ORIGINAL ARTICLE

Socioeconomic inequalities and determinants of health care utilization in Botswana: a decomposition analysis

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Abstract

Background In Botswana, healthcare services are more accessible to the more affluent, while healthcare benefits for the poor remain limited. The main aim of this study was to assess socioeconomic inequalities in health care utilization in Botswana.

Methods Using a multistage cross sectional design, 1178 male and female respondents aged 15 years and above were interviewed across three cities and towns, 15 urban villages and 15 rural villages. Health care utilization was measured using four indicators: health care needed, health care received, seeking health care for NCDs and use of health facilities. Multivariate analysis was performed using SPSS version 25, while decomposition of inequalities was carried out using ADePT (version 6). All comparisons were considered statistically significant at $p < 0.05$.

Results Concentration indices show that poor people did not seek health care when sick (CI = −0.0084), did not receive health care when they needed it (CI = –0.0175) and often used public health facilities (CI = –0.0531). On the other hand, seeking health care for NCDs was slightly concentrated among the non-poor (CI = 0.0465). All observed inequalities were small and overlapped with the line of inequality except for receiving health care in public health facilities. Education and wealth status were key contributing factors to inequalities for all health care utilization indicators.

Conclusion Findings from this study indicate the need for improvements in education and economic well-being of poor people in Botswana in order to close the inequality gap for health care utilization.

Keywords Inequalities · Health care utilization · Decomposition analysis · Botswana

Introduction

Governments worldwide are generally aware of the significance of access and utilization of health care services across various socioeconomic groups. The Sustainable Development Goals (SDGs) for health aims to ensure healthy lives and to promote the well-being for all at all ages. From the patients' perspective, the key target within the health goals is to achieve universal health coverage by 2030 (Chapman 2016).

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Consequently, the goal is to ensure universal access to health services. Generally, research evidence indicates that healthcare services are more accessible to the more affluent, while healthcare benefits for the poor remain regressive (Seccombe and Lockwood 2003; Marmo and Wilkinson 2006). This is despite the fact that the poor are usually faced with a heavier burden of diseases (Buxton and Kogan 2003; Gwatkin et al. 2007). Despite this recognition, there are limited studies in the field of medical and social sciences which examine the effect of socioeconomic inequalities on health care utilization, especially in resource constrained settings faced by the dual burden of non-communicable (NCDs) and communicable diseases (Chapman 2016).

As developing countries become increasingly advanced in the provision of public health systems, governments have simultaneously emphasized the importance of fairness in distribution of health care services (Azétsop and Ochieng 2015). Little available evidence in sub-Saharan Africa (SSA) indicates that mostly the poor people suffer inequalities in health care utilization (Azétsop and Ochieng 2015). For instance, in

Nigeria Onwujekwe and Uzochukwu (2005) examined socioeconomic and geographical inequalities in healthcare seeking, health expenditure and method of paying for health care and found that the poor and rural area dwellers were the major sufferers of inequalities. In rural Burkina Faso, Nikiema et al. (2008) evaluated the link between gender and access to health care and concluded that women suffer more delays in or exclusion from health care than men.

Makinen et al. (2000) found that richer groups were more likely to seek care than poorer groups. Using data drawn from eight developing countries (Kyrgyzstan, Thailand, Zambia, Kazakhstan, Guatemala, Burkina Faso, Paraguay, and South Africa), they found that in seven of these countries, individuals in the richest quintile had higher percentages of seeking care than those in the poorest quintile. The poor were seen to be more likely to use hospitals when ill, because hospitals are provided by the public sector and therefore are cheap or free. Overall, it has been found that for both developed and developing countries, utilization of health care services is pro-rich. Even at that, there is a paucity of evidence on inequalities in health care utilization in developing countries in the context of emerging burden of NCDs.

Even in cases where universal primary health care coverage is provided, utilization of healthcare services is often segregated by wealth status and education (Gwatkin et al. 2007). Botswana operates a universal primary healthcare system. There is little available evidence of studies explaining inequalities in health care utilization in Botswana. Consequently, information on inequalities in health care utilization would be vital in ascertaining how changes in wealth (especially at the group level) potentially affect health care utilization patterns and behaviour. This information would help to explain how variations in socioeconomic status (SES) explain health care utilization. In order to understand socioeconomic differences in health care utilization in the context of emerging burden of NCDs, this study aimed to assess socioeconomic inequalities in health care utilization in Botswana.

Methods

Data

The data for this study was derived from the survey on chronic non-communicable diseases in Botswana (NCD study) conducted in March 2016. The NCD study used multistage probability sampling design whereby census districts were divided into rural and urban clusters at the first step. At the second step, urban districts were divided into cities or towns and urban villages while rural clusters were maintained. Then from cities and towns, three were randomly selected, from the urban villages' strata 15 urban villages were randomly selected, while for rural areas strata 15 rural villages were randomly selected.

Enumeration areas were then selected using probability proportional to size sampling method for the different strata and localities. For each selected Enumeration Area (EA), 20 households were selected using systematic sampling method. This followed guidelines used in most demographic health surveys (DHS), where 20–25 households (HHS) are selected from the primary sampling units (PSUs) (Department of Economic and Social Affairs 2005).

The Kish grid was used to select eligible respondents from the selected households. Thus, once a household is selected, the interviewer created a sampling frame of all the persons in the household who were eligible for the interview. This frame included the name of the person, their gender, their relationship to the head of the household and their age. Once the listing was done, each eligible member was assigned a unique number. Then using a randomized response technique, a particular member was chosen for the interview. From an estimated initial sample size of 1280, only 1178 respondents successfully completed the individual questionnaire yielding a response rate of 92%. Details of the sampling procedure for the NCD study are available as an appendix with this submission.

Outcome variables

Four outcome variables were used to assess socioeconomic inequalities in health care utilization using Andersen's conceptual framework of healthcare utilization:

1. Health care needed—derived from a question asking respondents whether they needed health care in the past 12 months prior to the survey. The variable health care needed denotes health seeking behaviour which is commonly thought of as the ways in which people behave in relation to their health (Abera et al. 2017). This variable was dichotomized to 0, 1 values (0 → no and 1 → yes).
2. Health care received—derived from the question which sought to understand whether the respondent received health care the last time they needed it. Health care received can be thought of as the utilization of health-care services, which is an endpoint of the process of seeking care (Ward et al. 1997)[12]. This variable was also dichotomized to 0, 1 values (0 → no and 1 → yes).
3. Seeking health care for NCDs—derived and recoded from the question that sought to establish the main reason the respondent needed care, even if they did not get care. This variable was dichotomised to 0, 1 values (0 → no and 1 → yes).
4. Type of facility used—for type of facility, the variable was coded such that public facility = 1, private facility =

2 and the reference category was other health facilities (includes, traditional healer, pharmacy or dispensary).

Explanatory variables

Consistent with previous research (Xiao-Xiao et al. 2018), education and wealth status were used as socioeconomic indicators for this study. For education, a group containing lowest education level (no education, primary and secondary education) and a group containing highest education level (post-secondary education, tertiary and post-tertiary education) of the International Standard Classification of Education (ISCED) were distinguished. Wealth status was measured by a composite variable 'wealth index' because it stands out to be relatively the most appropriate measure of socioeconomic status in Botswana, compared to direct measures of wealth such as income, consumption or expenditure (World Health Organization 2011). The wealth index variable was created using the indicators of ownership of consumer durables, housing characteristics and access to public services. Respondents were asked questions on ownership of a range of durable assets during the survey (e.g. ownership of car, refrigerator and television,), housing characteristics (e.g. material of dwelling floor and roof, main cooking fuel), access to basic services (e.g. electricity supply, source of drinking water, sanitation facilities) and ownership of livestock (e.g. cattle, goats, sheep, horses, chickens). Moreover, information on land and livestock ownership was collected. Principal component analysis was used to derive the wealth index variable, which had five categories from the 1st to the 5th quintile (poorest to richest).

Sex, age, education, residence, marital status and work status were used as exposure variables because they were conceptualized to have an association with the outcome variables (Zere et al. 2011).

Data analysis

In order to assess determinants of health care utilization, two models were run. The first model uses logistic regression analysis to compare the lower education with the higher education group, while in the second model, the lower SES group was compared with the higher SES group controlling for other covariates. For each health care utilization variable, we tested if an interaction effect was present between wealth status and education level in the study population. This was done for each health care utilization variables by calculating the –2 log likelihood of a model with and without the interaction term. In order to address possible interaction between education and wealth several models were run, at first education was excluded while wealth status was included and then wealth status was excluded but education level variable included.

Then both variables were included in the model. Standard errors remained stable when adjusting for both groups of variables. Results were presented as adjusted odds ratios, together with their 95% confidence intervals.

In this study, we measured socioeconomic inequalities using ADePT software (version 6), and we derived inequalities using concentration curves and concentration indices. In calculating the cumulative percentages, wealth status was ranked from lowest to highest quintile. For any health care utilization which was equally distributed, the concentration curve would be running from the bottom left-hand corner to the top right-hand corner (a 45° line). On the other hand, if the share of health care utilization variable was low among the poor, the concentration curve would lie below the line of equality (Wagstaff and Van Doorslaer 2002; Wagstaff et al. 2011). The further the curve is from the diagonal, the greater the degree of inequality (Wagstaff et al. 2011). We defined the first case of socioeconomic inequality as the case in which individuals with high SES have a positive value of concentration index, while the second case, where the curve is above the diagonal line as socioeconomic inequality which disadvantages the individuals of lower SES and the value of the concentration index is negative (Regidor 2004).

Previous studies indicate that the concentration index is defined by the values which range between −1 to +1 and the index is 0 if there is no socioeconomic related inequality (Regidor 2004; Wagstaff et al. 2011). We used the achievement index together with the concentration index to reflect the average level of inequality in health care utilization between the poor and the non-poor. The achievement index is the weighted average of health care utilization of the various people in the sample, in which higher weights are attached to poorer people than to more affluent people and vice versa (Wagstaff and Van Doorslaer 2002). The larger value of the index is considered as higher health disachievment to one group of population than others group.

Results

Sample description

A total of 1178 respondents completed the NCD survey questionnaire. Out of this total, 813 (69.1%) were female and 364 (30.9%) were male (Table 1). The sample age distribution suggests a relatively young population, with more than half (59%) of the sample being less than 39 years of age. The majority (45.4%) resided in urban villages; follwed by cities and towns (30.2%) while the remaining proportion resided in rural settlements (24.5%). Almost three quarters (73.8%) of respondents reported that they were never married; over one third (35.5%) had primary education or less; over one quarter (27.2%) had junior secondary education while just under one

Table 1   Sample characteristics ($N = 1178$) NCD survey, 2016

Variable	Percentage (%)	Frequency (N)
Sex		
Male	30.9	364
Female	69.1	813
Missing		*1*
Age in years		
<24	26.4	270
25–34	29.5	302
35–44	19.2	196
45–54	12.7	130
55–64	7.3	75
65+ years	4.9	50
Missing		*155*
Locality type		
Cities/towns	30.2	355
Urban villages	45.4	534
Rural settlements	24.5	288
Missing		*1*
Marital status		
Never married	73.8	864
Currently married	17	199
Formerly married	9.2	108
Missing		*7*
Highest level of education attained		
Primary or less	35.5	410
Junior secondary	27.2	314
Senior secondary	17.3	200
Tertiary & over	19.9	230
Missing		*24*
Work Status in past 12 months		
Public Sector	10.5	122
Private sector	15.7	182
Self employed	11.2	130
Not employed	37.5	436
Homemaker–student	18.8	218
Retired–other	6.4	74
Missing		*16*
Wealth status		
Lowest	19.9	234
Second	20.1	237
Middle	19.9	235
Fourth	20.1	237
Highest	19.9	235
Missing		–
Overall		1178

fifth had senior secondary education (17.3%) and tertiary education (19.9%). Close to two fifths (37.5%) of respondents

were not employed; while over one quarter were employed in either the public (10.5%) or private sector (15.7%). Just over one in every ten (11.2%) were self-employed, while close to one fifth (18.8%) were either home makers or students; while under one tenth (6.4%) were retired from work.

Dimensions of health care utilization

Figure 1 gives health care utilization variables derived from the survey. It was found that 75.8% of respondents reported that they needed health care in the past 12 months prior to the survey. Of this proportion, 97% reported that they got health care the last time they needed it. A high proportion of the study participants reported that they have used public health facilities (87.4%) followed by private health facilities (11.4%) for health care, while a small proportion reported to use other facilities, including traditional health facilities (1.2%). A significant majority reported that they sought health care for other disease conditions (83.3%) rather than NCDs (16.7%).

Determinants of health care utilization

Educational inequalities were observed to exist for different indicators of health care utilization (Table 2). The odds of having needed health care when sick in the past 12 months were significantly lower for the low education group (AOR = 0.41, 95% C.I. =0.27–0.63) than the high education group. It was also found that the low education level group was less likely to report to have sought and received health care when they needed it (AOR = 0.62, 95% C.I. =0.54–0.69). The odds of seeking health care for NCDs than for other disease conditions were low among less educated respondents (AOR = 0.56, 95% C.I. =0.37–0.85). Considering the type of facility utilized, it was found that the odds of visiting a public health facility when sick or ill were significantly high among less educated people (AOR = 1.70, 95% C.I. =1.41–2.80). Contrarily, the odds of seeking health care in a private health facility were significantly low among the low education level respondents (AOR = 0.21, 95% C.I. 0.14–0.36).

Wealth status disparities were also observed for the dimensions of health care utilization (Table 3). It was found that the poor were less likely to have high odds of having needed health care in the past 12 months (AOR = 0.58, 95% C.I. =0.39–0.86) and they were less likely to have received health care the last time they needed health care (AOR = 0.69, 95% C.I. =0.61–0.78) than the non-poor. Moreover, the poor were less likely to have sought health care for NCDs (AOR = 0.33, 95% C.I. 0.11–0.99).

Inequalities in health care utilization

Figure 2 shows the concentration curves plotting the cumulative share of health care utilization against the

Fig. 1 Dimensions of health care utilization – NCD survey, 2016
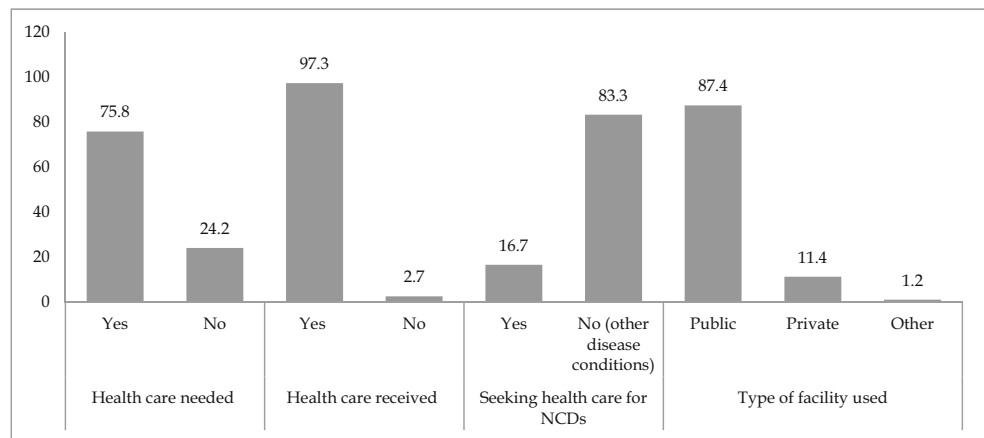
proportional cumulative SES of respondents. It can be observed from the concentration curves that receiving health care in a public health facility was more concentrated among the poor, while concentration curves for needing health care when sick/ill (health care needed), and receiving health care when needing it (health care received) almost overlaps with the line of inequality, indicating that the wealth-status related differences were small for these outcomes in favour of the non-poor. Seeking health care for NCDs was slightly under the line of inequality suggesting concentration among the non-poor.

Table 4 shows the concentration and achievement indices. The concentration index for receiving health care when one needed it was very low at 0.84%, implying small inequality in favour of the poor. This result corresponds with a high achievement index (96.4%). This is the same case for needing health care when sick/ill (1.75%), and having received health care in public health facility (5.31%) where the concentration index is negative, indicating concentration among the poor population. These correspond to high achievement indices implying that the concentration is skewed towards the poor. The concentration index of seeking health care for NCDs is small but positive (4.65%) implying slight concentration among the non-poor.

Decomposing inequalities in health care utilization

In the decomposition of the (small) concentration index for whether individuals received health care the last time they needed it, education level and wealth status dominate (Table 5). The same contributing factors dominate in the decomposition of the small concentration index for needing health care when sick/ill, seeking health care for NCDs and receiving health care in a public health facility. The regression errors for this decomposition analysis were low showing that the variables included in this analysis nearly fully explain observed inequalities in health care utilization.

Discussion

Socioeconomic inequalities were observed to exist for different indicators of health care utilization in this study. The odds of needing and seeking health care when sick were low among the poor and less educated individuals. The poor have been generally observed not to need and seek medical care even when ill or sick compared to the non-poor (Ahmed et al. 2000; Ghosh et al. 2013; Muriithi 2013). Based on the socioeconomic status of individuals, it is possible that two equally healthy individuals report different levels of health, act on their

Table 2 Odd ratios giving educational inequality on the dimensions of health care utilization in Botswana—NCD survey, 2016

Education	Health care needed AOR (95% CI)	Health care received AOR (95% CI)	Type of facility[†]		Reason for seeking health care AOR (95% CI)
			Private/no care AOR (95% CI)	Public/no care AOR (95% CI)	
Low	0.41** (0.27–0.63)	0.62 (0.54–0.69)**	0.21**(0.14–0.36)	1.70** (1.41–2.80)	0.56** (0.37–0.85)
High	1.00	1.00	1.00	1.00	1.00

Control variables used: sex, age, wealth status and residence. **Statistically significant at $P \leq 0.05$; †Multinomial model used, $N = 476$. Reference category = Other-health facilities

Table 3 Wealth status differences (poor vs non-poor) for health care utilization in Botswana—NCD survey, 2016

Wealth status	Health care needed AOR (95% CI)	Health care received AOR (95% CI)	Type of facility[†]		Seeking health care for NCDs AOR (95% CI)
			Private AOR (95% CI)	Public AOR (95% CI)	
Poor	0.58**(0.39–0.86)	0.69**(0.61–0.78)	0.16** (0.09–0.26)	1.60** (1.27–2.27)	0.33** (0.11–0.99)
Non-poor	1.00	1.00	1.00	1.00	1.00

Control variables used: sex, age, wealth status and residence **Statistically significant at 5%. †Multinomial model used; N = 476. Reference category = Other-health facilities

disease condition based on their conceptions of good health and their health expectations are contingent on their knowledge of disease (Van Kippersluis et al. 2011).

Socioeconomic differences observed in this study can also be explained by differences in conceptions of health, the need for medical attention, knowledge about health seeking and ultimately utilization of health services. The poor and less educated people in Botswana have poor health seeking behaviour such that even when ill they are less likely to seek health care (Langeni 2007). In cases where they seek health care, the condescending attitude of health workers may impede them from accessing health care (Ministry of Health and Wellness 2011).

Poor and less educated people were found to be less likely to seek health care for NCDs. This observation is expected in Botswana because people with low SES remain more susceptible to infectious diseases than NCDs (WHO 2008, 2014). Similarly, in other LMICs, infectious diseases have a higher prevalence among the poor and they are the main reason why poor people seek medical help (Myer et al. 2004; Awoyemi et al. 2011). However, while this remains largely the case, the increasing complexity of health problems is likely to lead to infectious diseases also occurring among individuals that are non-poor. Similarly, chronic diseases previously thought to be most prevalent among the non-poor are also likely to occur among the poor in the long run.

It was found that the poor and less educated people were likely to use public health facilities when sick or ill. Choice of health care provider and type of health facility to visit when sick is often determined by affordability and geographical accessibility, with the latter being the key determinant (Awoyemi et al. 2011). In Botswana, public health facilities are accessed freely and have geographical accessibility (Ministry of Health and Wellness 2011) and are therefore affordable to the poor.
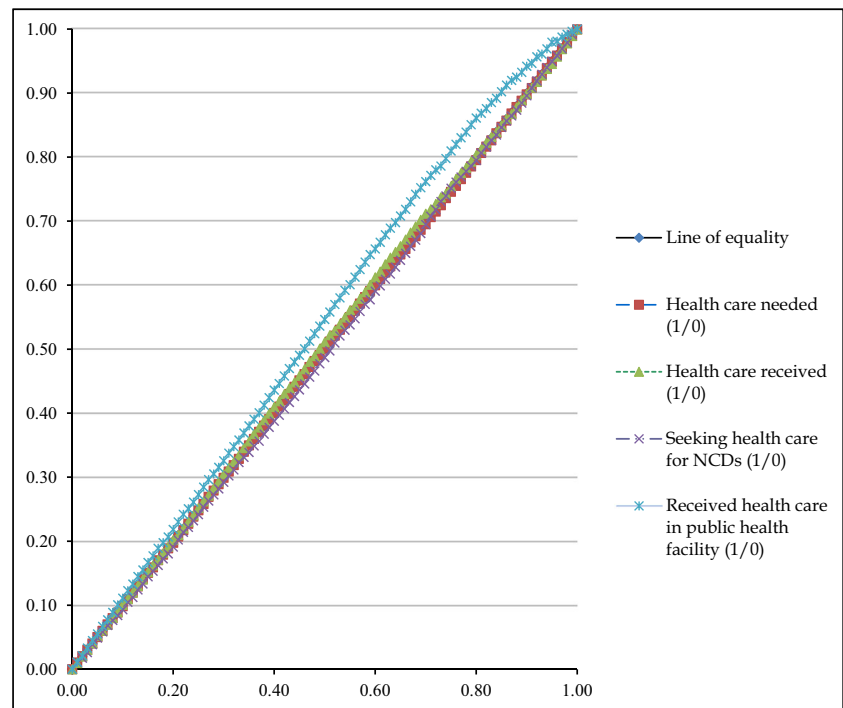
Fig. 2 Concentration curves for health care utilization in Botswana—NCD survey, 2016

Table 4 Inequalities in health care utilization in Botswana–NCD survey, 2016

Health care utilization variables	Concentration index (CI)	95% Confidence interval	Standard Achievement Index
Health care received	−0.0084	−0.1234, −0.0123	0.9645
Health care needed	−0.0175	−0.1923, −0.0219	0.8821
Seeking health care for NCDs	0.0465	0.0211, 0.744	1.8983
Received health care in a public health facility	−0.0531	−0.345, −0.0945	0.9110

Conversely, private health facilities are accessed through medical insurance or out-of-pocket payment for health care services which people of low SES cannot afford. Moreover, private health facilities are often found in urban areas and are accessed by people of high SES. Similar observations have been made elsewhere. In Kogi State, Nigeria, poor people prefer public facilities compared to private facilities on account of cost of accessing health services (Awoyemi et al. 2011). Cost was suggested as a major factor for utilization of public facilities. Similarly, it is plausible to postulate that the choice of public health facilities over private facilities among the poor in Botswana is cost.

Decomposition analysis results indicated that education and wealth status seem to be positive contributors to the concentration indices of the four health care utilization outcomes used. This means that inequalities in education and wealth status make positive health care utilization behaviours less predominant among poor individuals. Other studies have also shown similar results and the explanation offered is that lack of knowledge about disease, lack of income and poor wealth status discourages poor people to seek health care even when ill. The human capital of knowledge and education is vital as shown in the relative contribution of standardizing variables to inequalities. Thus, it can be argued that the inequitable distribution of health care utilization variables to the disadvantage of the poor is not only a matter of wealth status but also education.

Strengths and limitations

The main strength of our study is that it uses data collected from a large and randomly selected sample of respondents. The data for the NCD study contained information on potential confounding factors, with a low proportion of missing information making the study more comparable. The main limitation is that a cross-sectional design was used, meaning that it was not possible to establish the causal relationship between explanatory variables and health care utilization outcomes. Furthermore, the NCDs study sample was not designed such that it was to be representative of the whole of Botswana. However, the findings of this study give an indication of health care utilization patterns in Botswana.

Conclusion

In conclusion, the propensity of needing and receiving health care when ill was very low among poor people with low education level. The poor were also found to seek health care for diseases other than NCD conditions and often they utilized public health facilities rather than private health facilities when ill or sick. Low education level and poor wealth status were found to be key contributing factors to inequalities for the selected health care utilization indicators. Given that the poor are the most disadvantaged, there is need for improvements in education and economic well-being of poor people in

Table 5 Concentration indices of the covariates

Standardizing (need variables)	Health care needed	Health care received Coef	Seeking health care for NCDs Coef	Received health care in public health facility Coef
Wealth status	0.2610	0.2593	0.2671	0.2681
Education	0.1202	0.1274	0.1246	0.1198
Residence	−0.0575	−0.0603	−0.0609	−0.0482
Work status	0.0213	0.0173	0.0153	0.0159
Control variable				
Age	0.0038	−0.0028	0.0108	0.0076

Botswana in order to close the inequality gap for health care utilization.

Declarations

Conflict of interest   The authors declare that they have no conflict of interest.

Ethics approval   Before the NCDs study was conducted, the proposal, along with the survey instruments, were submitted to and approved by the Institutional Review Board of the University of Botswana (Ref #: UBR/RES/IRB/1583) for ethical clearance. After clearance by the University, ethical clearance and a research permit were also obtained from the Ministry of Health and Wellness (Ref #: HPDME: 13/18/1 Vol. X (130). Informed written consent was sought from all eligible participants before they could be interviewed. Privacy and confidentiality of the highest standard were maintained throughout the study by keeping the respondents and their data anonymous.

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