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Multi-Level Analysis of Health Care Demand in Uganda: Empirical Evidence from the National Household Survey – 2016/17

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Abstract

This study examines determinants of health-care demand in Uganda, by estimating mixed-effects logistic regressions using data from the Uganda National Household Survey (UNHS) - 2016/17. The study firstly compares the 2012/13 and 2016/17 UNHS data and finds that the demand for health care in Uganda has decreased, except for the sub-regions of Busoga, Central I, and Kigezi. Secondly, the results from a mixed-effects regression on the entire sample show that health-care demand at an individual level is associated with individual's age, smoking habits, and non-communicable disease (NCD) status, whereas household size and poverty status determine health-care demand at the household level. Running separate models for each region to investigate regional peculiarities, the results show disparities in health-care demand among regions in Uganda. Therefore, to improve efficacy and health-care seeking behaviours of Ugandans, policies should recognize and be tailored to address individual, household as well as regional peculiarities.

Keywords*:* demand, health care, mixed-effects logit

JEL Codes: A10, I11, I19

1. Introduction

Health care is the maintenance of health via prevention, diagnosis and treatment of disease, injury and other human physical and mental impairments in human beings. The fundamental purpose of health care is to enhance the quality of life through enhancing health. Thriving economies have been seen to put greater emphasis on health care, for example, the World Health Organization (WHO) has consistently commended France on its health care system. France has a Gross Domestic Product (GDP) of about USD 2.8 trillion (WHO, 2019). An efficient and reliable health-care system is a critical factor in establishing a good economy (Cylus et al., 2018). Hence, an economy would be at risk without a reliable access to health care.

Health care demand is a derived demand from the demand for health (Santerre & Neun, 2010) and consumers demand for health care to increase their stock of health capital (Grossman. 1972). One of the main purposes of analysing health-care demand is to identify influential factors that determine an individual's health-care seeking behaviour. Health-care seeking behaviour is defined as a "sequence of remedial actions that an individual undertakes to rectify perceived ill health" (Bhuiya, 2009). Furthermore, health care, as an input into the production of health, is valued only when it has a positive marginal product.

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The vision of the Uganda's health sector is to have a healthy and productive population that contributes to economic growth and national development (MoH, 2018). In addition, the 2030 Agenda provides an opportunity to build better systems for health by strengthening the systems to achieve universal health coverage, and by recognizing that health depends upon, and in turn supports, productivity in other key sectors, such as agriculture, education, employment, energy, and environment (WHO, 2017). However, Uganda's health budget is still low, despite the government's pledge to increase it. For instance, in the 2017/2018 budget, the government allocated only 6.4% of its total national budget to the health sector. Generally, Uganda's health budget allocations are always less than 10%, which is far less than the 15% Abuja Declaration requirement (MoH, 2018).

The Poverty Participatory Assessment Project (PPAP) postulates that ill health is a major cause and consequence of poverty. An increase in poverty levels from 19.7% in 2013 to 21.4% in 2017 coupled with increase in income inequality in all regions of Uganda hindered people's health-care seeking behaviour (UBOS, 2018). In addition, Uganda's health indicators are worse than of most African countries, due to an inefficient service delivery system (MoH, 2018). Even without user fees in public health facilities, the government has not succeeded at ensuring equal access to health care. People still face non-monetary costs, such as travel time and long distances, among others. In this regard, about 14% of Ugandans that fell sick reported not to have sought health care because health facilities were very far (UBOS, 2018).

Good health is a major target of all households and governments in all countries. Globally, governments through the relevant ministries of health undertake responsibilities such as formulating overall health policies, regulating activities of health institutions and related agencies and acting as a channel for sectoral financing (Berman et al., 2014). However, the decision to seek health care by an individual is dependent on what matters to them most; these issues include, for example, cost considerations, age, location, and infrastructure availability, among others. Provision of affordable health services in hospitals within these systems often determines their sustainability and appreciation by patients. Thus, in a perfect world, health care would be universal in terms of physical coverage, affordability, accessibility, and equity.

The study compares the 2012/13 UNHS and 2016/17 UNHS data and finds that many sub regions of Uganda, with the exception of Busoga, Central 1 and Kigezi, experienced reductions in the health-care seeking behaviour of Ugandans between the two periods. For instance, reductions in Bukedi, Bugishu and Karamoja sub regions were, 85% to 60%, 83% to 65%, and 91% to 74%, respectively. Furthermore, the health-care seeking behaviour was high in the sub-regions of Central I (90%), Busoga (93%), and Kigezi (88%). On the other hand, the behaviour was low in Karamoja (74%), Elgon (65%) and Bukedi (60%) (UBOS, 2018). This finding indicates that despite the health sector goal to move towards universal health coverage, there still exists regional disparities in the healthcare seeking behaviour of Ugandans.

To date, no consensus has emerged on the forces causing these health-care seeking variations and regional disparities. Yet, health is one of the most important aspects of livelihood. In this regard, this study sought to examine the forces that have caused the regional disparities in healthcare demand. To this end, the study used the latest UNHS data at individual and household levels to get the most recent evidence. In addition, the study incorporates the emerging issue of non-communicable diseases (NCD) and individual lifestyle factors in examining the determinants of health-care demand in Uganda. Specifically, the study has examined the determinants of health-care demand at individual and household levels in Uganda, as well as investigated the region-specific determinants of health-care demand. The study found health-care demand at an individual level to be associated with individual's age, smoking habits, and NCD status, and by household size and poverty status at the household level. In addition, the results show disparities in health-care demand among regions in Uganda.

2. Literature Review

2.1 Conceptual Framework

This section reviews the theory of demand for health by Grossman (1972), the utility maximization theory by Acton (1975), and the behavioural model of health-care utilization by Andersen (1995). Andersen's (1995) theory is preferred over Grossman's and Acton's mainly because it suggests that health seeking behaviour of individuals is a function of three categories of factors – predisposing, enabling and need factors, which neither Grossman (1972) nor Acton (1975) considered. Hence, this study adopts Andersen's behavioural model of health-care demand.

Actual utilization is initiated by need, which may result from an illness. In turn, need determines the demand for health care, thereby resulting in the utilization of care. This study adopts and modifies a conceptual framework based on Andersen's behavioural model of utilization of health care services, as depicted in Figure 1.1.

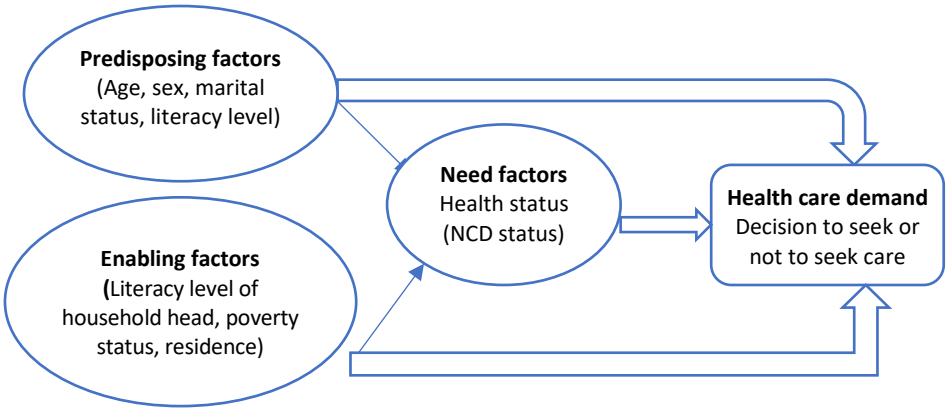

Figure 1: ***Conceptual Framework for Health Care Demand***
Source: Adapted from Andersen (1995)

2.2 Theories of Health Care Demand

Different theories have been put forward to explain why people demand health and health care. They include but not limited to the theory of demand for health by Grossman (1972) and Acton's (1975) utility maximization theory. Grossman (1972) was the first study to discuss the idea that health is not a direct good but a derived one, whereby people demand health for consumption and investment purposes. As a consumption good, health care enters directly into a consumer's utility function. Grossman (1972) highlights further that, an individual inherits an initial stock of health, which depreciates with age but can be restored by investment. Therefore, an individual has to demand health care in order to increase his or her initial stock of health as long as the marginal cost of investment in health is lower than the marginal rate of return.

The individual is assumed to derive utility from consumption of both health goods and non-health goods. Thus, utility can be specified as a function of the quantity of medical care. However, as emphasized by Mosadeghrad (2014), socio-demographic variables such as age, race, education, social class and health status as well as attitudes, and behaviours such as mood, actions and cooperation may have an influence on the level of the utilization of medical services, either positively or negatively.

In his utility maximization theory, Acton (1975) modelled medical services m and a composite good X (other goods and services) as constituting the two goods in the model. The theory concentrated on the role of money prices, time prices, as well as earned and non-earned income. The theory made major predictions that non-monetary factors, such as travel distance, function as prices in discouraging health-care demand. Acton highlighted a number of implications for public policy, which included the possibility of substituting income maintenance for direct provision or medical insurance.

According to Andersen (1995), healthcare utilization is a function of three categories of factors; predisposing, enabling, and need factors. Unlike Grossman (1972) and Acton (1975), Andersen's model also emphasizes a public health approach of prevention where personal health choices such as smoking, drug use, and diet, among others, are considered as determinants of health outcomes. Another reason for adopting Andersen's healthcare utilization model over the models by Grossman (1972) and Acton (1975) is that the relationships depicted in the conceptual framework can be used to determine the directionality of health-care demand, following a change in an individual's characteristics. In this regard, the Andersen's (1995) model guided us in selecting and grouping the independent variables for this study.

2.3 Empirical Literature

The health care individuals receive is a function of the demographic, social and economic characteristics of the environment in which an individual lives (Andersen, 1995). Whitehead (1991) argues further that certain barriers, such as financial, organizational, linguistic and cultural, control people wanting to use health services so that, even though they may have a right to health care in theory,

their actions may be restricted in practice. The number of GP (General Practitioner) and/or specialist visits has been used in various countries to assess access to health care utilization (Van Doorslaer et al., 2006). In the case of Uganda, where the GP system is not used, lists (and other related records) of patients that access any health care centre (public or private) to consult health workers are used as proxies.

2.3.1Individual Level Factors

Age is one of the factors that influences health-care demand at individual level. With regard to age, Ali and Noman (2013) have argued that age is negatively related to demand for health care of a patient because the marginal benefit of investment into health decreases with age. They found that elderly persons were less likely to seek health care than young people were. Other studies have considered sex to be an important determinant of health-care demand. In their study of the influence of gender and other patient characteristics on health-care seeking behaviour in Canada, Thompson et al (2016) found that there were gender differences in the health-care seeking behaviour, with women reporting more visits to their primary care providers than men – for both physical and mental health concerns. However, Currie and Wiesenberg (2003) argue that women are generally less likely to identify disease symptoms, and feel more restricted in access to health care facilities. They account this observation to the relatively lower social value placed on women by culture, as well as their defined social roles, which make it cumbersome for them to visit health care facilities during the day, when the facilities are open.

With regard to marital status, single women can be more autonomous and therefore visit health facilities more often than married women do. However, single women may have lower budgets for health care. Gabrysch and Campbell (2009) looked separately at women in a monogamous marriage, a polygamous marriage, and the never-married and formerly married women in six African countries. They found the results to vary from showing no association (for Tanzania, Ghana, and Burkina Faso) to monogamous women seeking care more often than the rest of the other groups (for Ivory Coast and Kenya). Kone et al (2013) found that the region where a community is located is significantly associated with the use of health care. Similarly, Van der Hoeven, Kruger, and Greeff (2012) found that urban people are more likely to demand for health care than their rural counterparts, possibly because they have more health care options and better access to health services.

According to Odwee, Okurut and Adebua (2006), the general education level makes a community more sensitive to seeking proper diagnosis and treatment from a qualified medical staff for any disease, hence having a positive demand effect for health care. On the other hand, high educational levels among households always enable such households to practice good primary health preventive measures (such as boiling drinking water, maintaining good hygiene, and eating a balanced diet). Lungu, Darker and Biesma (2020) postulate that, improving access to health services, for example, for children under-five years is multifaceted and thus requires considering multiple factors.

Health status is the most important factor associated with increased health-care demand. Evidence shows that a poor health status of a population directly results in increased health-care demand of all types – clinic visits, physician visits, and hospitalization (Anderson, 1973; Hershey et al., 1975; Muller, 1986). Smoking habits as a lifestyle factor, which directly affects the health status of an individual, influences health care demand in that regard (Selivanova & Cramm, 2014). In addition, alcohol consumption has been found to also influence the demand for health care (Zarkin, Bray, Babor, and Higgins-Biddle, 2004). Noteworthy, Armstrong, Midanik, and Klatsky (1998) emphasize the importance of understanding the relationship between alcohol use patterns and health care demand for policy makers. They argue that the heaviest drinkers (as measured by weekly consumption after adjusting for age and race), have fewer hospital days, fewer hospitalization and fewer outpatient visits. Furthermore, NCDs which is an emerging issue in low- and middle- income countries like Uganda, pose a heavy financial burden on both individuals and households (Mpuuga, Yawe & Muwanga, 2020). NCDs influence demand for health care by increasing health care utilization as well as health care expenditure among people suffering from such diseases (Kankeu, Saksena, Xu & Evans, 2013; Lee et al., 2015).

2.3.2 Household Level Factors

Individuals from male-headed households have been found to be more likely to seek care from any formal health-care provider than their counterparts from female-headed households (Ssewanyana, Nabyonga, Kasirye & Lawson, 2004). The reasons for this result range from affordability (financial ability) to literacy. The authors further argue that price and income elasticities (in absolute terms) fall with increases in income levels, whereby poor households are more sensitive to price and income changes than richer households are. Although household perceptions of quality are an important determinant of health-care seeking behaviour, patients are often unable to gauge the competence of doctors (Fe, Powell-Jackson & Yip, 2020).

Household size is another factor that determines household's demand for health care. According to Ching (1992), the size of the family significantly determines the demand for health care – the bigger the family size, the higher the demand for health care. In a bid to understand health care use among the urban poor in Africa, Kone et al (2013) use a multi-level model and conclude that the poverty status of the household affects health care in many ways. They unearth the relationship between household wealth and first-line recourse to a consultation – rich people use modern health care more frequently than poor people in response to a health problem. This result is consistent with the finding in the literature on health-care demand in low-income countries by Akin, Guilkey, and Hazel (1995) as well as Franckel and Lalou (2009).

Most of the studies on demand for healthcare in Uganda, for example, Ssewanyana et al., (2004) and Odwee et al., (2006), focused on only demographic and socioeconomic factors. None of the studies examined the effect of behavioural

factors on health-care demand, even when studies from other countries such as Jahangir, Irazola, and Rubinstein (2012) argue that behavioural factors are greatly associated with health-care demand. This study therefore, has attempted to fill this gap by incorporating behavioural or lifestyle factors among the factors that affect health-care demand in Uganda. Modifiable human behaviours that influence health and health outcomes include smoking, alcohol indulgence, diet, and physical activity (Cawley & Ruhm, 2011), among others. This study has incorporated lifestyle factors, such as alcohol consumption and smoking habits, as captured in the UNHS 2016/2017. The study also incorporates the globally and nationally emerging issue of non-communicable diseases, which has hitherto not attracted researchers' attention in Uganda.

Furthermore, most of the aforementioned studies concentrated mainly on where the individuals sought care, for example whether to visit private or public facilities. They did not examine the initial decision of whether to seek healthcare or not to and what really determines this decision. Because the decision is either to seek or not to seek healthcare, this study has empirically analysed the determinants of healthcare demand using the mixed-effects logistic regression model other than the nested multinomial logit, as applied by most of the reviewed studies.

3. Methodology

3.1 Model Specification and Estimation

In order to examine the factors that determine health-care demand, we estimate a mixed-effects logit model. The factors are classified into two levels, namely, individual and household levels. The dependent variable (demand for health care) was measured by whether the individual sought health care or not during the event of an illness. In the UNHS 2016/2017, individuals were asked whether a health-care provider (a doctor, nurse, pharmacist or traditional healer) was consulted in the event of an illness during the last 30 days. Thus, the dependent variable is binary in nature. The analysis is however conditional to only those who fell sick during the last 30 days at the time of the survey.

$Level\ 1$ ..... Individual factors
$Level\ 2$ ..... Household factors

$$y_{ij} = \begin{cases} 1 & \text{if individual sought care in the event of an illness} \\ 0 & \text{if individual did not seek care in the event of an illness} \end{cases}$$

Level 1 model:

$$ln\left(\frac{p}{1-p}\right) = Z_{ij}\beta_j \qquad (3.1)$$

Level 2 model:

$$\beta_{jkl} = A_j\beta + b_j \qquad (3.2)$$

Substituting (3.2) into (3.1)

$$ln\left(\frac{p}{1-p}\right) = Z_{ij}A_j\beta + Z_{ij}b_j$$

But $Z_{ij}A_j = X_{ij}$

$$ln\left(\frac{p}{1-p}\right) = X_{ij}\beta + Z_{ij}b_j$$

Where,

Z_{ij} are the characteristics of an individual
A_j are the characteristics of a household

Since the outcome variable is binary (dichotomous) in nature, the mixed effects logit model was adopted for this study. The Linear Probability Model (LPM) could not be applied because it is always heteroskedastic, and its simplistic assumption of linearity, which cannot apply to a dichotomous variable of health-care demand confirmed its inappropriateness in this regard. The LPM was also inconvenient because the predicted probabilities could lie outside the [0 1] interval. The mixed logit and probit models give qualitatively similar results. However, the mixed logit model was adopted for this study over the probit model due to its comparative mathematical simplicity and its provision of the odds ratios (Gujarati and Porter, 2009). The mixed effects logit model is given by;

$$ln\left(\frac{p}{1-p}\right) = X_{ij}\beta + Z_{ij}b_j \qquad (3.3)$$

Where;

X_{ij} is the matrix of individual and household level characteristics
$Z_{ij}b_j$ is the variance at household level
p is the probability of seeking care

3.2 Data

The study utilized secondary data from the most recent Uganda National Household Survey of 2016/2017. The UNHS is the sixth in a series of national household surveys undertaken by the Uganda Bureau of Statistics (UBOS). The survey collected data on four modules, namely, socio-economic, labour force, community and market price modules covering all the 112 districts of Uganda. The data were collected from a nationally representative sample by UBOS, using a two-stage stratified design. The survey targeted to interview 10 households per Enumeration Area. This implies that the sample encompassed 17,540 households. The data were used because they are representative, easily accessible and available, in addition to being the most recent household survey.

In Table 1, we present a detailed description of the variables used for this study. The explanatory variables were categorized into two levels, which are the individual and household levels (see Appendix for descriptive statistics).

Table 1: Description of Variables

Variable	Definition	Coding	Type	E-Sign*
Dependent variable HCD	Health Care Demand	0–Did not seek care 1–Sought care	Binary	
Explanatory variables at individual level				
Age	Age of respondent	0–Children 1–Youth 2–Adults 3–Elderly	ordinal	+
Sex	Sex of respondent	1–Male 2–Female	binary	+/-
Marital status	Marital status of respondent	1–Married 2–Divorced/Separated 3–Widow/Widower 4–Never married	Nominal	+/-
Region	Region of respondent	1–Central 2–Eastern 3–Northern 4–Western	Nominal	+/-
Residence	Place of residence	0–Rural 1–Urban	Binary	+/-
Literacy level	Literacy level of respondent	1–Unable to read and write 2–able to read or write or both	Binary	+
Health status	Health status of respondent	1–suffered illness/injury 2–did not suffer any illness/injury	Binary	-
Smoking habit	Smoking habit of respondent	1–smoker 2–non-smoker	Binary	+
Alcohol consumption	Alcohol consumption of respondent	1–consumer 2–non-consumer	Binary	+
Drug use	Drug use	1–Yes 2–No	Binary	+
NCD	NCD status	0–Has no NCD 1–Has NCD	binary	+
Explanatory variables at household level				
Health expenditure	Household health expenditure		continuous	+
Household size	Household size		continuous	+
Poverty status	Household poverty status	0–non-poor 1–poor	binary	-

*E-Sign is expected sign

4. Empirical Results

We carried out statistical diagnostic tests in order to study the behaviour of the data. A multicollinearity test was carried out to find out if multiple independent variables have a high correlation between each other. Correlation coefficients can tell whether there is a linear relationship between two variables, whereby if the correlation coefficient is above 0.7 there is a strong correlation. However, for this study we use the Variance Inflation Factor (VIF) and pairwise correlation to test for multicollinearity. All variables were below thresholds of 10 and 0.7 for the VIF and pairwise correlation, respectively. To ascertain normality of the variables, we carried out monotone transformations such as logging to variables that were not normally distributed (see Loghousehold health expenditure).

4.1 Individual Level Determinants of Health-care Demand

The results with respect to determinants of healthcare at individual level are summarized in Table 2. Marital status was found to be significantly related to the demand for healthcare at 5% level of significance for individuals who have never been married (OR=0.610, 95% CI=0.47–0.80). Individuals who have never been married are 0.6 times less likely to seek health care relative to the married ones. The results further indicate that literacy is positively related to the demand for health care at 5% significance level (OR=1.534, 95% CI=1.29–1.82). These result indicate that individuals who are able to read or write or do both, are almost twice more likely to demand for health care in the event of an illness compared to individuals who are unable to read and write.

Table 2: Mixed-Effects Logistic Regression for the Determinants of Health Care Demand

Variables	Health Care Demand (OR)	95% CI
Age: Children (0–17years) (Ref)		
Youth (18–30 years)	0.942	0.73–1.22
Adults (31–60 years)	0.717**	0.52–0.99
Elderly (above 60 years)	0.365**	0.25–0.54
Sex: Male (Ref)		
Female	1.147	0.98–1.34
Marital status: Married (Ref)		
Divorced / separated	0.816	0.61–1.09
Widow / widower	0.912	0.68–1.23
Never married	0.610**	0.47–0.80
Region: Central (Ref)		
Eastern	1.147	0.90–1.46
Northern	0.959	0.76-1.21
Western	0.881	0.68–1.14
Residence: Rural (Ref)		
Urban	1.117	0.92–1.35
Literacy level: Unable to read & write(Ref)		
Able to read or write or both	1.534**	1.29–1.82
Smoking habits: Smoker (Ref)		
Non-smoker	1.439**	1.09–1.89
Alcohol consumption: Yes (Ref)		
No	1.006	0.82–1.24
NCD status: No NCD (Ref)		
Has NCD	1.386**	1.08–1.78
Loghousehold health expenditure	1.582**	1.48–1.69
Household size	1.052**	1.02–1.09
Household poverty status: Non-poor (Ref)		
Poor	0.777**	0.64–0.95
Constant	0.130**	

Note: ***, **, * implies significance at **1%**, **5%**, &**10%**, respectively; **OR** indicates the Odds Ratio and, **Ref** indicates the reference category for the categorical variables

With regard to smoking, the results showed that smoking habits are statistically significant; that is to say, individuals who do not smoke are 1.4 times more likely to demand for health care in the event of an illness compared to individuals who smoke (OR=1.439, 95% CI=1.09–1.89). Similarly, the NCD status has a significant effect on the demand for health care (OR=1.386, 95% CI=1.08–1.78), which implies that individuals suffering from a Non-Communicable Disease are more likely to demand for health care than individuals who are not suffering from any Non-Communicable Disease.

Age, marital status, literacy level, smoking habits and NCD status are all statistically significant, whereas region of residence, residence (rural or urban) and alcohol consumption are not statistically significant. The results also show that the age of an individual has a significant impact on his/her demand for health care at 5% level of significance. In this regard, adults aged 31–60 years are less likely to seek health care compared to children aged 0–17 years. In addition, the elderly, aged above 60, are also less likely to seek health care compared to the children.

4.2 Household level determinants of health care demand

The results of household level determinants of health-care demand, as summarized in Table 2, indicate that household health expenditure, household size and the poverty status of the household are all statistically significant. Specifically, household health expenditure has a very significant impact on the demand for health care at 5% level of significance (OR=1.582, 95% CI=1.48–1.69). This means that for instance, during the month, households that spent more on health care were more likely to demand for more health care. The results further indicate that, households with many household members are more likely to seek care during an illness, whereas, the poor are less likely to demand for health care in the event of an illness compared to the non-poor (OR=0.777, 95%CI=0.64, 0.95).

4.3 Determinants of Health Care Demand by Region

To examine regional differences in the demand for health care, we ran a regression for every one of the four regions of Uganda (i.e. Central, Eastern, Northern and Western) to further understand which variables are more important for a particular region, the results of which are presented in Table 3.

4.3.1 Central Region

Results in Table 3 indicate that in the central region, the significant variables are age, marital status, literacy level, smoking habits, NCD status and monthly household health expenditure. Elderly individuals from the central region are less likely to seek health care compared to the children (OR=0.079). In addition, the results show that individuals in the Central region who have never been married are less likely to seek health care compared to their married counterparts (OR=0.449), as was found to be the case for the whole country.

With regard to literacy, the literacy level has a significant impact on demand for health care among individuals residing in the Central region at 1% level of

significance. However, it is not so for the Eastern and Western regions. Literacy is higher in the Central region than in other regions, which may partly explain why it is significant in that region only. Particularly, in the Central region, individuals who are able to read or write or do both are twice more likely to demand for health care compared to individuals who are unable to read and write (OR=2.217).

Table 3: Mixed-effects Logistic Regression for the Determinants of Health Care Demand by Region

Variables	Central OR	Eastern OR	Northern OR	Western OR
Age: Children (Ref)				
Youth	0.742	0.588*	1.229	1.201
Adults	0.677	0.530*	0.711	0.994
Elderly	0.079***	0.309***	0.505**	0.452*
Sex: Male (Ref)				
Female	0.729	1.305	1.294*	1.015
Marital status: Married (Ref)				
Divorced / separated	0.795	0.946	0.641*	0.891
Widow / widower	0.851	0.956	1.009	0.716
Never married	0.449**	0.485**	0.601**	0.866
Residence: Rural (Ref)				
Urban	0.821	1.133	1.407**	1.121
Literacy level: Unable to read &write (Ref)				
Able to read or write or both	2.217***	1.333	1.736***	1.286
Smoking habit: Smoker (Ref)				
Non-smoker	3.904**	1.346	1.172	1.353
Alcohol consumption: Consumer(Ref)				
Non-consumer	0.691	0.781	1.415**	0.812
NCD: No NCD (Ref)				
Has NCD	2.239*	2.147***	1.406	0.704
Loghousehold Health Expenditure	1.651***	1.691***	1.427***	2.061***
Household size	1.081	1.082**	1.039	1.028
Household poverty status: Non-poor (Ref)				
Poor	0.663	0.647*	0.792	1.129
Constant	0.591	0.273	0.172***	0.0113***

Notes: ***, **, * implies significance at 1%, 5%, &10%, respectively; **OR** indicates the Odds Ratio, and **Ref** indicates the reference category for the categorical variables.

Smoking habits have a significant effect on demand for health care at 5% level of significance. The study found that non-smokers are nearly 4 times more likely to seek health care than smokers in the Central region (OR=3.904). The study further found that NCD status has a significant impact on healthcare demand at 10% level of significance. Individuals who are suffering from non-communicable diseases, are twice more likely to seek health care compared to those who are not suffering from any non-communicable disease (OR=2.239). The results also show that household

health expenditure is statistically significant as a determinant of health-care demand. The finding in this regard shows a direct relationship between monthly household expenditure and health care demand.

4.3.2 Eastern Region

For the Eastern region, the results show age, marital status, NCD status, monthly household health expenditure, household size and household poverty status as significant determinants of health-care demand. The youth, adults and elderly in the region are less likely to seek health care compared to the children, with the odds ratios of 0.588, 0.530 and 0.309, respectively. Furthermore, individuals who have never been married are less likely to demand for healthcare in the event of an illness compared to their married counterparts (OR=0.485); and those suffering from a non-communicable diseases are twice more likely to demand for health care compared to those not suffering from any non-communicable disease (OR=2.147). Households whose monthly expenditure on health is high are more likely to seek health care (OR=1.691), and households with a large household size are more likely to demand for healthcare (OR=1.082) relative to those with small household size. The study also found that poor households are less likely to seek health care compared to non-poor households (OR=0.647).

4.3.3 Northern Region

Results in Table 3 indicate that for the Northern region, age, sex, marital status, residence, literacy level, alcohol consumption and household health expenditure are significant determinants of health-care demand. The elderly are 0.5 times less likely to seek health care compared to the children (OR=0.505), while females are more likely to seek health care compared to their male counterparts (OR=1.294).

The divorced/separated and those who have never married are less likely to seek care compared to the married ones, given the odds ratios of 0.641 and 0.601, respectively. Urban dwellers in the Northern region are more likely to seek care compared to the rural dwellers in the region (OR=1.407). Individuals who are able to read or write or both are more likely to seek health care compared to those who are unable to read and write (OR=1.736). In addition, alcohol consumption is statistically significant only for the Northern region, whereby individuals who consume alcohol are 1.4 times more likely to demand for health care in the event of an illness compared to those that do not consume alcohol (OR=1.415). NCD status, household size and household poverty status are not significant determinants of health-care demand in the Northern region.

4.3.4 Western Region

Results in Table 3 show that for the Western region, health-care demand is determined by only age and household health expenditure. The elderly persons are less likely to seek health care compared to the children (OR=0.452). In addition, household health expenditure was found to be statistically significant at 1% significance level, with a direct and positive relationship with health-care demand.

4.4 Discussion of Results

The study findings with respect to the elderly aged above 60 years is that they are less likely to seek health care compared to the children. This implies that as an individual gets older, he or she is less likely to seek health care in the event of an illness. Although children and older persons are expected to demand more health care than the youth and adults, older persons are often less likely to seek health care during an illness. This tendency for the elderly might be due to their reduced incomes, due to retirement. This finding is similar to that of Ali and Noman (2013), who found that age has a negative relationship with the patient's demand for health care. Thus, the marginal benefit of investment into health tend to decrease with age. We further find that individuals who have never been married are less likely to seek health care compared to their married counterparts. Notably, the biggest proportion of people who have never been married comprises the youth, whose resources are limited, thereby making it difficult for them to seek care in the event of a serious illness. The youth also tend to be healthier; thus, they seek health care less frequently. With regard to the Marital status variable, Gabrysch and Campbell's (2009) results showed that monogamous women, formerly married and polygamous women seek care more than those who have never been married.

Our findings on literacy are consistent with Odwee et al (2006), who found that literate or educated individuals tend to seek for health care more, relative to the uneducated. Such individuals are more sensitive in ensuring that they get proper diagnosis and treatment. They also have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions. Furthermore, lifestyle factors, specifically smoking habits have a significant impact on health-care demand. Non-smokers are about 1.4 times more likely to seek care compared to smokers. This finding reflects the nature of risk averse individuals, who care a lot about the state of their health such that they may choose not to smoke and seek more health care, whereas risk lovers end up smoking and seeking less health care. The study also shows that individuals suffering from a non-communicable disease are more likely to demand for health care than individuals who are not suffering from any non-communicable disease. This finding is consistent with that of Lee et al (2015) who found that individuals with one or more NCD are more likely to seek for health care and even spend more compared to those with no NCD.

The more the household members, the more it is likely for the family to demand for health care. Ching (1992) found similar results that larger families demand more health care. For poor households, the result that individuals from poor households demand less health care calls for policy actions towards poverty alleviation and managing of the family size through family planning measures. The rising costs of health care coupled with income inequalities tend to constrain poor households from seeking health care. Akin et al. (1995) also argue that poor people may forego the option of seeking health care because of financial constraints.

The study findings underscore regional differences in the demand for health care in Uganda. Although age and household health expenditure are found to be significant across the four regions, the significance of other variables that affect health-care demand vary across the four regions. Household poverty status is significant in the Eastern region, which reflects the high levels of poverty reported in the region. Although there was a general increase in poverty countrywide, the Eastern region experienced higher increase in poverty than other regions (UBOS, 2018). The implications from the findings in this regard is that regions in Uganda have different health care needs; hence, the allocation of the health budget across regions needs to be proportional to these needs, with priority being accorded to the most vulnerable regions, such as the Eastern region.

5. Conclusion and Policy Implications

Based on the findings, we conclude that health-care demand is influenced by both individual and household characteristics. The findings also confirm the existence of regional disparities in health-care demand. Therefore, in order to boost the health-care seeking behaviour in Uganda, policy measures need to take into account individual factors, household factors as well as regional differences. To this end,

(a) The government and policy makers need to exert more effort into social protection of the elderly, since they have been found not to seek health care yet they are expected to do so, considering the underlying health conditions that come with aging. For instance, the elderly are more susceptible to suffer from chronic health conditions, such as diabetes, heart diseases, high blood pressure, which are costly in terms of treatment. The Social Assistance Grant for Empowerment (SAGE) should be expanded to cover all regions and all districts in the country. In addition, medical personnel should be adequately trained in handling the elderly and their health needs, which will encourage them to visit health facilities when they fall ill.

(b) More emphasis should be put on literacy, as it was found to be a significant determinant of demand for health care. Nationwide, the study found that individuals who were able to read or write or both were more likely to demand for health care. This finding implies that every individual in Uganda need to attain basic education in order to be able to read and write. A basic education will influence better choices about lifestyle and personal health behaviours. Greater emphasis should be on improving education in the Eastern and Western regions where the literacy level was not significant.

(c) To address the surge in NCDs, the study recommends that health policy makers should put much emphasis on preventive care through sensitization of masses on nutrition and life style issues, given the limited capacity to handle the expensive curative measures. For instance, Uganda needs massive sensitization about the dangers of lifestyle options like smoking and excessive alcohol consumption. While there is an argument that living a healthy lifestyle is an individual's choice, there is a need for the government to implement ways to improve the healthy lifestyles of its people. The reason

for this need is that the lifestyle an individual affects his or her demand for health care. In addition, there is need for early detection and screening of the NCDs.

(d) Finally, in addition to addressing people's poverty through, for example, income-enhancing programmes, the country needs to start pooling resources for health care by implementing a National Health Insurance Scheme (NHIS) given the rising health care costs. This will help individuals to access health care conveniently and to reduce the financial burden of high-risk diseases.

References

Acton, J. P. (1975). Nonmonetary factors in the demand for medical services: Some empirical evidence. *Journal of Political Economy*, 83(3): 595–614.

Akin, J. S., Guilkey, D. K. & Hazel, E. (1995). Quality of services and demand for health care in Nigeria: A multinomial probit estimation. *Social Science & Medicine,* 40(11): 1527–1537.

Ali, K. J. & Noman, A. (2013, November). Determinants of demand for health care in Bangladesh: An econometric analysis. In 3rd Asia-Pacific Business Research Conference.

Andersen, R. M. (1995). Revisiting the behavioral model and access to medical care: Does it matter? *Journal of Health and Social Behavior*, 1–10.

Anderson, J. G. (1973). Health services utilization: Framework and review. *Health Services Research*, 8(3): 184.

Armstrong, M. A., Midanik, L. T. & Klatsky, A. L. (1998). Alcohol consumption and utilization of health services in a health maintenance organization. *Medical Care*, 1599–1605.

Audibert, M., Le Hesran, J.Y., Dos Santos, S., Lafarge, H., Lalou, R. and Kone, G.K., (2013). *Use of health care among the urban poor in Africa: Does the neighbourhood have an impact?* (No. 201319).

Berman, J., Nkabane, E. L., Malope, S., Machai, S., Jack, B. & Bicknell, W. (2014). Developing a hospital quality improvement initiative in Lesotho. *International Journal of Health Care Quality Assurance*.

Bhuiya, A. (2009). Health for Rural Masses: Insights from Chakaria Bangladesh. International Centre for Diarrhoeal Disease Research**.**

Cawley, J. & Ruhm, C. J. (2011). The economics of risky health behaviors. In *Handbook of Health Economics,* 2: 95–199. Elsevier.

Ching, P. (1992). Factors affecting the demand for health services in the Philippines. Philippine Institute for Development Studies, Working Paper Series No. 92–06.

Currie, D. & Wiesenberg, S. (2003). Promoting women's health-seeking behavior: Research and the empowerment of women. *Health Care for Women International*, 24(10): 880–899.

Cylus, J., Permanand, G. & Smith, P. C. (2018). Making the economic case for investing in health systems: What is the evidence that health systems advance economic and fiscal objectives?

Fe, E., Powell-Jackson, T. & Yip, W. C. M. (2020). Doctor competence and the demand for health care: evidence from rural China. In *Health Care Policy in East Asia: A World Scientific Reference: Volume 1: Health Care System Reform and Policy Research in China* (pp. 229–259).

Franckel, A. & Lalou, R. (2009). Health-seeking behavior for childhood malaria: Household dynamics in rural Senegal. *Journal of biosocial Science*, 41(1): 1–19.

Gabrysch, S. & Campbell, O. M. (2009). Still too far to walk: Literature review of the determinants of delivery service use. *BMC Pregnancy and Childbirth*, 9(1): 1–18.

Grossman, M. (1972). On the concept of health capital and the demand for health. *Journal of Political Economy*, 80(2): 223–255.

Gujarati, D. N. & Porter, D. (2009). *Basic econometrics*. Mc Graw-Hill International Edition.

Hershey, J. C., Luft, H. S. & Gianaris, J. M. (1975). Making sense out of utilization data. *Medical Care*, 838–854.

Jahangir, E., Irazola, V. & Rubinstein, A. (2012). Need, enabling, predisposing, and behavioral determinants of access to preventative care in Argentina: Analysis of the national survey of risk factors. *PLoS One*, 7(9), e45053.

Kankeu, H. T., Saksena, P., Xu, K. & Evans, D. B. (2013). The financial burden from non-communicable diseases in low-and middle-income countries: A literature review. *Health Research Policy and Systems*, 11(1): 1–12.

Lee, J. T., Hamid, F., Pati, S., Atun, R. & Millett, C. (2015). Impact of noncommunicable disease multimorbidity on healthcare utilization and out-of-pocket expenditures in middle-income countries: Cross sectional analysis. *PloS One*, 10(7), e0127199.

Lungu, E. A., Darker, C. & Biesma, R. (2020). Determinants of healthcare seeking for childhood illnesses among caregivers of under-five children in urban slums in Malawi: A population-based cross-sectional study. *BMC Pediatrics,* 20(1): 1–13. https://doi.org/ 10.1186/ s12887–020–1913–9.

MoH (2018). Annual Health Sector Performance Report 2016/2017. Kampala, Uganda: Ministry of Health.

Mosadeghrad, A. M. (2014). Factors affecting medical service quality. *Iranian Journal of Public Health*, 43(2): 210.

Mpuuga, D., Yawe, B. L. & Muwanga, J. (2020). Determinants of demand for health insurance in Uganda: An analysis of utilisation and willingness to pay. *Tanzanian Economic Review*, 10(1): 1–22.

Muller, C. (1986). Review of twenty years of research on medical care utilization. *Health Services Research*, 21(2 Pt 1): 129.

Odwee, J. J., Okurut, F. N. & Adebua, A. (2006). *The determinants of health care demand in Uganda: The case study of Lira District, Northern Uganda*. AERC.

Santerre, R. E. & Neun, S. P. (2010). Health Economics: Theories, Insights, and Industry Studies. 5th Edition, South-Western, Cengage Learning: 5191 Natorp Boulevard Mason, USA.

Selivanova, A. & Cramm, J. M. (2014). The relationship between healthy behaviors and health outcomes among older adults in Russia. *BMC Public Health*, 14(1): 1–13.

Ssewanyana, S., Nabyonga, J. O., Kasirye, I. & Lawson, D. (2004). Demand for health care services in Uganda: Implications for poverty reduction (No. 677–2016-46634).

Thompson, A. E., Anisimowicz, Y., Miedema, B., Hogg, W., Wodchis, W. P. & Aubrey-Bassler, K. (2016). The influence of gender and other patient characteristics on health care-seeking behavior: A QUALICOPC study. *BMC family Practice*, 17(1): 1–7.

UBOS. (2018). *Uganda National Household Survey 2016/2017*. Kampala, Uganda: Uganda Bureau of Statistics.

Van der Hoeven, M., Kruger, A. & Greeff, M. (2012). Differences in health care seeking behavior between rural and urban communities in South Africa. *International Journal for Equity in Health*, 11(1): 1–9.

Van Doorslaer, E., Masseria, C. & Koolman, X. (2006). Inequalities in access to medical care by income in developed countries. *Cmaj*, 174(2): 177–183.

Whitehead, M. (1991). The concepts and principles of equity and health. *Health Promotion International*, 6(3): 217–228.

WHO. (2017). Strengthening health systems for universal health coverage and sustainable development, *World Health Organization,* 2017; 95:537–539.

WHO. (2019). Global spending on health: A world in transition. World Health Organization, Geneva WHO/HIS/HGF/HFWorkingPaper/19.4.

Zarkin, G. A., Bray, J. W., Babor, T. F. & Higgins-Biddle, J. C. (2004). Alcohol drinking patterns and health care utilization in a managed care organization. *Health Services Research*, 39(3): 553–570.

Appendix

The Appendix entails the descriptive statistics of the background characteristics – both at individual and household level (see Table A1 and Table A2). It also highlights the relationship between these characteristics and healthcare demand using bivariate analysis which was carried out using the Chi-square test and Wilcoxon rank-sum test (see Table A3).

Table A1: Background Characteristics of Respondents at Individual Level

Characteristic	Frequency	Percent
Background characteristics		
Age		
Children (0–17 years)	3,075	26.0
Youth (18–35 years)	3,388	28.7
Adults (36-60 years)	3,984	33.7
Elderly (above 60 years)	1,380	11.7
Sex		
Male	4,915	41.6
Female	6,912	58.4
Marital status		
Married	5,715	48.3
Divorced / Separated	821	6.9
Widow/Widower	1,080	9.1
Never married	4,211	35.6
Region		
Central	2,731	23.1
Eastern	3,270	27.6
Northern	3,408	28.8
Western	2,418	20.4
Residence		
Urban	3,323	28.1
Rural	8,504	71.9
Literacy level		
Able to read or write or both	8,135	68.8
Unable to read and write	3,692	31.2
Health Status		
Suffered illness or injury	11,819	99.9
Did not suffer illness or injury	8	0.1
Healthcare Demand		
Sought care	9,910	83.8
Did not seek care	1,917	16.2
Smoking habit		
Smoker	969	8.2
Non-smoker	10,858	91.8

Alcohol consumption		
Consumer	2,599	22.0
Non-consumer	9,228	78.0
Drug use		
User	66	0.6
Non-user	11,761	99.4
NCD status		
No NCD	10,413	88.0
Has NCD	1,414	12.0
n=11,827		

Table A2: Background Characteristics of Respondents at Household Level

Characteristic	Frequency	Percent
Poverty status		
Non-poor	8,956	75.7
Poor	2,871	24.3
	Mean	**Range**
Household size	5.3	1–23
Household health expenditure (UGX)	30,085	100–6,000,000

Table A3: Association between Background Characteristics and Healthcare Demand at Individual and Household Level.

Characteristic	Healthcare Demand: Sought Care (%)	Did Not Seek Care (%)	Total (n)
Individual level factors			
Age		χ^2 = 77.80 p=0.000	
Children (0–17 years)	83.1	16.9	3,075
Youth (18–35 years)	86.5	13.5	3,388
Adults (36-60 years)	84.6	15.4	3,984
Elderly (above 60 years)	76.4	23.6	1,380
Sex		χ^2=5.51 p=0.019	
Male	82.9	17.1	4,915
Female	84.5	15.5	6,912
Marital Status		χ^2=37.91 p=0.000	
Married	85.6	14.4	5,715
Divorced/Separated	82.0	18.0	821
Widow/ Widower	78.7	21.3	1,080
Never married	83.0	17.0	4,211
Region		χ^2=18.46 p=0.000	
Central	85.3	14.7	2,731
Eastern	83.9	16.1	3,270
Northern	81.7	18.3	3,408
Western	85.0	15.0	2,418

Residence		χ^2=17.62 p=0.000	
Rural	82.9	17.1	8,504
Urban	86.1	13.9	3,323
Literacy level		χ^2= 113.18 p=0.000	
Unable to read and write	78.4	21.6	3,692
Able to read or write or both	86.2	13.8	8,135
Health status		χ^2=0.08 p=0.776	
Suffered illness or injury	83.8	16.2	11,819
Did not suffer illness or injury	87.5	12.5	8
Smoking habit		χ^2=34.90 p=0.000	
Smoker	77.1	22.9	969
Non-smoker	84.4	15.6	10,858
Alcohol consumption		χ^2=24.26 p=0.000	
Consumer	80.7	19.4	2,599
Non-consumer	84.7	15.3	9,228
Drug use		χ^2=1.53 p=0.216	
User	89.4	10.6	66
Non-user	83.8	16.2	11,761
NCD status		χ^2=6.13 p=0.013	
No NCD	83.5	16.5	10,413
Has NCD	86.1	13.9	1,414
Household level factors			
Household Poverty status		χ^2=36.38 p=0.000	
Non-poor	84.9	15.1	8,956
Poor	80.2	19.8	2,871
Household size		z=-2.94 p=0.003	
Household health expenditure		z=-16.47 p=0.000	