STATISTICAL ANALYSIS OF CATEGORICAL DATA : THE CASE STUDY IS BASED ON THE DEMOGRAPHIC AND SOCIO ECONOMIC DETERMINANTS OF ACCESS TO CLEAN AND SAFE WATER AMONG BASOTHO.

By

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ABSTRACT

The study examined demographic and socio economic determinants of access to safe and clean drinking water in Lesotho. The data was taken from the 2014 Lesotho and Demographic Health Survey. There were 9402 respondents who were enumerated on whether they were using safe and clean water for drinking and cooking. The aim of the study is to identify the factors that are associated with access to clean and safe drinking water in Lesotho. Moreover, the study revealed that age, sources of water, educational level, wealth index and residence are determinants of access to clean and safe water in Lesotho. It is therefore concluded that there is a need for Basotho to use clean and safe drinking water.

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CHAPTER 1

Introduction

1.1 Background

Water is the most precious resource on our planet and water is imperative for existence of life, it is essential for food production and food security. Clean water is our lifeblood, human beings like other animals and plants are made mostly of water, and we need water to maintain basic health and sanitation hence continuous access to adequate quantities of safe water is essential for human health and socioeconomic development. Basic drinking-water refers to water from an improved source (as per the existing Millennium Development Goals (MDGs) indicator) with a total collection time of 30 minutes or less from a round-trip, including queuing (Lacent 2015).

Inadequate and unequal access to clean water is thus both a result and cause of poverty. Physical water shortage is definitely a real phenomenon in some dry regions and countries in the world; however, water scarcity is much more common phenomenon (Hemson D, Kulindwa K, Lein H &Mascarenhas A. 2008). The World Bank (1994) indicated that inadequate drinking water not only resulted in more sickness and deaths but also increases health expenditures, lowers productivity and school enrolment. Poor water quality is responsible for the death of an estimated 5 million children in the developing countries. It is estimated that, in Pakistan, 30% of all diseases and 40% of all deaths are due to poor water quality (Pak. J. Engg. & Appl. Sci 2009)

In 2015, according to the United Nations, close to 800 million people have no access to safe, clean water sources and the number continues to climb (Ross Michael Pink 2016). In Lesotho most households (87%) report that they do no treat their water prior to drinking (Demographic and Health Survey (DHS) 2014). The reality is that very few household uses any form of water purification technique, the results from Across-sectional study in peri-urban community of Islamabad reveal that at household level 77%of the population did not use any form of water purification technique (Ghazanfar H, Saleem S & Naseem S.et al 2017).

Lesotho has plans and policies in place for urban and rural water and sanitation that have been casted but are only partially implemented. The water and sanitation policy of 2007 states that “all Basotho are entitled to have access to a sustainable supply of potable water and to the provision of basic sanitation services at an affordable cost.” The policy indicates that all Basotho have a right to 30lcd of water, but mechanisms for implementing this policy are not in place. There is, however, a drive towards improving access to both water and sanitation, although access for all will a long time to achieve (UNICEF, 2014).

1.2 The Statement of the Problem

The world health organisation (WHO) estimates that 2.1 million people die every year from diarrheal diseases including cholera, that the majority of these deaths is among children in developing countries and that 65% of these fatalities could be prevented by water, hygiene and sanitation(Hrudey S. E & Hrudey E. J 2004). Safe, clean drinking water is the remedy for fatal diseases; however in Lesotho there is no current study which has aimed at determining factors which influence the access to the safe drinking water among Basotho. Therefore it is strongly believed that this study will address the appropriate measures that increase the access to safe and clean drinking water.

1.3 Objectives and Significance of the Study

- The purpose of the study is to isolate the factors that ultimately lead to the greater access of clean and safe drinking water among Basotho based on the Lesotho Demographic and Health survey 2014.
- To raise awareness on the importance of being responsible for quality health and socioeconomic development
- Understanding of the factors can be of use for ministry of health in planning and policy formation

1.4 Methodology

This section describes the methods used in this study. It will look at the source of data, the design of the sample size from targeted population and the methods used to analyse the data from the sample.

1.4.1 Sample Design

The data used in this study is secondary data from the 2014 Lesotho Demographic and Health Survey (LDHS) implemented by ministry of health. The data was accessed from dhsprogram website (http://www.dhsprogram.com/data/dataset_admin/log_main.cfm). According the 2014 Lesotho Demographic and Health Survey the sample size was design using the sampling frame which is updated frame from the 2006 Lesotho Population and Housing Census (PHC) provided by the Lesotho Bureau of Statistics (BOS). The sampling frame excluded nomadic and institutional populations such as persons in hotels, barracks, and prisons. The 2014 LDHS followed a two-stage sample design and was intended to allow estimates of key indicators at the national level as well as in urban and rural areas, four ecological zones, and each of Lesotho's 10 districts.

The first stage involved selecting sample points (clusters) consisting of enumeration areas (EAs) delineated for the 2006 PHC. A total of 400 clusters was selected, 118 in urban areas and 282 in rural areas. The second stage involved systematic sampling of households. A household listing operation was undertaken in all of the selected EAs in July 2014, and households to be included in the survey were randomly selected from these lists. About 25 households were selected from each sample point, for a total sample size of 9,942. A total of 9,942 households were selected for the sample, of which 9,543 were occupied. Of the occupied households, 9,402 were successfully interviewed, yielding a response rate of 99%.

1.4.2 Method of Analysis

In this section, both bivariate and multivariate analysis are applied to determine the effect of single explanatory variable on response variable and to explore the influence of combined explanatory variables on response variable. The explanatory (independent) variables are age of the household, district of the household, education attainment of the household, wealth index of the household, ecological zone of the household and source of water for the household. The response (dependent) variable is access to clean water. Some variables were recoded to suit the purpose of this study. The data was extracted, processed and analysed using STATA version 12.

1.4.2.1 Descriptive Analysis

The percentages are used to measure the ability to access clean water and are compared within each explanatory variable to observe which category has greater opportunity to access clean water and which category has least opportunity to access clean water. The trend of the access to clean water is also observed from one explanatory variable to another. Contingency table between response variable and covariates consisting of proportions were constructed. Graphical presentation was done using bar charts.

1.4.2.2 Chi-Square Analysis

Chi-square test is one of measure of association which is used to test if the two categorical variables are independent. The chi-square test is an inferential test that requires the use of data for large samples to make conclusions about the independence between the variables. The use of data for large samples means that the expected cell frequencies should be greater or equal to 5. It varies depending on the degrees of freedom and it is a special type of right skewed distribution. The observed association is statistically significant when the p-value is less than the level of significance which is typically 0.05, the p-value is the chi-squared right-tail probability above the observed value of chi-square (Agresti A, 2007).

$$\chi 2 = \sum_{i=1}^{I} \sum_{j=1}^{J} \frac{(n_{ij}-u_{ij})^2}{u_{ij}} \quad \text{……} (1)$$

Where: I is the number of rows.

J is the number of columns.

n_{ij} is the observed frequency of the i^{th} row and j^{th} column

u_{ij} is the expected frequency of the i^{th} row and j^{th} column

The degree of freedom is equal to (I-1) × (J-1),

The formula for expected frequency from Equation (1) is denoted by

$$U_{ij} = \frac{n_{i.} \times n_{.j}}{N} \quad \text{……} (2)$$

Where: $n_{i.}$ is the i^{th} row total

$n_{.j}$ is the j^{th} column total

N is the sample size

1.4.2.3 Logistic Regression Analysis

Logistic regression model is used to examine the cumulative influence of explanatory variables on the response variable. It measures the relationship between the categorical response variable Y and one explanatory variable X, or between more explanatory variables $X_1, X_2, \dots, X_n$. Logistic regression model is one of categories of statistical models called generalized linear model. It is used to predict a discrete outcome from a set of variables that maybe continuous, discrete or dichotomous. Generally the response variable is dichotomous such as success or failure, present or absent, improving or getting worse, etc.

Logistic regression makes no assumptions about the distribution of the explanatory variables that is: there is no normality assumption and no assumption of equal variance within each group. The relationship between explanatory variable and response variable is not linear.

Logistic regression function is in the form

$$\text{P (event)} = \frac{e^{\alpha+\beta_1 X_1+\beta_2 X_2+\cdots+\beta_n X_n}}{1+e^{\alpha+\beta_1 X+\beta_2 X_2+\cdots+\beta_n X_n}}$$

$$= \frac{1}{1+e^{-(\alpha+\sum_{i=1}^{n}\beta_i X_i)}}$$

$$= \frac{1}{1+e^{-z}} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(3)}$$

Where Z = $(\alpha + \sum_{i=1}^{n} \beta_i X_i)$

n = the number of explanatory variables.

Since the probability of a response in a case of a binary variable is equal to the expected value of the response Equation (3) can be presented as follows

$$E(Y) = \frac{1}{1+e^{-(\alpha+\sum_{i=1}^{n}\beta_i X_i)}} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(4)}$$

The parameter α is the intercept parameter. The parameter β_i in the logistic model measures the degree of relationships of the explanatory variables to the dependent variable. The sign of β_i indicates whether the curve ascends (β_i >0) or descends (β_i <0), and the rate of change increases as $|\beta_i|$ increases (Agresti A, 2007)

CHAPTER 2

Data Analysis

2.1 Introduction

In this chapter we discuss results obtained from applying the bivariate analysis and multivariate analysis to the data obtained from 2014 Lesotho Demographic and Health Survey. This chapter focus on descriptive methods using tabular and graphical aids.

2.2 Descriptive Analysis

This section shows the discussion of the frequencies and percentages determined using the cross tabulations between explanatory variables such as : age of the respondents, district of the respondents, education attainment of the respondents, ecological zone of the respondents , wealth index of the household and source of water for the respondents and response variable as access to clean water. The results are presented in the form of tables and bar charts as shown below.

Table 2.1: shows the frequencies of cross tabulation on the access to clean water by districts.

Districts	Prevalence of access to clean water	No prevalence of access to clean water	Total
Botha-Bothe	77	783	860
Leribe	87	973	1060
Berea	181	806	987
Maseru	228	960	1188
Mafeteng	140	796	936
Mohales'Hoek	106	844	950
Quthing	98	748	846
Qacha's Nek	46	831	877
Mokhotlong	58	785	843
Thaba- Tseka	42	813	855
Total	1063	8339	9402

Table 2.1 shows the distribution of respondents by their districts together with whether they have access to clean water or not. Looking at place of residence Maseru is the district with most respondents (1188) or 12.64% but only 228 respondents have access to clean water.

Mokhotlong is the district with the least respondents but those who have prevalence on clean water are more as compared to Thaba-Tseka.

Table 2.2: shows the frequencies of cross tabulation on the access to clean water by source of water.

Source of water	Prevalence of access to clean water	No prevalence of access to clean water	Total
Dwelling	101	179	280
Yard	355	1474	1829
Public tap	320	4308	4628
Borehole	39	427	466
Protected well	105	755	860
Unprotected well	127	1084	1211
Rainwater	13	67	80
Tanker truck	3	42	45
Bottle water	0	3	3
Total	1063	8339	9402

Table 2.2 shows the distribution of respondents by their source of water together with whether they have access to clean water or not. Looking at source of drinking water, most of respondents access their drinking water from public tap (4628) with only 6.91% of respondents with access to clean water, as for dwelling only few respondents use it as source of water yet most of them claims to have prevalence on access to clean water.

Table 2.3: shows the frequencies of cross tabulation on the access to clean water by age group

Age group	Prevalence of access to clean water	No prevalence of access to clean water	Total
10-19	5	75	80
20-29	102	858	960
30-39	254	1709	1963
40-49	197	1470	1667
50-59	202	1592	1794
60-69	176	1310	1486
70+	127	1325	1452
Total	1063	8339	9402

Table 2.3 shows the distribution of respondents by their age group together with whether they have access to clean water or not. According to age of respondents, most respondents are aged 30-39 with 12.94% of those who have access to clean water, followed by respondents

who are aged 50-59 and the least age group with least respondents with prevalence of access to clean drinking water.

Table 2.4: shows the frequencies of cross tabulation on the access to clean water by wealth index

Wealth index	Prevalence of access to clean water	No prevalence of access to clean water	Total
Poorest	105	2033	2138
Poorer	138	1730	1868
Middle	176	1696	1872
Richer	183	1582	1765
Richest	461	1298	1759
Total	1063	8339	9402

Table 2.4 shows the distribution of respondents by their wealth index together with whether they have access to clean water or not. Looking at wealth status of respondents, most respondents are the poorest (2138) with only 4.91% of those who have access to clean water. As the wealth status improves the prevalence of access to clean water increases.

Table 2.5: shows the frequencies of cross tabulation on the access to clean water by education level

Education level	Prevalence of access to clean water	No prevalence of access to clean water	Total
No education	110	1516	1626
Primary	422	4567	4989
Secondary	311	1633	1944
Higher	220	623	843
Total	1063	8339	9402

Table 2.5 shows the distribution of respondents by their education level together with whether they have access to clean water or not. As for education level, most respondents have primary qualifications (4989) of which only 8.46% have access to clean water. Looking at the frequencies of the prevalence of access to clean water we observe that as education attainment improves respondents are more likely to have access to clean water.

Table 2.6: shows the frequencies of cross tabulation on the access to clean water by ecological zone

Ecological zone	Prevalence of access to clean water	No prevalence of access to clean water	Total
Lowlands	699	3758	4457
Foothills	82	863	945
Mountainous	186	2601	2787
Sengu river valley	96	1117	1213
Totals	1063	8339	9402

Table 2.6 shows the distribution of respondents by their ecological zones together with whether they have access to clean water or not. Looking at ecological zones of respondents, most respondents are from lowlands (4457) with only 16% of those who have access to clean water, followed by respondents who are from foothills with only 9% and the least are those who are from mountainous with 7%.

The descriptions of the Tables above are further demonstrated thoroughly through the bars charts below where the prevalence of access to clean water is determined by demographic and socio-economic factors in Lesotho. Each independent variable has a bar chart displaying the percentage of the prevalence of access to clean water.

Figure 2.1 shows the percentage of access to clean water among the districts

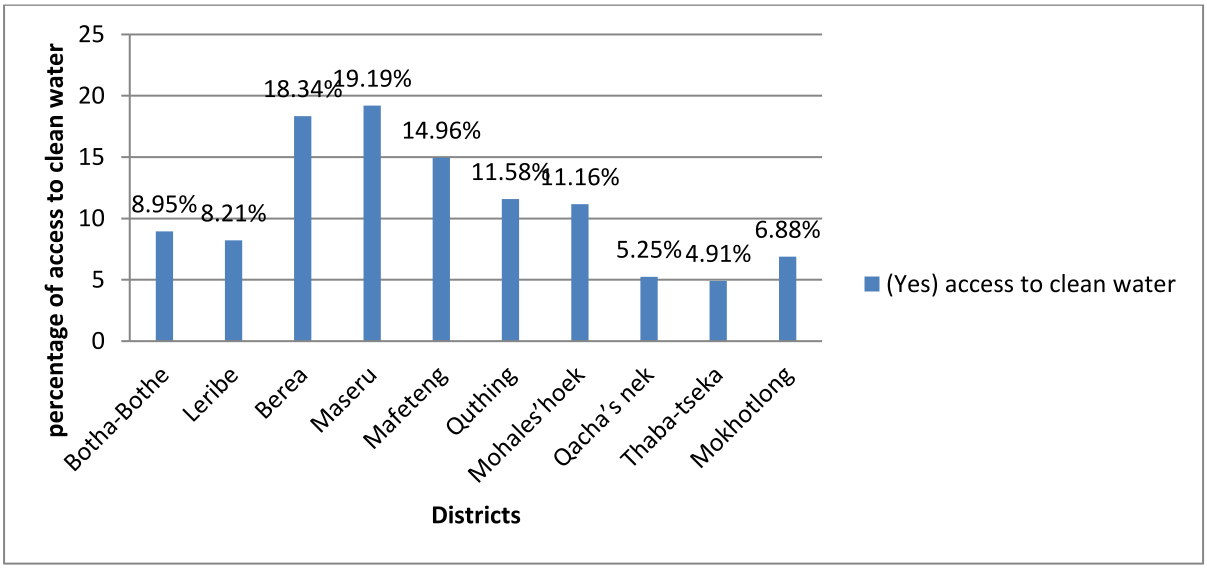
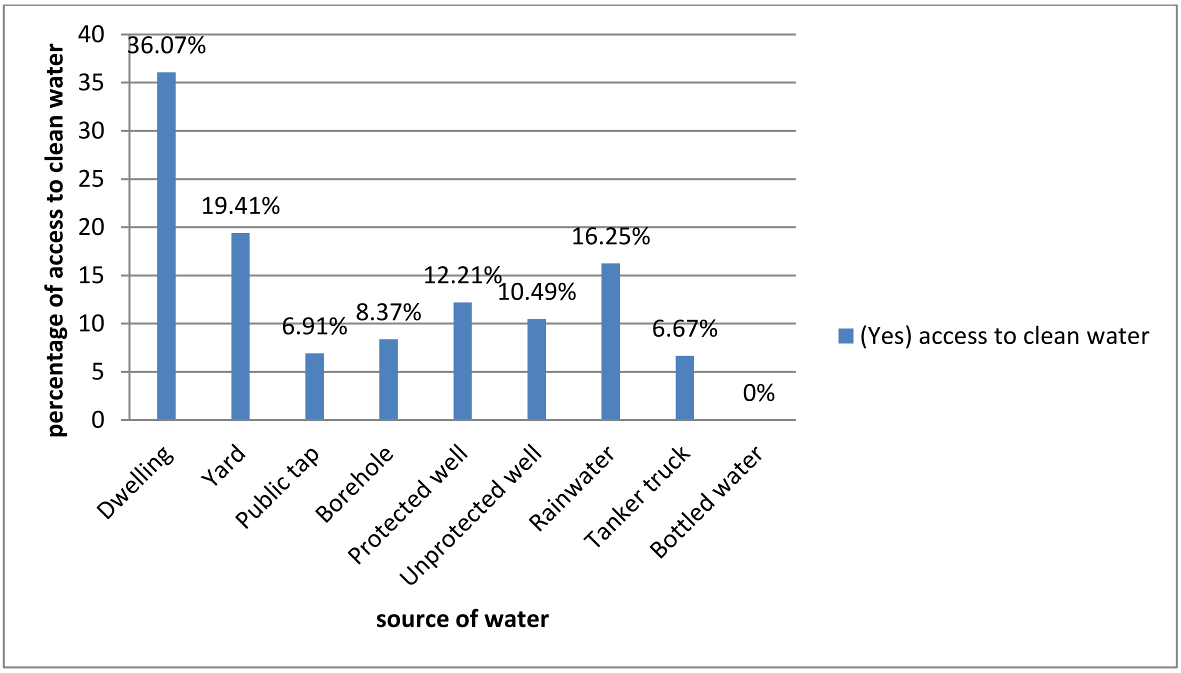


Figure 2.1 demonstrates that Maseru is the highest district with 19.19% of respondents who have access to clean water, followed by Berea with 18.34%. We also observe that Thaba-tseka is the least district with only 4.91% of households who can access clean water. It shows that from Maseru to Qacha'snek the percentage of access to clean water decreases. The results are as expected that Maseru should consists of households with access to clean water as compared to Thaba-tseka.

Figure 2.2 shows bar chart of the percentage of access to clean water by the source of water.



From Figure 2.2 we observe that most respondents who have access to clean water obtain their water from water piped into dwelling with 36.07% followed by those who access water from the water piped into the yard with 19.41%. We also observe that as the distance of the location of source of water increases the access to clean water decreases from water piped into dwelling to public tap. The source of water with least percentage is bottled water with 0% of access to clean water.

Fig 2.3 shows the percentage of access to clean on age group of the households

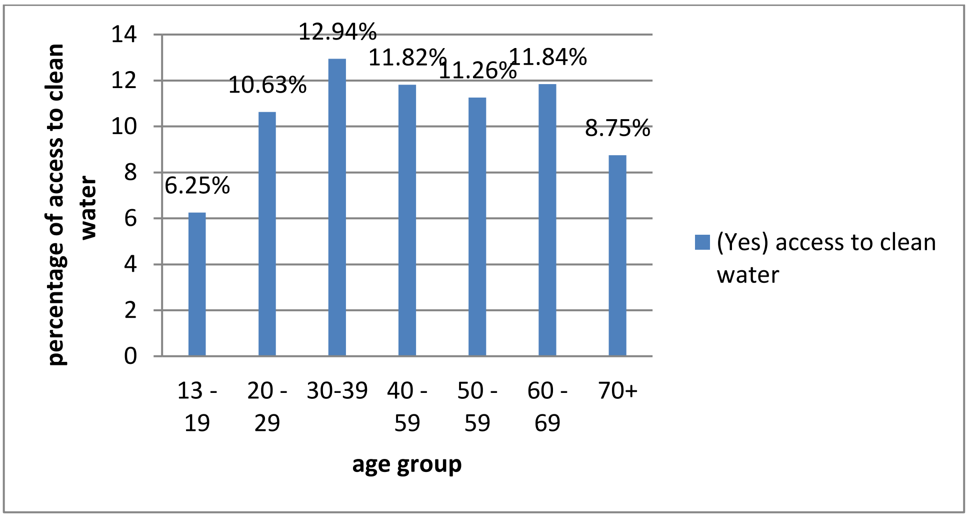


Figure 2.3 demonstrates that most respondents aged between ages 30 to 39 years have access to clean water with 12.94% followed by households aged between 60 to 69 years with 11.84%. It further reveals that individual aged 10 to 19 have least percentage of access to clean water which means that most youth don't access clean water. We observe that from the age 10-39 the access to clean water increases as age increases then at age 39-59 access to clean water decreases as age increase at age 60 it increases again and decrease at age 69 to oldest age.

Figure 2.4 shows the percentages of access to clean water according to wealth index

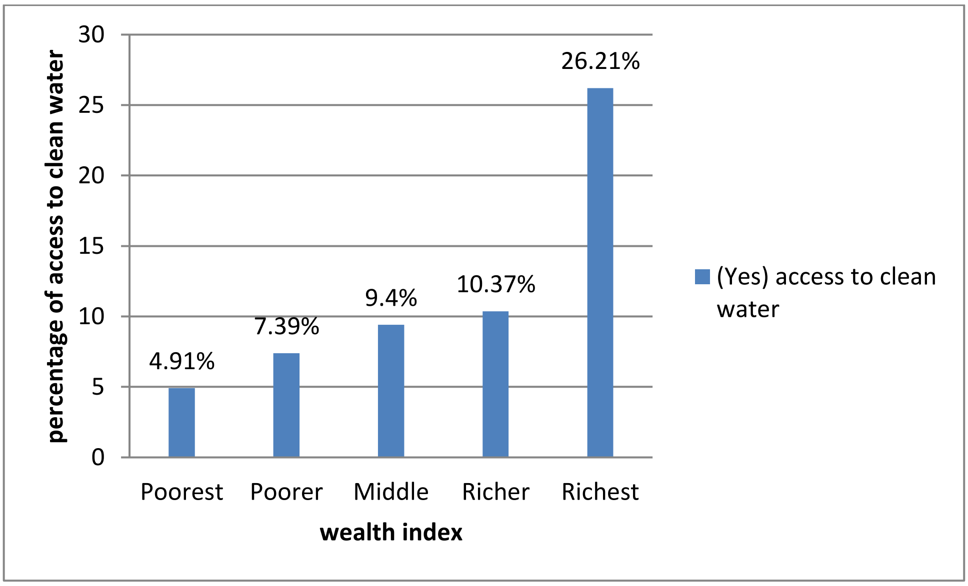
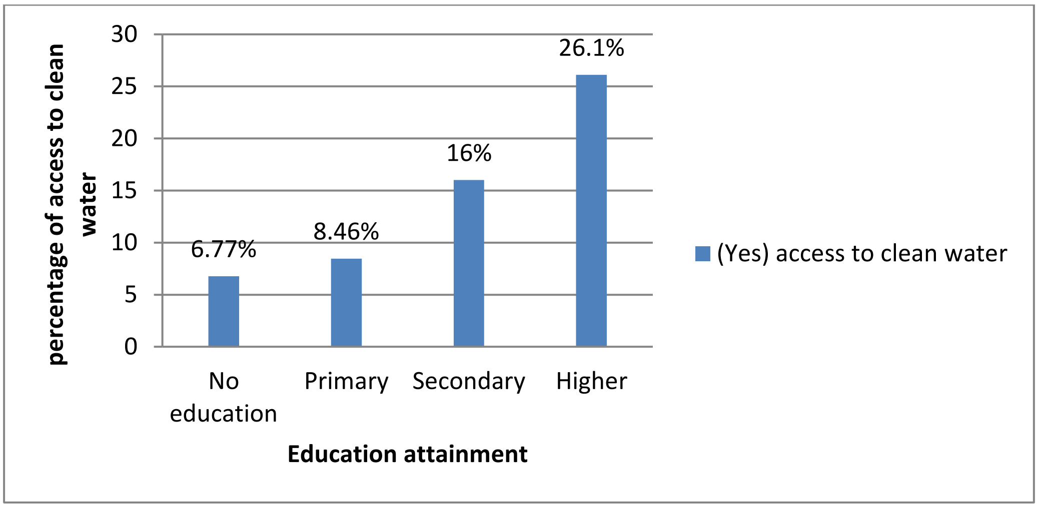


Figure 2.4 reveals that most respondents who have access to clean water are those who are considered to be the richest with 26.21% in terms of wealth index, followed by those who are

richer with 10.37%.the wealth index poorest has the least households who has access to clean water with 4.91% The results also suggest that's as wealth index increases the access to clean water also increases.

Figure 2.5 shows bar chart of the percentage of access to clean water by education attainment



The results from figure 2.5 reveal that most respondents with higher education level have access to clean with 26.10% followed by those who have secondary education attainment with 16%, the education attainment with least percentage of access to clean water is category called no education with 6.77%. We can also observe that as the education attainment increases the access to clean water also increases, the results are as expected.

2.3 Summary

The descriptive method using either tabulation or graphical aids assists in determining the important factors that influence the access to clean water. The results observed from both tabulation and graphical methods reveal that the place of residence known as districts in this project is an important factor that influence the access to clean drinking water, the observations also detect that the source of water has an impact in determining the access to clean water. Looking at age group of the respondents, the results indicate that age is very influential in determining the access to clean water. The education levels as well as the wealth index of respondents influence the access to clean water.

CHAPTER 3

Result of Logistic Regression Analysis

3.1 Introduction

In this chapter we fit the logistic regression model to the data and give interpretation of the results. The response variable is access to clean drinking water and predictor or explanatories variables are districts, age group, education attainment, wealth index and source of water. The results show predictor variables inclusion in the logistic regression model analysis with their corresponding coefficients and the 95 percent confidence intervals on the coefficients.

3.2 Simple Logistic Regression Output

This section outlines the simple regression analysis results on each socio- economic and demographic variables against the response variable which is access to clean drinking water. The results are presented in the tabulation form below.

Table 3.1: Logistic regression results about districts

Districts	Coefficients	95% Confidence interval
Leribe	-0.0951	(-0.4159, 0.2256)
Berea	0.8257	(0.5415, 1.1100)
Maseru	0.8817	(0.6067, 1.1568)
Mafeteng	0.5814	(0.2863, 0.8764)
Mohales'Hoek	0.2446	(-0.0646, 0.5538)
Quthing	0.2869	(-0.0280, 0.6017)
Qacha's Nek	-0.5747	(-0.9527, -0.1966)
Mokhotlong	-0.2859	(-0.6408, 0.0689)
Thaba- Tseka	-0.6437	(-1.0323, -0.2552)
Constant	-2.3193	(-2.5534, -0.3283)

Table 3.1 above shows the results of the logistics regression with the district of Botha-Bothe as reference point. Looking at Table 3.1, the regression coefficients of all districts categories are positive and negative suggesting that people who live in the districts with positive regression coefficients are more likely to have access to clean water as compared to Botha-Bothe district. The districts with negative regression coefficients imply that people who are located in these districts are less likely to have access to clean water as compared to Botha-Bothe. The results also reveal that Maseru is the most districts likely to have access to clean

water followed by Berea district and Thaba-Tseka is the least district which is less likely to have access to clean water as compared to Bothe-Bothe. The 95% confidence intervals for Leribe, Mohales'Hoek, Quthing and Mokhotlong are not significant which implies that they have no significant contribution in increasing the access of clean water. Berea, Maseru, Mafeteng, Qacha's Nek and Thaba-Tseka have the significant 95% confidence intervals which suggest that there is increase in access to clean water for people who are living in Berea, Maseru and Mafeteng districts and there is decrease in access to clean water for people living in Qacha's Nek and Thaba-Tseka districts.

Table 3.2: Logistic regression results about source of water

Source of Water	Coefficients	95% Confidence interval
Yard	-0.8514	(-1.1214, -0.5813)
Public tap	-2.0276	(-2.2967, -1.7586)
Borehole	-1.8210	(-2.2296, -1.4123)
Protected well	-1.4005	(-1.7186, -1.0824)
Unprotected well	-1.5720	(-1.8774, -1.2665)
Rainwater	-1.0675	(-1.7096, -0.4254)
Tanker truck	-2.0668	(-3.2632, -0.8706)
Constant	-0.5723	(-0.8162, -0.3283)

Table 3.2 presents the results of logistic regression when dwelling is used as a reference category. Looking at source of water, regression coefficients are all negative suggesting that people who are accessing water at any source of water except dwelling are less likely to access clean water as compared to those who access water through dwelling. Most people who are less likely to access clean water are those who use tanker truck as source of water. The 95% confidence intervals for all categories of source of water are significant which implies that sources of water are very important in determining the access to clean water.

Table 3.3: Logistic regression results about age

Age groups	Coefficients	95% Confidence interval
20 to 29	0.5784	(-0.3499, 1.5066)
30 to 39	0.8017	(-0.1131, 1.7165)
40 to 49	0.6982	(-0..2192, 1.6156)
50 to 59	0.6435	(-0.2735, 1.5606)
60 to 69	0.7007	(-0.2181, 1.6195)
70+	0.3630	(-0.5603, 1.2864)
Constant	-2.7080	(-3.6133, -1.8028)

Table 3.3 presents the results of logistic regression when age category 10 - 19 is used as a reference category. Looking at table 3.3 above, the regression coefficients of respective age groups from 20-29 to 70+ are all positive implying that people in these age groups are more likely to have access to clean water as compared to those that are in age group 10-19. Age group 30-39 has the most people who have access to clean water as compared to other age groups and age group 70+ has less people who have access to clean water as compared to other age groups except age group 10-19. The 95% confidence intervals for all age groups are not significant which implies that being in any age group does not determine the increase or decrease of access to clean water.

Table 3.4: Logistic regression results about wealth index

Wealth Index	Coefficients	95% Confidence interval
Poorer	0.4347	(0.1729, 0.6965)
Middle	0.6978	(0.4476, 0.9479)
Richer	0.8063	(0.5576, 1.0551)
Richest	1.9281	(1.7050, 2.1512)
Constant	-2.9633	(-3.1595, -2.7672)

Table 3.4 presents the results of logistic regression when poorest category is used as a reference category for wealth index, regression coefficients are all positive for all categories suggesting that people in these categories are more likely to have access to clean water as compared to those that are considered to be the poorest. Looking at the results the richest people are most advantageous people in terms accessing clean water as compared to other categories of wealth index which implies that as the wealth status becomes better access to

clean water also increases. The 95%confidence intervals on the coefficients for all categories of wealth index are significance which means that wealth index is the important factor that determines the access to clean water.

Table 3.5: Logistic regression results about education attainment

Education level	Coefficients	95% Confidence interval
Primary	0.2417	(0.0240, 0.4595)
Secondary	0.9650	(0.7366, 1.1934)
Higher	1.5824	(1.3353, 1.8296)
Constant	-2.6234	(-2.8169, -2.4298)

Table 3.5 presents the results of logistic regression when no education category is used as a reference category for education attainment; the regression coefficients are all positive suggesting that people with primary, secondary and higher attainment are more likely to have access to clean water as compared to people with no education attainment. The results also suggest that the more educated a person is the more she /he become advantageous to access clean water. The 95% confidence intervals on the coefficients for all categories of education attainment are all significant and imply that education attainment is an important factor which determines the access to clean water.

Table 3.6: Logistic regression results about ecological zone

Ecological zones	Coefficients	95% Confidence interval
Foothills	-0.6717	(-0.9122, -0.4313)
Mountainous	-0.9559	(-1.1252,-0.7867)
Sengu river valley	-0.7721	(-0.9956, -0.5485)
Constant	-1.6820	(-1.7627, -1.6013)

Table 3.6 presents the results of logistic regression when lowlands category is used as a reference category for ecological zones; the regression coefficients are all negative suggesting that people who reside at foothills, mountainous and senqu river valley are less likely to have access to clean water as compared to people who reside at lowlands. The 95% confidence intervals on the coefficients for all categories of ecological zones are all

significant and imply that ecological zones is an important factor which determines the access to clean water.

3.3 Multiple Logistic Regression Output

This section explores the results of logistic regression when all predictor variables are included in the model. The results present the regression coefficients of districts, source of water, age group, ecological zones and wealth index as well as education level, including their standard errors, Z-scores, P-values and 95% confidence intervals of the coefficients

Table 3.7 below presents the results of logistic regression when all predictor variables are included in the logistic regression model. Looking at table 3.7 we see that all the coefficients are positive suggesting that age group, wealth index, districts, education level and source of water influence the increase in access to clean water except coefficient for ecological zones which suggest that ecological zones decrease the access to clean water. The p-values from the results reveal that the predictor variables : age group, wealth index, ecological zones, education level and source of water are significant except districts which implies that the districts variable is not the important factor in determining the access to clean water, hence is not significant. We can also observe that whenever there are no factors that determine the access to clean water, the access to clean water is insufficient because we have a negative constant.

Table 3.7: The multiple logistic regression model results

Access to clean water	Coefficients	Standard error	Z- value	P>Z	95% Confidence interval
Age group	0.0766	0.0226	3.39	0.001	(0.0323,0.1209)
Districts	0.0222	0.0184	1.20	0.229	(-0.0139,0.0583)
Wealth index	0.3781	0.0334	11.31	0.000	(0.3125,0.4213)
Education level	0.3303	0.0464	7.12	0.000	(0.2393,0.4213)
Source of water	0.0763	0.0271	2.81	0.005	(0.0232,0.1295)
Ecological zone	-0.1730	0.0475	-3.64	0.000	(-0.2661,-0.0799)
Constant	-4.4619	0.2550	-17.50	0.000	(-4.9618,-3.9621)
Number of observation = 9402 LR chi2(5) = 467.76 Prob > chi2 = 0.0000 Pseudo R2 = 0.0705					

3.4 Summary

The model explains 7% of the variations in the probability that clean and safe water would be chosen for drinking purposes, indicating a good fit for a choice model and the p-value suggest strong evidence that the model is definitely perfect for this analysis. The multiple logistic regressions model is sufficiently significant although it suggests that the place of residence does not have much effect on determining the access to clean drinking water. All the predictor variables except districts are very important factors that have influence in accessing clean drinking water among Basotho nation.

CHAPTER 4

Conclusion and Limitations

4.1 Conclusion

A former UN Secretary General, Kofi Annan noted that "no single measure would do more to reduce disease and save lives in the developing world than bringing safe water to all." (as cited in Water Matters 2003). The study revealed that access to safe and clean drinking water in Lesotho remains a huge challenge. Therefore, there is much to be done to achieve universal access of drinking water, to address the challenge; the Government has to provide a regulatory framework to govern the development of sustainable drinking water supply across country as to reduce inequality in access to clean water. The key stakeholders in national and local levels should refocus in the development of appropriate legislation to accommodate the need for a legal framework in managing water resource based on criteria and indicators to meet the challenges with regard to human rights of obtaining sufficient and safe water for all Basotho people.

4.2 Recommendations

In the light of the findings, several recommendations are proposed. First, in the long run, coverage of piped water services in a dwelling should be expanded as it is the most reliable drinking water service. As water from piped services may still be contaminated, the use of household water treatment and safe storage (HWTS) should also be encouraged by local governments to eliminate disparities in burden of water-related illnesses where community-based water supplies are infeasible. Secondly, as household education determines better knowledge of using safe and clean drinking water, there should be water and health related module in all education institutions as well as places of residence regardless of age that is everyone need to have an understanding of the importance of using clean and safe water in daily activities. Lastly everyone should be engaged in reducing the burden of poverty by being economically active, this will improve the wealth status which affect access to clean water positively.

4.3 Limitations

This study has focused only on the districts and the ecological zones but urban and rural areas have been excluded which might have given better comparison of the place of residence on access to clean water. The gender of respondents was also not included which could have given the comparison among females and males on prevalence to access clean and safe water. The occupational status also might have influence on the prevalence of access to clean water. The study focused only on determinants of access to clean water but not the reasons why those factors are determinants of access to clean. Analyses were not weighted.

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