministry of Health, Zanzibar. The technical support for the surveys was provided by ICF International under DHS programme.

Study design

This study analysed a nationwide population-based cross-sectional survey using information obtained by interviewing women (15–49 years old) who were either

residents or visitors in the household on the night before the survey.

Sample size and sampling technique

The 2015–2016 TDHS-MIS used a two-stage cluster sampling technique to obtain a sample designed to provide nationally representative results according to all 30 regions of Tanzania. In the first stage, sample points (a total of 608 clusters) consisting of enumeration areas delineated for the 2012 Tanzania Population and Housing Census were selected. In the second stage, households were selected systematically. A complete listing of households was established for all 608 selected clusters prior to the fieldwork. From this list, 22 households were then systematically selected from each cluster, yielding a representative probability sample of 13 376 households. All eligible women in the selected households and men in subsample of one-third of selected households between the ages of 15 and 49 years who were either residents or visitors in the household on the night before the survey were then interviewed. Finally, a total of 13 266 women and 3514 men were interviewed.⁶

Data collection and processing

The 2015–2016 TDHS-MIS used four main types of questionnaires during data collection. However, only data collected with the Women's Questionnaire were used in the present study. After pretesting of the questionnaires, the finalised and corrected version was used in the main survey from 22 August 2015 to 14 February 2016. Data collection was performed by 64 female nurses who were trained and qualified to be interviewers through a series of practical tests and examinations. Following the training, 16 teams were formed (three for Zanzibar and 13 for Tanzania Mainland). Data entry was performed concurrently with data collection in the field. After the paper questionnaires were completed, edited and checked by both the field editor and the supervisor, the data were entered into a tablet equipped with a data entry programme. A 100% double entry data entry process was used to minimise keying errors, and editing was completed on 21 March 2016, while data cleaning and finalisation were completed on 22 April 2016.

Measurement of variables

Outcome variable

In this survey, women were asked whether each of the following four factors was a problem in seeking medical advice or treatment when they were ill: obtaining permission to go to the doctor/health facility; obtaining money to pay for advice, consultation or treatment; distance to the health facility and not wanting to go alone. A new composite variable called 'problems in accessing healthcare' was then created based on the number of problems reported, with respondents reporting fewer or more problems placed in lower and higher categories, respectively. The categories were assigned as 1, 2, 3, 4, and 5 for women who reported 'no', 'one', 'two', 'three' and

'four' problems in accessing healthcare, respectively. These categories of a composite (outcome) variable were treated as ordinal numbers, with the assumption that conceptual differences between categories were identical.

Independent variables

Several independent variables that have been linked both empirically and theoretically with the accessibility of healthcare among women were included in the present study. The respondents were divided into groups according to age as follows: 15–19, 20–34 and 35–49 years. Women were grouped according to marital status as 'never married', 'married/living together' and 'divorced, separated or widowed.' Education level was classified as 'none', 'primary', 'secondary' and 'higher' (including college and all university levels). Employment in the last 12 months was grouped into 'not employed', 'employed for cash' and 'employed but paid-in-kind'. The area of residence was grouped into 'urban' and 'rural'. Possession of health insurance was grouped as 'no' for women who did not have any type of health insurance and 'yes' to those who had any type of health insurance. The wealth index was computed based on household assets and housing characteristics. During computation, the households were given scores based on the number and kinds of consumer goods they owned, ranging from a television to a bicycle or car, plus housing characteristics, such as the source of drinking water, toilet facilities and flooring materials. These scores were derived using principal component analysis. National wealth quintiles were compiled by assigning the household score to each usual (de jure) household member, ranking each person in the household by their score, and then dividing the distribution into five equal categories, each with 20% of the population, as 'poorest', 'poorer', 'middle,' 'richer' and 'richest'.⁶ The selection of these variables was based on previous studies.^{26–30}

Statistical approaches

In descriptive analyses, categorical variables were summarised using proportions and then presented in tables, while quantitative variables were summarised using the median and IQR.

As the outcome variable 'problems in accessing healthcare' was ordinal in nature (a score based on the number of different reported problems), in which the order of values corresponded to a hierarchy in meaning as in this study, the application of ordered logistic regression was recommended.³¹ Stata V.14 (StataCorp) was used for analysis in the present study. For all analyses, the Stata survey set commands were used to adjust for the variability of clustering and all the estimates were weighted to correct for non-responses and disproportionate sampling.

When assessing the associations between selected independent variables and the outcome variable, four models were tested for fit: a proportional ordered logistic model, a generalised ordered logistic regression model and a generalised ordered logistic regression model with and

without alternative parameterisation. The generalised ordered logistic regression model with alternative parameterisation was chosen as the best fit. This model allows some variables to be modelled with the proportional odds assumption while the parallel line constraint is relaxed for variables in which the assumption is not met. The model is less restrictive as it allows the coefficient of the variables to vary for the different categories that are compared.³² The model provides gamma coefficients that show the extent to which the parallel regression assumption is violated by the variable.

This study was based on an analysis of existing public domain survey data sets that are freely available online with all identifier information detached. The ICF IRB ensured that the survey complied with the US Department of Health and Human Services regulations for the protection of human subjects⁴⁵ Code of Federal Regulations Part 46 (45 CFR 46), while NIMR-IRB ensured that the surveys complied with the laws and norms of Tanzania. The participants were adequately informed about all relevant aspects of the survey, including its objective and interview procedures.

Patient and public involvement statement

Patients and the public were not involved in the analysis of this study.

RESULTS

Respondents' characteristics

As shown in [table 1](#), a total of 13 266 women between 15 and 49 years old were interviewed and included in the analysis. The median age (IQR) of the respondents was 27 (20–36) years. About 62% of the respondents were living with their spouse at the time of the interview. Less than 2% had attained the highest level of education (college or university). Nearly 2/3 were employed but paid-in-kind and 1/10 reported having any type of health insurance. Almost half of the respondents reported that obtaining money for healthcare was the major problem in accessing healthcare. Furthermore, about two-thirds of the respondents reported at least one of the four problems in accessing healthcare.

Partial generalised ordered logistic regression model with alternative gamma parameterisation

[Table 2](#) shows the results of the partially constrained generalised ordered logistic regression model with alternative (gamma) parameterisation for the outcome variable of problems in accessing healthcare. The results showed non-significant Wald test statistics, indicating that the model did not violate the proportional odds/parallel regression assumptions. However, constraints for parallel lines were not imposed for age, wealth status (richest) and marital status (divorced, separated or widowed). The remaining variables that met the parallel assumption can be interpreted in the same manner as for the ordered logistic regression model as follows. The odds

Table 1 Per cent distribution of women between the ages 15 and 49 years by selected background characteristics, Tanzania DHS-MIS 2015–2016 (n=13 266)

Variable	n (%) (weighted)
Age (median (IQR)=27) (20–36)	
15–19	2904 (21.89)
20–34	6360 (47.94)
35–49	4002 (30.17)
Marital status	
Never married	3353 (25.27)
Married/living together	8210 (61.89)
Divorced/separated/widowed	1703 (12.84)
Education	
None	1947 (14.67)
Primary	8211 (61.90)
Secondary	2925 (22.05)
Highest	183 (1.38)
Employed last 12 months	
Not employed	3033 (22.86)
Employed for cash	6197 (46.71)
Employed but paid-in-kind	4036 (30.43)
Residence	
Urban	4811 (36.27)
Rural	8455 (63.73)
Health insurance ownership	
Yes	12 066 (90.95)
No	1200 (9.05)
Health quintile	
Lowest	2246 (16.93)
Second	2274 (17.14)
Middle	2328 (17.55)
Fourth	2822 (21.27)
Highest	3596 (27.11)
Types of problems*	
Obtaining money	6565 (49.49)
Distance to facility	5615 (42.33)
Not want to go alone	3962 (29.87)
Obtaining permission	1900 (14.32)
No of problems in accessing healthcare	
None	4574 (34.48)
One problem	3291 (24.81)
Two problems	2547 (19.20)
Three problems	1759 (13.26)
Four problems	1095 (8.25)

*n and % do not add up to 13 266 and 100%, respectively, because multiple responses were possible.
DHS-MIS, Demographic and Health Survey and Malaria Indicator Survey.

of being in higher categories of problems in accessing healthcare versus lower or equal to a reference category were 0.622 (0.531–0.731) times lower for women who had health insurance than those who did not, given constant values for the other variables in the model. Furthermore, the odds of being in higher categories of problems in accessing healthcare versus less than or equal to a reference category were 1.220 (1.067–1.395) times higher for women who were employed but paid-in-kind than those who were unemployed for the last 12 months before the survey keeping the other variables constant in the model.

The variables for which constraints for parallel lines were not imposed were interpreted as follows: the coefficients for age and marital status (divorced, separated or widowed) were consistently positive, while those for wealth status (richest) were negative but decreased across the cut-points. Therefore, for each year of increase in age and being divorced, separated or widowed, women were more likely to report having a larger number of problems in accessing healthcare. The greatest differences were seen with increasing age and for those who were divorced, separated or widowed, women were less likely to report having few problems in accessing healthcare. In addition, the women in the richest economic group tended to be less likely to report having many problems in accessing healthcare than those in the poorest group, with the greatest differences because the richest women were less likely to report having many problems in accessing healthcare.

DISCUSSION

This study was performed to explore the factors associated with accumulation of multiple problems in accessing healthcare among women in Tanzania. To our knowledge, this is the first study to explore the factors associated with multiple problems in accessing healthcare. Furthermore, the study used a nationally representative sample from Tanzania with the application of generalised ordered logistic regression models, which provided the best models for ordinal data to validate the factors associated with problems in accessing healthcare. In the present study, about 65%, 40% and 20% of women reported 'one or more', 'two or more' and 'three or more' major problems in accessing healthcare, respectively. In addition, not having health insurance and low socioeconomic status as measured by wealth, education and employment status were associated with accumulation of multiple problems in accessing healthcare.

The high proportion of women reporting problems in accessing healthcare in this study was consistent with the findings of a previous study performed in Egypt.³³ These findings provide evidence that demand-side barriers, such as cost of care, permission from their spouse, lack of someone to escort to a healthcare facility and distance to the facility,^{34 35} still prevent many African women from accessing healthcare. Due to the cultural, social and traditional perceptions in Africa that maternal health is only the responsibility of women, existing and new interventions should influence health service utilisation to begin

Table 2 Generalised ordered logistic regression model with alternative gamma parameterisation, Tanzania DHS-MIS 2015–2016 (n=13266)

Variable	POR (95% CI)	P values
Beta		
Health insurance (ref: no)		
Yes	0.622 (0.531 to 0.731)	0.000
Residence (ref: urban)		
Rural	0.858 (0.728 to 1.012)	0.069
Age (continuous)	1.010 (1.001 to 1.017)	0.000
Marital status (ref: never married)		
Married/living together	0.901 (0.801 to 1.014)	0.085
Divorced/separated/widowed	1.418 (1.175 to 1.712)	0.000
Education (ref: none)		
Primary	0.883 (0.788 to 0.990)	0.033
Secondary	0.683 (0.582 to 0.800)	0.000
Highest	0.516 (0.360 to 0.741)	0.000
Wealth status (ref: poorest)		
Poorer	0.854 (0.726 to 1.006)	0.059
Middle	0.725 (0.626 to 0.840)	0.000
Richer	0.496 (0.417 to 0.590)	0.000
Richest	0.291 (0.233 to 0.364)	0.000
Employed last 12 months (ref: not employed)		
Employed for cash	0.975 (0.869 to 1.095)	0.668
Employed but paid-in-kind	1.220 (1.067 to 1.395)	0.004
Gamma_2		
Age	0.993 (0.989 to 0.998)	0.000
Wealth status (richest)	1.279 (1.140 to 1.435)	0.000
Marital status (divorced/separated/widowed)	0.814 (0.701 to 0.945)	0.007
Gamma_3		
Age	0.993 (0.986 to 0.999)	0.018
Wealth status (richest)	1.515 (1.265 to 1.814)	0.000
Marital status (divorced/separated/widowed)	0.749 (0.625 to 0.899)	0.002
Gamma_4		
Age	0.987 (0.978 to 0.996)	0.005
Wealth status (richest)	1.957 (1.508 to 2.540)	0.000
Marital status (divorced/separated/widowed)	0.566 (0.419 to 0.764)	0.000

Wald test of parallel lines assumption for the final model: $F(33, 517)=1.110$, $p=0.310$. A non-significant test statistic indicates that the final model does not violate the proportional odds/parallel lines assumption.

DHS-MIS, Demographic and Health Survey and Malaria Indicator Survey; POR, proportional OR.

at the individual, household and community levels to eliminate such demand-side barriers.^{21 36}

Having health insurance is an essential element for timely access to healthcare and better health-related outcomes.^{37 38} Despite the availability of the National Health Insurance Fund in Tanzania since 2001 through Act no. 8 of 1999, more than 90% of women are still uninsured.^{27 39} Less than 1/10 of the women in the present study reported having any type of health insurance. Moreover, the women who had health insurance were

less likely to report having multiple problems associated with access to healthcare. This may have been because having health insurance makes someone more comfortable with receiving a wide range of services and ensures a wider choice regarding where and when to obtain healthcare without being afraid of the costs as they are covered by insurance. Similar findings were reported in a study conducted Ghana.²⁶ The similarity in the findings between these studies may have been because both used secondary data collected by a DHS programme that

applied a similar methodology. Furthermore, the participants in these two studies were from SSA, and therefore may have similar socioeconomic determinants.

The present study indicated a strong association between being in the poorest class of the wealth index and accumulation of multiple problems in accessing healthcare among women in Tanzania. This finding may be explained by the fact that being in the poorest class requires individuals to spend their income on basic needs, such as food, and healthcare costs may therefore be less likely to be affordable.⁴⁰ Such women are therefore more likely to report having many problems in accessing healthcare, as reported in other studies conducted in SSA.^{41–43}

In contrast to our expectations, we found no significant association between unemployment and problems in accessing healthcare. However, this may have been because being employed is not enough to have full access to healthcare as there are other barriers preventing women from accessing healthcare, such as gender inequality, poor infrastructure and lack of knowledge regarding maternal health services.^{28 33 44} On the other hand, the results presented here indicated that women who are employed and receive wages in the form of payment-in-kind, such as food, clothes and other goods instead of cash, were likely to experience multiple problems in accessing healthcare.

The variables age, wealth status (richest) and marital status (divorced, separated or widowed) were found to vary for each category of the outcome variable. The findings indicated that the accumulation of multiple problems in accessing healthcare was associated with older age and being divorced, separated or widowed, consistent with the results of previous studies in other low-income countries.^{45 46} Older age is more likely to be accompanied by decreased working capability, and hence low income, being retired and uninsured.⁴⁷ As the risk of maternal complications increased with older age^{48 49} and living without a spouse reduced the chance of having an escort to the health facility, efforts and support should be made to provide such women with access to healthcare.

This study had some limitations, including the risk of misclassification bias, which may have been introduced due to the lack of external validation of self-reported information that could have affected categorisation of the outcome variable. However, we reduced this effect by categorising the outcome variable into five groups and the use of a generalised ordered logistics regression model that clearly validated the factors associated with problems in accessing healthcare among women in low-income countries. In addition, causality assumptions could not be made due to the cross-sectional nature of the study, and therefore, the results should be interpreted with caution.

CONCLUSION

The results of the present study provided evidence for additive effects of barriers to healthcare in low-income countries, such as Tanzania. Based on these results,

improving access to health insurance and addressing social determinants of health represent the first steps towards reducing problems associated with accessing healthcare for women in low-income countries.

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Contributors DB originated the design of the study, performed statistical analysis, interpretation and drafted the manuscript. KN contributed to the design of the study and the interpretation advice of data. KS contributed to interpretation advice of data and drafted the manuscript. Both DB, KN and KS critically revised the draft manuscript. All authors read and approved the final manuscript.

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Competing interests None declared.

Ethics approval The original TDHS-MIS protocols were reviewed by the Institutional Review Board (IRB) of ICF Macro at Calverton in the USA and by the National Institute of Medical Research (NIMR) IRB in Tanzania.

Provenance and peer review Not commissioned; externally peer reviewed.

Data sharing statement The datasets used for the current analysis were generated from the original survey of Tanzania DHS-MIS datasets available from within the DHS programme repository: <http://dhsprogram.com/data/available-datasets.cfm>.

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