HEALTHCARE-SEEKING BEHAVIOUR FOR ACUTE RESPIRATORY TRACT INFECTIONS AMONG UNDER 5-YEARS OLD CHILDREN IN RURAL KENYA

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DECLARATION

This research project is a completely original piece of work that has not been submitted to any other university for the purpose of earning a degree.

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This research project has been submitted for review with my approval as University Supervisor.

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DEDICATION

My wife Evelyn Momanyi, my two kids Elysia and Elsie, as well as my parents and siblings, are the recipients of this work's dedication.

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ABBREVIATIONS AND ACRONYMS

ARIs:	Acute Respiratory Infections
WHO:	World Health Organization
LMICs:	Low- and Middle-Income Countries
ODA:	Official Development Assistance
KDHS:	Kenya Demographic Health Survey
RTIs:	Respiratory Tract Infections
MOH:	Ministry of Health

ABSTRACT

Acute Respiratory Infections (ARIs) are the number one cause of death in young children, accounting for more than two-fifths of all deaths in Sub-Saharan African countries. ARIs are still the chief cause of below 5 mortalities in Kenya, with a persistent surge in rural areas. The study was designed to determine health-seeking behaviour for ARIs among under-five children in rural Kenya. The specific goals were to identify the pattern of health-seeking behaviour for ARIs among children below 5 in rural Kenya, as well as the core determinants influencing health service utilization among under-five children with ARIs in rural Kenya. The study used the Kenya KDHS (2014) dataset to model the hypothesized association. To investigate the impacts of various factors influencing health-seeking behaviour for ARIs among under-five children with ARIs in rural Kenya, both descriptive and inferential analyses (probit regression model) were used. According to the findings, the prevalence of ARI among under-five children in rural Kenya was 4.7 percent. It was discovered that child age, education levels (primary, secondary, and tertiary), and socioeconomic status (poor, middle, and rich) all had a positive and significant effect on ARI health-seeking behaviour among under-five children in rural Kenya. Only age squared has a statistically significant effect. On the basis of the results, the study suggests that the national and county governments of Kenya design specialized healthcare programs for ARIs, including a variety of sources and appropriate counseling, so that mothers with children below the age of 5 can make a knowledgeable decision and have easy access to quality follow-up services. The government should adapt the curriculum to include instruction on specialized healthcare services and the advantages of these services for this unique demographic. In addition, government agencies and independent organizations must renew their commitment to implementing and monitoring healthcare service delivery strategies to ensure adherence to and provision of the most appropriate specialized healthcare services for mothers of all socioeconomic levels who have children with ARIs in rural areas.

CHAPTER ONE: INTRODUCTION

1.1 Background

ARIs globally are the main mortality cause among young children, with more than two-fifths of these deaths occurring in Africa. In high-income nations, where ARIs were the leading cause of infant mortality a century ago, their burden has decreased dramatically (Yaya & Bishwajit, 2019). Nonetheless, ARIs continue to be the most prevalent infectious illness in many prosperous nations, including the United States. Several African nations have achieved significant success in lowering maternal and child mortality as a result of substantial programmatic initiatives to improve child health-related Millennium Development Goals (MDGs) indicators (Orayo, 2020). Unfortunately, there has been wide variation in the rate of development; some nations, like Uganda, have seen minimal growth in the last 20 years in terms of improving the health of children. A study of Uganda's Demographic and Health Surveys found a rise in the death rate for children five 5 years old between the years 1995 and 2000 (147.3 deaths per 1000 live births in 1995 compared to 151.5 deaths per 1000 live births in 2000). WHO estimates that respiratory diseases account for 6 percent of the world's diseases, which is significantly higher compared to the burden of cancer, diarrheal disease, ischemic heart disease, HIV infection, and malaria (Naghavi et al., 2017). About 12 million hospital admissions of children below the age of five occur every year as a result of ARIs. In a sixteen-year survey on the circumstances and etiology of deaths in the northern United States, ARIs were found to cause more mortality in children, accounting for 24 percent (167) of all deaths, followed by malaria at 21 percent (152) and diarrheal diseases at 19 percent (133), making ARIs be the leading country's public health concerns for children below the age of five (Hyöty et al., 2017). Moreover, it is predicted that 3,9 million children died worldwide from ARI in the year 2012, with 98 percent of these deaths attributable to lower respiratory tract infections (Pegoraro &

Wannaz, 2019). Each year, ARI affects approximately four to five children aged below five years. Children under the age of five make up 20% to 40% of all hospital admissions, with ARI accounting for 30% to 50% of all hospital visits. Around 73% of the projected 10.4 million deaths of children below 5 years worldwide were attributed to ARIs (WHO, 2012).

At the regional level, Dagne et al. (2020) IRI and related factors in children younger than five who were admitted to the children's ward of the Gondar University Comprehensive Specialized Hospital, which is found in Northwest Ethiopia. They discovered that in children less than two years old prevalence was substantially higher, males, and children from the poorest quintiles of households when compared to the wealthiest group. Numerous studies have discovered that interactions between behavioral, socioeconomic, and environmental factors contribute to childhood morbidity in Sub-Saharan Africa's low- and middle-income countries (LMICs). According to Akpinar-Bayizit (2020), socio-demographic factors and the spread of ARI in these countries are inextricably linked.

Kenya, like other countries at a similar development stage, has a high rate of infectious diseases. This is mainly due to poor healthcare arrangements, a rising HIV and malaria epidemic, socioeconomic disparities in the delivery of care, seasonal outbreaks of water-borne diseases, lack of access to clean sanitation facilities and water, and pollution in the environment (Chan et al., 2019). Gender-based crimes and Armed conflict, which slow down development efforts and hurt people's health, especially in vulnerable groups like women and children, make the public health and healthcare situation worse.

Kenya also gets a lot of foreign aid, the Official development assistance (ODA), which comes from other countries, makes up about 10% of the national budget. Aid to the healthcare sector has

made a big difference in lowering the overall number of diseases, however, there is no proof that this aid has any effect on known causes of child death, like ARIs.

1.2 Statement of the Problem

ARIs can have a substantial influence on a child's life, especially when medical care is lacking or not sought. Two of the four primary treatment options for Acute Respiratory Infections (ARIs) are early identification and prompt treatment (Yaya & Bishwajit, 2019). According to the WHO, ARIs are the main cause of disease in Kenya, accounting for a total of 960 460 visits per year (9.32 percent). The 2017 IDHS found that about 8 percent of children under the age of five who displayed signs of ARI went untreated. As a public health issue, acute respiratory infections (ARIs) continue to be a significant source of concern.

One of the 15 nations responsible for 75 percent of the world's mortality from respiratory tract infections (RTIs) in Kenya. According to KDHS 2014 report, 9 percent of children below five had ARI in the two weeks after the survey (KDHS, 2014). This percentage is expected double by 2025 if nothing is done. Four hundred thousand children under the age of five are anticipated to have died in Kenya between 2013 and 2020, with about half of those deaths taking place in rural regions where ARI was the main cause of death (MOH, 2020).

Acute respiratory tract infections have been the subject of several empirical studies. For instance, Mulatya and Mutuku (2020) conducted research in Kenya to investigate the prevalence of ARIs and diarrhea in young infants. The researchers found that having older caregivers and living in the top quintile of income were the key factors linked to lower probabilities of combined morbidity from diarrhea and ARI. It is evident from the empirical literature, among other sources, that little research has been done to examine how young children with respiratory tract infections who live

in rural regions seek out health care. As a result, this research was conducted to empirically investigate the health-seeking behavior of children aged below five-year-old in rural areas of Kenya for respiratory tract infections.

1.3 Research Questions

i. What are the health-seeking behaviors for respiratory illnesses among under-five children in Kenya?
ii. Which are the determinants of healthcare seeking among under-five children with acute respiratory tract infections in rural Kenya?
iii. What are policy recommendations based on the findings?

1.4 Objectives of the Study

The specific objectives are:

i. To establish the health-seeking behaviors for respiratory illnesses among under-five children in rural Kenya.
ii. To examine the determinants of healthcare seeking among under-five children with acute respiratory tract infections in rural Kenya.
iii. To suggest policy recommendations based on the above findings

1.5 Study Justification

This research is justified because it has the potential to inform health ministry policymakers and administrators about the policy-making and implementation process in the ministry of health. Moreso, despite the government's numerous efforts to contain the spread of ARI, it continues to be a challenge, raising questions about the possible factors influencing this spread. As a result,

policymakers in this sector will view this as critical in developing credible policies that can be used to combat the spread of the ARI in Kenya.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

In this section, a theoretical overview of healthcare-seeking behavior for ARIs among children under the age of 5 in rural Kenya is discussed. The empirical literature review is thoroughly explained, highlighting past studies and variables to be used. Finally, there is an overview review of the literature.

2.2 Theoretical Literature

The theories reviewed include the theory of the human capital consumption model and the Human service model. The study reviews the following theories as they inform on health-seeking behaviors for ARIs for children under 5 years old.

2.2.1 Theory of Human Capital

Grossman's (1972) model describes Health capital as a durable consumption and an investment good. The utility is gained directly from the health stock that an individual is endowed with. Factors associated with the efficiency of the production process include higher literacy, employment status, and higher socioeconomic class. According to a study investigated by sultana et al. (2019) on factors, Prevalence, and healthcare-seeking of childhood ARTIs in Bangladesh, the education level of the mother, household lifestyle, and wealth index characteristics were linked with the prevalence of ARIs. Health capital depreciates over time and must be replenished to avoid being depleted to zero. Acute respiratory infections in children have been linked to child mortality if medical attention is not sought promptly or at all.

2.2.2. Health service utilization model

Anderson and Newman (1973) model categorizes factors affecting health services utilization into three areas: These include, enabling, need factors, and predisposing. Predisposing factors include individuals' characteristics that put them in a position to utilize health services. According to (Yaya & Bishwajit 2019), mother's age in the older age cohort and high levels of education related to health-seeking behavior in children with ARIs. Enabling factors are individual resources that increase the likelihood of health services. Mulatya and Mutuku (2020) showed that mothers in from the 3^{rd}- 5^{th} quintile had a higher likelihood to utilize health services for children with ARIs. The last component is need factors. Professional evaluation is needed with the severity of an illness.

2.3 Empirical Literature

Adesanya et al. (2017) researched the determinants that contribute to geographical disparities in ARIs signs in Nigerian children below 5 years. The cross-sectional study relied on nationally representative surveys steered in 2003, 2008, and 2013. In the data analysis, multivariate logistic regressions were used. The findings revealed that child age (12 months), low maternal education, a child who did not have a vaccination card, and a short birth interval were all linked with ARIs in children.

Children below five years may be more prone to seek medical attention for ARIs if their caretakers have certain socio-demographic characteristics. A cross-sectional study on patterns in the prevalence and care-seeking habits for ARIs among Ugandan newborns was conducted by Yaya and Bishwajit (2019). Mothers between the ages of 15 and 49 were included in the UDHS, which was done in the period between 1995 and 2016. The findings showed that mothers in the third to

fifth quintiles of society, who were between the ages of 25 and 34 and came from wealthy homes, had a preventive impact on the development of ARIs in children. In addition, high educational levels, mothers' employment status, and urban residency of the household were also determined to be significant and reduced the ARIs occurrence in children below 5 years. In addition, the likelihood of not seeking and obtaining treatment for fever/cough and other ARIs was low across all studies.

A study was done by Sultana et al. (2019) to establish the determinants, healthcare-seeking behavior, and prevalence of childhood ARIs in Bangladesh. The data was obtained from the Bangladesh DHS of 2014. The study used logistic regression analysis to evaluate socioeconomic and demographic factors in connection to children's health-seeking behavior for ARIs. The study noted that 5.42% of children were symptomatic of ARIs in the two weeks before the survey. 90% of Households sought health services for their children who presented with symptoms. High Health seeking behavior was significant and positively associated with parents from the higher socioeconomic class, child's age < 12 months, child's sex (male), high literacy levels of the parents, the age of the mother (young mothers), and small family size.

Ndungu, Okwara, and Oyore (2018) conducted a cross-sectional survey of children below 5 in rural Kenya who sought medical attention for acute respiratory illnesses. Structured questionnaires were used to gather information among caregivers who had children below five years and had suffered an episode of ARI 2 weeks preceding the study. Analysis of multivariate and bivariate data were utilized to examine the relationship between caregivers' seeking behavior and ARIs. The findings revealed that 74.3 percent had an ARI episode and 62.1 percent had delayed health facility consultation. Lack of understanding about ARIs by children's caregivers as well as their inability to recognize symptoms were linked to delayed health care and facility consultation. The research

recognized that an increase in how far the hospital is had a negative impact on health service utilization.

Timkete (2018) carried out a study in Ethiopia to investigate factors influencing healthcare-seeking for young children under 5 years old with ARI signs. This survey was based on the 2016 EDHS for children below 5 years who had ARI symptoms. The bivariate logistic regression analysis method was used, and the finding revealed that having a female child had a negative effect on seeking health care while high levels of maternal education were positively correlated with seeking health services. The study further noted that female-headed households had a higher probability of seeking health care for a sick child likened to male-headed households. Rural residency among mothers was found to be negatively correlated with the likelihood of seeking care from health facilities.

Mulatya and Mutuku (2020) assessed the Comorbidity of Diarrheal disease and ARIs in Children below 5 five years**.** The study used collected from the Kenya DHS 2014. According to the findings of the study, having a high-wealth position and being an elderly caregiver were inversely related to the risk of combined morbidity from ARI, and diarrhea.

In yet another study by Tazinya et al. (2018) assessed risk factors for ARIs in under 5 years old children attending a Regional Hospital in Cameroon. The study was a cross-sectional analytic study that was done between December 2014 to February 2015. A logistic regression model was used to do a multivariable analysis in the study. The study established that risk factors like contact with a person having ARI, maternal education, having HIV infection, exposure to wood smoke, and passive smoking were significant and positively associated with ARIs.

High levels of literacy influence the attitudes, knowledge, and behaviors of mothers about acute respiratory infections. A study in Bangladesh by Khan, et al. (2018) investigated the Knowledge, Attitude, and Practices of Mothers regarding ARIs in under five Children. A cross-sectional study of 290 mother-child pairs who attended the outpatient department was conducted between August and December at the Upazila Health Complex. Semi-structured questionnaires were utilized to collect data, and the Chi-square test was used to analyze the data. The findings showed that the mothers who attended the facility had good knowledge of ARIs and their symptoms, aggravating factors, and complications. It was also noted that the majority of the mother's attitude was appropriate and had a positive effect on consultation with a qualified medical practitioner once a child presented with ARIs symptoms.

2.4 Overview of empirical Literature

Socioeconomic and demographic characteristics of caregivers have been shown to influence health-seeking behavior for ARIs for children aged less than five years old. Factors that lowered the odds of seeking health services once a child presented with ARIs included the child's age (< 12 months), vaccination, and child sex (male). Maternal attributes included high literacy levels, age (young mothers), employment, and higher socioeconomic class. Other factors included birth interval, residing in urban regions, and small family size (Yaya & Bishwajit 2019; Sultanah et al., 2019; Timkete, 2018; Khan et al., 2018; Adesanya et al., 2017).

Combined morbidity from diarrhea and ARIs in children was associated with a high wealth index and older-aged caregivers (Mulatya & Mutuku, 2020). The risk factors that were significant and had a higher likelihood of children being prone to ARIs included: poor maternal education, infection with HIV, exposure to and wood smoke, passive smoking, and contact with a person having ARIs (Tazinya et al., 2018). On the other hand, health-seeking behavior was positively

associated with female-headed households with male children and a short distance from the health facilities (Ndungu, Okwara & Oyore 2018; Timkete 2018).

According to the literature, investigations on factors related to ARIs in children below 5 years old have focused on caregivers' characteristics of health-seeking behavior. However, few studies have been done in Kenya, exploring children's attributes and associated factors in seeking health services in rural regions. As a result, this study looked into the health-seeking habits of children below 5 who have acute respiratory infections in rural Kenya.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

The methodology and data used to estimate various health-seeking behavior models were explained in this section. The variables of the study have been defined. There is also an outline of the theoretical and econometric models.

3.2 Theoretical model

This study was grounded on the utility maximization model which presumes that, in the existence of competing alternatives, a consumer's decision to allocate his income is guided by the choice which maximizes utility (Orayo, 2020). In this case, a sick individual is faced with having to choose whether to consume health care services or not, subject to budget constraints. The derived utility a consumer expects on the condition of seeking health is dependent on the consumption of both health (H) and non-health goods (C) and can be expressed as:

$$U = f(H, C) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.1)$$

Where:

U is the direct conditional utility that an individual anticipates having after utilizing health services.

H is the direct benefit in the health status of an individual after health care consumption from health care providers.

C is the consumption of non-healthcare goods conferring direct benefit to an individual but has no direct impact on health.

The decision by an individual on the consumption of health services is constrained by the individual's budget. The budget constraint is expressed as follows:

(i) $Y=HP_H+ CP_C$ …… *(3.2)*

Where Y is the annual income, HP_H is the price paid for health care and CP_C is the cost of non-health goods. The health production function is given by;

(ii) $H = f(I, H)$ …… *(3.3)*

Where I represent individual health care and H is the health-related goods. Equation 1, 2 and 3 yields the Langragian function solving the optimization problem which is expressed as follows.

(iii) $L = U\{C, f(I, H)\} + \lambda (Y - HP_H - CP_C)$……*(3.4)*

This Equation when solved gives the optimal values of C* and H* which maximizes the utility of the consumer which is the health demand function expressed as follows:

(iv) $H = f(HP_H, CP_C, Y, S)$ …… *(3.5)*

Where H is the demand for health care services by an individual, P_H and P_C are prices paid for both health and non-health related goods and S represents social-economic and enabling factors. Health care service demand by an individual is dependent on affected prices of goods and services, income, socio and demographic factors of the sick individual, and enabling factors.

3.3 Econometric model and specification

This research employed Probit model regressions to analyze determinants of health service consumption since the dependent variable in this study is binary in nature. Further Probit regression model assumes a cumulative distribution of a normal function of the standard of the normal distribution. The focus of the study is on whether or not caregivers seek medical attention

for young children under 5 with ARI symptoms. Therefore, taking two values 0 if no and 1 if yes. The assumption made is that the probability of an individual seeking health care services or not, is linear and dependent upon underlying explanatory variables as shown below:

$Y=xi\beta+\varepsilon$ …….…… (3.6)

Where Y is the dependent variable of seeking health services or not seeking healthcare services

xi represents the explanatory variables that determine the decision to seek health, β are estimated coefficients and ε is the stochastic error term.

A decision to seek health services is linked to a notion of a latent variable Y and observed binary variable using a measurement equation of the form:

$qpyi = 1$ if $Y > k$, $yi = 0$ if $Y \leq k$ …… *(3.7)*

Where *yi* is the probability of seeking health services k is the threshold point of Y of which if it exceeds the individual seeks health services following ill health. The probability density function can be expressed as follows.

$\Pr(Y=1|X) = \phi(\beta_0 + \beta_1 X)$……(3.8)

The parameter vectors (βs) were assessed using the Maximum Likelihood Estimator (MLE) using the Stata software. The marginal effects of a unit variation of explanatory variables in predicting the likelihood of seeking health services were obtained using the equation below:

$\delta p/\delta xi = \phi(X'\beta)\beta_1$ …….(3.9)

Where δp is a change in the probability that $y = 1/x_i$. The specified model is as follows.

Y=β0 + β1child's age +β2 child's sex + β3 child's vaccination status + β4 mother's age + β5 Household wealth + β6 mother's status of employment +β7 mother's level of education + β8 family size + β9 birth interval + β10 place of residence + error term (ε)…… (3.10)

Seeking health services (Y) were presented as a function of predictor variables which are the child's attributes (age, sex, and vaccination status), maternal attributes (age, socioeconomic, education level, family size, employment, and birth interval). The study used place of residence variable to extract data on respondents residing in rural areas in Kenya.

3.4 Variable definition, measurement, and expected signs

Table 3.1: Description of variables

Variable	Variable definition	Measurement	Hypothesized sign
Dependent variable			
Health seeking behavior	Mothers had sought health care services for children who presented with ARIs.	1 if yes, 0 if no	
Independent variable			
Child's age	Number of complete months of life	Age n months	Negative
Child's sex	Categorized as male or female	1 if Male 0 if Female	Positive
Child's vaccination status	A child vaccinated against measles, pneumococcus, diphtheria, and pertussis.	1 if vaccinated 0 if not vaccinated	Positive
Age of the mother	Number of complete years of life	Age in years	Positive
Mother's level of education	higher level of formal education attained	1 for no-education 0 if otherwise, 1 for primary 0 if otherwise, 1 if secondary 0 otherwise and 1 if post-secondary level 0 otherwise	Positive
Household wealth index	An index indicating the socioeconomic status of an individual	1 if poor, 0 otherwise, 1 if middle, 0 otherwise 1 if rich, 0 otherwise	Positive

Mother's employment status	Working arrangements of the mother regardless of whether formal or informal	1 if employed 0 if not employed	
Family size	Number of family members living in the household	Number	Positive
Birth interval	time interval between two consecutive live births, during whereby short birth interval < 24 months and long > 60 months	1 if a short birth interval 0 if a long, short birth interval	Negative

3.5 Data type, source, and diagnostic tests

3.5.1 Data type and source

The 2014 Kenya Demographic and Health Survey (KDHS) served as the source for the study's information. This survey represents a national representative sample comprising women aged between 15 to 49 years and men aged years 15-54 years drawn from all 47 counties across the country. Questionnaires were used in this survey to collect data providing various indicators representative of the national level. KDHS 2014 provides adequate information on household characteristics, vaccination status, and ARIs symptoms for children aged 12-23 months weeks before the survey in rural region. Hence the most suited for analyzing health-seeking behavior of ARIs in young children aged below five years in rural Kenya.

3.5.2 Diagnostic tests

The study is expected to fulfill the normalcy conditions for the error term (Mukras, 1993). Because model estimators are linear functions of the error term, was tested via the Shapiro Wilk test to ascertain normal distribution. To determine whether data are regularly distributed, the Shapiro Wilk test was utilized. Due to the observation of several participants simultaneously, a multicollinearity analysis is required, which was examined using the VIF test. In regression

models, the variances of error components typically fluctuate across data, indicating the existence of heteroscedasticity. This was examined through scatter plots.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1 Introduction

Empirical findings, interpretations and discussion examining Healthcare-seeking behavior for acute respiratory tract infections among under 5-years old children in rural Kenya are depicted. The study results are grounded on the following specific objectives; First, to establish the health-seeking behaviors for respiratory illnesses among under-five children in rural Kenya. Secondly is to examine the determinants of healthcare seeking among under-five children with acute respiratory tract infections in rural Kenya. The empirical results are presented through figures and tables. Lastly, to suggest policy recommendations based on the study results.

4.2 Descriptive Statistics

The study in the first objective, explored the demographic profile of both respondents in this case mothers and their children under five years in rural Kenya. The reviewed literature influenced the choice of variables in children under five years and its determinants. The dependent variable was acute respiratory infections in below 5 which is a binary variable given identified characteristics in both mother and child under five from the reviewed literature. They include sex of the child, age, vaccination status, size, education, mother's age employment status, income, residence, household size, family size and birth interval which form independent variables.

From Table 4.1 which presents the descriptive statistics show that approximately a total of 19,463 respondents of children under five years were surveyed. The findings revealed that children were aged between 0 to 59 months with approximate mean age of 26 months of out of 19,463 who

responded to the survey. The sex of the children revealed that, majority were female at 53.3 percent of 19,463 respondents. On the other hand, 78 percent of 19,351 children were immunized.

Most of the mothers out of the 19,463 were approximately aged 19 years on average when they gave birth, 13 being the youngest while 33 years old was the oldest. On education attainment, the findings revealed that most mothers that is 76% had attained primary education followed by 37% of the mothers who had achieved highschool education level. On the other hand, only 8 percent of the mothers attained tertiary education while 2 percent had no formal education.

Regarding the source of income, approximately 18 percent of 19,415 mothers were working. Regarding wealth index, majority at 73 percent were at lower socio-economic class, followed by 24 percent in the middle class whereas only 2 percent belonged to upper economic class. The findings also revealed that household size was 6 members per household sampled. Whereas birth interval, were 3 children.

Table 4.1: Summary statistics of mothers and children under five with ARIs

Variable	Observation	Mean	Std. Dev.	Min	Max
Child's age	19,463	26.88086	17.3645	0	59
Child's sex (M=1)	19,463	0.4666042	0.5006	0	1
Child's vaccination status	19,351	0.7803922	0.13698	0	1
Age of the mother	19,463	19.1746	2.7561	13	33
No education	19, 463	0.02253	0.1087	0	1
Primary	19, 463	0.7653	0.4132	0	1
Secondary	19, 463	0.3785	0.3830	0	1
Tertiary	19, 463	0.07705	0.1885	0	1
Poor	19, 463	0.73681	0.4968	0	1
Middle	19, 463	0.2439	0.4405	0	1

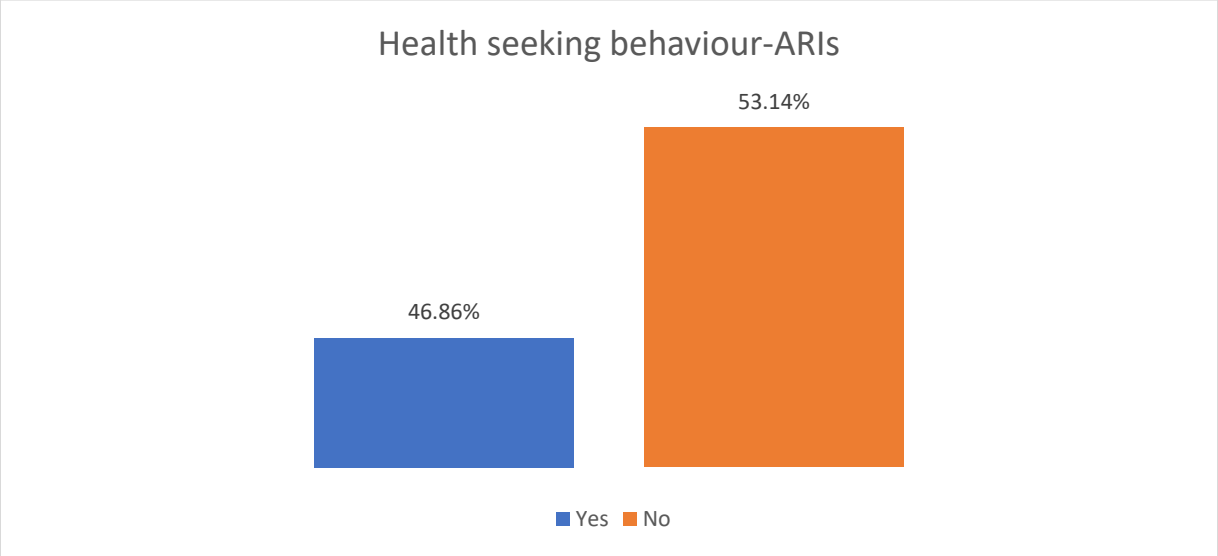
Rich	19, 463	0.1898	0.3841	0	1
Mother's employment status	19, 463	0.1875	0.2893	0	1
Family size	19, 371	6.1432	2.2715	1	20
Birth interval	19, 463	3.1683	4.3742	1	10

Source: Computation based on KDHS (2014)

4.3 Pattern of Healthcare-seeking behavior for ARIs in under-five in rural Kenya.

The original goal of this research was to learn how often children under the age of five in rural Kenya seek medical attention when they develop a respiratory illness. The study focused on mothers who brought their children to the doctor for treatment of acute respiratory illnesses. The following symptoms, including cough and short, quick breathing, characterized ARIs in children under 5 years: About 47% of children younger than five in rural Kenya sought medical attention for ARIs in the two weeks prior to the research as shown in Figure 4.1.

Figure 4.1: Health-seeking behaviors for ARI among under five children in rural Kenya



4.4 Diagnostic Tests

The following tests were carried out in a bid to obtain correct standard errors which would be used in testing hypothesis. The findings for each diagnostic test is presented and discussed.

4.4.1 Multicollinearity test

To assess the existence or absence of multicollinearity, correlation coefficients and shown in the correlation matrix (table 4.5). According to the computed correlation coefficients, all pairs of variables were found to be correlated moderately. Most correlations have absolute values less than 0.5. According to Mukras (1993), there was no any difference which thus made the corresponding pairs be subjected in more analysis. As could be seen, the dependent variable Health seeking behavior was positively correlated with child's gender, employment, wealth index, education, whereas vaccination status of the child, household size and birth interval had a negatively correlation with dependent variable which is health seeking behavior among children under five years.More details are shown in Table 4.2.

Table 4.2: Correlation Matrix

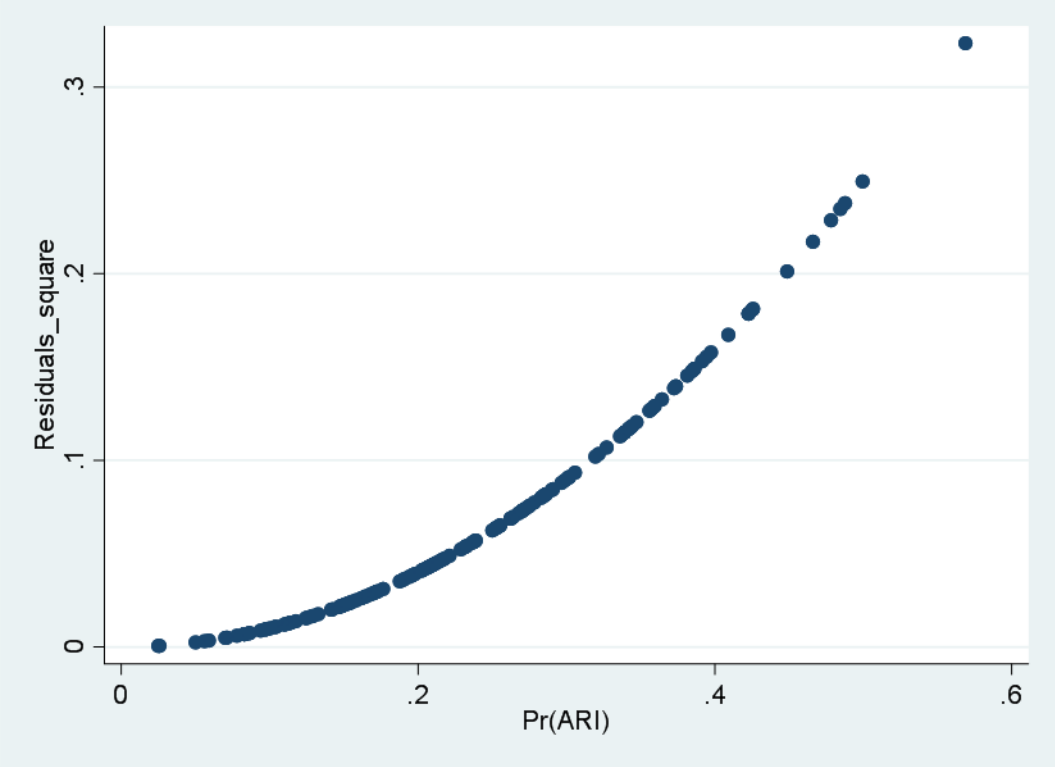
Variables	Child's age	Child's sex	Wealth index	Edu-cation	House-hold size	employment	Wealth index	Birth interval	Vaccination status
Child's age	1.0000								
Child's sex	-0.0034	1.0000							
Wealth index	0.0036	-0.0154	1.0000						
Education	0.024	-0.0159	0.043	1.0000					
House-hold size	-0.0290	-0.0039	0.1223	0.1060	1.0000				
employment	0.0155	-0.0069	-0.0125	-0.0327	-0.1785	1.0000			
Wealth index	0.0066	-0.0174	-0.0623	0.0066	-0.0174	-0.0623	1.0000		

Birth interval	0.0773	0.0269	-0.0671	0.0291	-0.0265	0.0019	0.0203	1.0000	
Vaccination status	0.0595	-0.0014	0.0327	0.0842	0.0784	0.0688	-0.0122	-0.0928	1.0000

4.4.2 Tests for Heteroscedasticity

Heteroscedasticity test was done using residual plot method which entails graphing the squared residuals against the expected values of the dependent variables. A systematic pattern between plotted variables, depict presence of heteroscedasticity while non-systematic pattern. From the findings in figure 4.2 there is no constant variance depicting that there is presence of heteroscedasticity. The study therefore employed robust standard errors in the final model to correct the problem shows there is homoscedasticity.

Figure 4.2: Scatter Plots of Residuals against the Fitted Values of ARI



4.6 Model Estimation (Healthcare-seeking behavior for ARIs)

Acute respiratory tract infections among children less than 5 years old in rural Kenya was the primary focus of this study. Because of this, a Probit regression model was used. To evaluate the overall fit of the model, we used the R2 and F tests. The outcomes of this regression are shown in Table 4.3.

At the 5% level, both the coefficient on the age of the kid (= 0.1941, p value=0.000) and the coefficient on the age squared (= -.0031, p value=0.000) were determined to be statistically significant. The coefficient on the child's sex was negative and not statistically significant (= 0.1592, p value=0.319).

Table 4.3: Robust Probit Regression Results

Probit Regression Number of observations = 19,351 Wald chi2(14) = 35.58 Pseudo R2 = 0. 0713 Prob > chi2 = 0.0042 Log likelihood = -260.74387						
Health seeking behaviour	Coefficients	Robust Std. Err	z	P>z	[95% Conf.	Interval]
Child's age	.1940**	.0162	11.98	0.000	.1623	.2257
Age of child Squared	-.0031**	.0002	-12.44	0.000	-.0035	-.0026
Child's sex (M=1)	-.1592	.1597	-1.00	0.319	-.4721	.1537
Child's vaccination status	.0534	.0448	1.19	0.233	-.0344	.1412
Age of the mother	.1089	.0599	1.82	0.069	-.0086	.2263
Education Level						
Primary	.4790**	.0840	5.70	0.000	.3143	.6437
Secondary	.4463**	.0907	4.92	0.000	.2685	.6241

Tertiary	.5778**	.1016	5.69	0.000	.3786	.7770
Wealth index						
Poor	.2315**	.0623	3.71	0.000	.1093	.3536
Middle	.2791**	.0634	4.40	0.000	.1549	.4034
Rich	.4113**	.0668	6.16	0.000	.2804	.5422
Mother's employment status	.0490	.1475	0.33	0.740	-.2402	.3381
Family size	.0457	.0753	0.61	0.544	-.1019	.1933
Birth interval	.0453	.0500	0.90	0.366	-.0528	.1434
-cons	-2.7806	.4460	-6.24	0.000	-3.655	-1.9066

***Significance at 5% level.*

On child's vaccination status, the coefficient was non-significant and positive (β= 0.053, p value=0.233). On mother's age, the coefficient ((β=.1089 p value=0.069) was statistically non-significant at 5% level of significance. On different levels of educational, the coefficient on primary education was 0.4790 with a p-value of 0.000, showing that respondents who attained basic level of education had higher probability of seeking health services following occurrence of ARIs by 0.4790 points compared to those without education. The secondary education coefficient was 0.4463 with a p value of 0.000 showing that respondents who attained high school level of education increased use of utilization of ARIs services by 0.4463 points compared to their counterparts without education. Further, the findings indicated that the coefficient on higher education (β=0.5778, p value= 0.000) was positive and significant statistically. This implies that participants who were reported to have high education levels had increased health seeking behavior for ARIs by 0.5778 points compared to those who had no education.

Wealth index measuring the socioeconomic status in this study was found to be significant statistically. The outcomes specifically demonstrated that children born from the middle wealth

quintile were less likely to seek health services for ARIs by 0.2791 points with p value of 0.000. The results show that being in middle wealth quintile compared to those in poor wealth quintile increased the probability of seeking health services for ARIs significantly by 0.2791 points holding other factors constant. Those in the rich wealth quintile (rich or richest class) according to the finding have high probability of obtaining treatment following ARIs 0.4113 points with p value of 0.000. The results show that being in rich wealth quintile compared to those in poor wealth quintile increased the probability of seeking health services for ARIs significantly by 0.4113 points holding other factors constant.

The coefficient on employment (β= 0.0490, p value=0.740) was positive and statistically non-significant at 5 percent. The findings show that employment increased the probability of seeking health services for ARIs significantly by 0.049 points holding other factors constant. Although this effect was not significant.

The coefficient for household size was at 5% level positive and statistically non-significant. The outcomes show that a child from a household with more members of the household increased the likelihood of seeking health services for ARIs among under five children by 0.0457 points with a p value of 0.544 holding other factors constant. An additional member to a household affected health seeking behavior among children under five with ARIs although insignificantly. Whereas short birth interval (short birth interval < 24 months) influenced health seeking behavior positively by 0.0453 points with a p value of 0.366. The finding indicates that those with short birth interval < 24 months increased the probability of seeking health services for ARIs significantly by 0.0453 points holding other factors constant compared those with long birth interval > 60 months. The coefficient was not statistically significant. The results for marginal effects are as shown in table 4.4.

Table 4.4: Average Marginal Effects (Health seeking behavior)

Health seeking behaviour	Marginal Effects	Std. Err.	Z	P>z	[95% Conf.	Interval]
Child's age	.0275**	.0023	11.89	0.000	.0230	.0321
Age of Child Squared	-.0004**	.00004	-12.35	0.000	-.0005	-.0004
Child's sex (M=1)	-.0197	.0212	-0.93	0.352	-.0612	.0218
Child's vaccination status	.0076	.0064	1.19	0.233	-.0049	.0200
Age of the mother	.0029	.0057	0.51	0.609	-.0082	.0140
Education levels						
Primary	.0528**	.007	7.50	0.000	.0390	.0666
Secondary	.0480**	.0082	5.89	0.000	.0320	.0640
Tertiary	.0684**	.0114	6.00	0.000	.0461	.0908
Wealth index						
Middle	.0352**	.0077	4.57	0.000	.0201	.0502
Rich	.0565**	.0089	6.32	0.000	.0390	.0740
Mother's employment status	.0069	.0202	0.34	0.733	-.0327	.0464
Family size	.0118	.0195	0.61	0.544	-.0263	.0499
Birth interval	.0107	.0118	0.90	0.365	-.0125	.0339

The findings in Table 4.4 indicate the marginal effects. The coefficient on child's age (β=0.0275, p =0.000) was found to be associated with health seeking behavior of an under-five child with ARIs in rural Kenya. This shows increase in the probability of seeking for ARIs services by 2.75%

holding other factors constant. The coefficient on age squared (β= -0.0004, p =0.000) was however shown to have a at 5% level negative and statistically significant effect. This means that age of the child had a nonlinear relationship with health seeking behavior of children under 5 with ARIs. This implied that as a child with ARI advance in age, the effect in health seeking behavior for ARIs is stronger hence it increases.

The coefficient on child's sex had significant and positive impact on health seeking behavior (β= -.0197, p value=0.352). This implies that male children were more probable to seek health services for ARIs significantly by 1.97 percent holding other factors constant compared to their female counterparts.

The coefficient on vaccination status of a child s had a significant positive effect on health seeking behavior in under five with ARIs in rural Kenya. (β= 0.0076, p value=0.233). This coefficient was statistically non-significant and revealed that a child who was immunized, had higher chances of seeking health services following ARIs by 0.76 percent keeping other factors constant compared to those who were not immunized.

Mother's age was shown to be statistically insignificant (β= 0.0029, p value=0.609) at 5% level of significance and implying a positive non-significant association with children suffering from ARIs seeking health services by 0.29 percent. This depicts that as the mother's age advances there is high likelihood of seeking health services for children who develop ARI cases compared to children with teenage/young mothers. However, this was not significant.

In terms of educational attainment, persons with elementary, secondary, and university education were compared to the uneducated. The coefficient on primary education was (β= 0.0528, p value = 0.000), showing that children whose mothers had obtained elementary school were 5.28 percent

more likely to seek health care than those whose mothers had no education. The coefficient on (= 0.048, p value = 0.000) reveals that parents who completed some kind of secondary school were 4.8% more likely to take their kids to the doctor than those who did not. Equally as convincingly, we found that the coefficient on graduate education is positive and statistically significant (= 0.0684, p=0.000). Preschoolers with acute respiratory infections whose moms had a high school diploma were 6.84% more likely to seek medical assistance than those whose mothers did not. As a consequence, mothers with higher levels of education are better able to grasp the bigger picture when it comes to the advantages of getting medical help for their children who are afflicted with ARIs.

Wealth index in this study was significant statistically for health seeking behavior for children under five years with ARIs in rural Kenya. The results demonstrated that children born from middle wealth group had less probability of seeking health services for ARIs by 3.52 percent whereas those in the middle rich group were more probable to seek ARIs health services by 5.65 percent. In addition, children considered to be in the rich wealth quantile have a higher likelihood of seeking ARIs health services by 0.89 percent at 5 % level of significance.

The coefficient on employment (β= 0.0069, p =0.733) at 5% was positive and statistically non-significant. The outcomes show that a child whose mother is employed increased the likelihood of seeking health services insignificantly by 0.6% keeping other factors constant. This result means that mothers who are on any employment are likely to cater for the cost of obtaining health services for their children suffering from ARIs compared to those mothers who are not under any employment.

The coefficient for family size was statistically significant (β= 0.0118, p =0.544). The findings show that children from a higher family size were more probable to seek ARIs health services by

1.18 percent holding other factors constant. On the other hand, children who had a shorter birth interval, had a more likelihood of seeking ARIs health services compared to children with long birth interval by 1.07 percent. The coefficient was however not statistically significant at 5% level of significance.

4.6 Discussion of the Probit Regression Results

From the estimated Probit model, the coefficient on age was found to be positive and significant statistically meaning that an additional child's age, increases the likelihood of a child with ARIs residing in rural Kenya seeking health services. The coefficient on age squared was however shown to have a negative at 5% level and statistically significant effect. This means that age had a nonlinear relationship with health seeking behavior of children under five with ARIs. This implied that as a child with ARI advance in age, the effect in health seeking behaviour is stronger hence it increases. The study findings concur with findings of Sultana et al., (2019) to who sought to establish the determinants, healthcare-seeking prevalence and behavior of childhood ARIs in Bangladesh. Their findings indicated that high ARIs health seeking behavior was significant and positively associated with child who is younger below 12 months.

Child's sex had a positive and non-significant coefficient. This implies that male children were more likely to seek health services holding other factors constant compared to their female counterparts. Similar studies done by Timkete, (2018) in Ethiopia agree to these findings. The findings revealed that having a female child had a negative effect on seeking health services. The coefficient on vaccination status of a child had a non-significant positive effect on health seeking behavior in under five with ARIs in rural Kenya. A child, who was immunized, had higher chances of seeking health services following ARIs other factors kept constant compared to those who were not immunized. Adesanya et al. (2017) supports the findings as they found out that a child who

did not have a vaccination card lowered the odds of seeking health services once a child presented with ARIs.

Mother's age was shown to be statistically at 5% level of significance non-significant and had a positive association with children suffering from ARIs seeking health services. This depicts that as the mother's age advances there is high likelihood of seeking health services for children who develop ARI cases compared to children with young mothers. This is not similar to the findings by Mulatya and Mutuku (2020), who found that there was a postive and significant correlation between older care givers and high likelihood of seeking health services for children suffering from ARIs.

Regarding levels of education Individuals with elementary, intermediate, and tertiary levels of education were likened to those with no formal schooling. The basic education level coefficient indicating that children who had mothers who had attained basic level education had higher probability of seeking health services showing that respondents who attained secondary level of education increased chances of their children seeking ARIs health services compared to their counterparts without education. In addition, the findigs showed that the coefficient on higher education was statistically significant and positive. This means that children under five with ARIs who had mothers who had attained higher level of education had increased chances of seeking ARIs health services compared to those who had no education. The outcomes means that women who are educated are more probable to understand the wider benefits of seeking health care for their children suffering from ARIs. The findings concur with studies done by Khan, et al., (2018) who noted that majority of mothers who had good knowledge and attitude had a positive effect on consultation with a qualified medical practitioner once a child presented with ARIs symptoms.

Socioeconomic status (that is wealth index) in this study was found to be significant statistically for health seeking behavior for children under five years with ARIs in rural Kenya. The results demonstrated that children born in the 3rd wealth quintile (middle) were more probable to seek health care. In addition, children considered to be in the rich wealth quantile have a higher likelihood of seeking ARI health services. These results agree with previous studies done in Kenya by Mulatya and Mutuku (2020) that whose findings noted that having a high wealth position increased high likelihood of seeking health services.

The coefficient on employment at 5% was statistically non-significant and positive. The outcomes indicate that a child whose mother is employed increased the likelihood of seeking health services. This finding implies that mothers who are on any employment are likely to cater for the cost of obtaining health services for their children suffering from ARIs compared to those mothers who are not under any employment. The findings collaborate only on the direction of effect with Yaya & Bishwajit (2019) whose studies revealed that mothers who were employed were more likely to seek health services following a child contracting ARIs.

The coefficient for family size was statistically non-significant. The findings show that children from a smaller family size were more likely to seek ARIs health services holding other factors constant. The results however failed to conform to Sultana et al., (2019) studies whose studies showed that small family size was associated with health service seeking behavior significantly among children under five. On the other hand, children, who had a shorter birth interval, had a less likelihood of seeking ARIs health services compared to children with long birth interval. However, the coefficient was not statistically significant at 5% level of significance. The findings agree with the findings of Adesanya et al. (2017), who concluded that short birth interval was positively associated with health seeking behavior among children under five years.

CHAPTER FIVE: SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This section presents the summary of the research results with comprehensive conclusions in relation to the purpose of the study that is examining the health seeking behavior of ARIs. Thereafter key policy recommendations are made. Suggestions for further studies are also made.

5.2 Summary of the findings

Globally, ARIs are the leading cause of child death, with more than two-fifths of these fatalities happening in sub-Saharan African nations. In low-income countries, such as Kenya, ARIs continue to be the major cause of death among children under the age of 5, despite a slight decline in their prevalence. Despite this, ARIs remain the most frequent infectious disease in Kenya, particularly in rural regions. The government's health-related responsibilities include coordinating and overseeing the delivery of county healthcare services, including the promotion of primary healthcare, ambulance services, public health and sanitation, disease surveillance and response, among other components.

The research was conducted purposely to establish factors affecting health seeking behaviour for ARIs among the under-5 children in rural Kenya. The specific objectives were to establish the pattern of health seeking behaviour for ARIs among under-five children in rural Kenya; the second objective is to establish the core determinants affecting utilization of health services among under-five children with acute respiratory tract infections in rural Kenya. The Kenya KDHS (2014) dataset was used as a source of data.

To model the hypothesized relationship, the research used probit regression model to expound on impacts of different factors affecting health seeking behaviour for ARIs among under-five children with acute respiratory tract infections in rural Kenya. Significance was tested at five percent levels. Dependant variable was health seeking (demand for ARIs services). Factors considered in this study as determinants include, child age, age of the child squared, child sex, child vaccination status, age of the mother, education levels (primary, secondary and tertiary), socioeconomic status (poor, middle and rich), mother's employment status, family size, and birth interval. Only and child sex were found to have a negative impact on health seeking behaviour for ARIs.

5.3 Conclusions

From the results of this study, the following conclusions are made: In the first objective; the prevalence of ARI among the surveyed under 5 children in rural Kenya was 4.7 percent that is around 110 cases in the two weeks preceding the survey. While reports from the ministry of health in Kenya indicating that four hundred thousand children under the age of five are anticipated to have died between 2013 and 2020, with about half of those deaths taking place in rural regions where ARI was the main cause of death, there remains other factors promoting or hindering access to healthcare seeking in rural Kenya. For example, child age, education levels (primary, secondary and tertiary), socioeconomic status (poor, middle and rich) were found to have a positive and significant effect on health seeking behaviour. Only age squared had a significant and significant effect.

Moreover, child sex, child vaccination status, age of the mother, mother's employment status, family size, and birth interval were all not statistically significant. In this category, only child sex was found to have a negative and non-significant effect on health seeking behaviour for ARIs among under-five children in rural Kenya. Following the empirical analysis, the study concludes

that demand side factors, and not just making services free are important in influencing health seeking behaviour of ARIs among under 5 children in rural Kenya.

5.4 Recommendations

To eradicate the increased cases of ARIs in some regions, and advocate for health seeking, the national and county governments of Kenya could adopt the following suggestions; Ideally, healthcare programs for ARIs need to be customized So as to provide a variety of resources and suitable counseling, so that women with children under the age of five in various age groups may make an educated decision and have easy access to excellent follow-up services. This is due to the fact that the age of the kid emerged as a significant driver of health seeking behavior for ARIs care.

Government agencies at the national and county levels, as well as non-governmental organizations, must recommit themselves to implementing and monitoring healthcare service delivery strategies for mothers in rural areas with children diagnosed with acute respiratory infections (ARIs), so that these families can receive the best possible specialized healthcare. This is due to the fact that research conducted on parents in rural Kenya who have children diagnosed with ARI has showed that higher socioeconomic class correlates with greater probability of seeking medical attention for their children. This conclusion supports the study's recommendation of specialized clinics for outreach workers who may be needed to lessen obstacles to care usage among children under the age of five who have ARIs.

Concerning education, those with higher levels of education are more likely to find work in the contemporary economy, and therefore to be among the first to make use of the best current medical technology has to offer. Therefore, the government should have the curriculum altered and include

instruction on the advantages of specialist healthcare services for this unique group. Young moms with children under the age of five who have been diagnosed with acute respiratory illness might benefit greatly from educational programs that raise their understanding of accessible current sources of healthcare services. This is due to the fact that a higher level of education significantly increased the likelihood that ARI children under the age of five in rural Kenya would seek medical attention.

Socioeconomic determinants that is wealth index of women were also linked or associated strongly to enhance use of healthcare services among ARI children under the age of five in rural Kenya. Therefore, the research implies that the government should explore addressing the demand side characteristics that influence healthcare service use. Irrespective of an individual's levels of empowerment, his/her ability to access and use specialized healthcare services may be influenced by health and non-health system barriers. The study suggests that such barriers including location of the patient could significantly be neutralized via giving attention to quality issues in healthcare service delivery. This is also based on the fact that residence was significantly linked to increased healthcare use among STI patients in Kenya.

5.5 Areas of further study

The research mainly explored the effect of various variables socio economic factors on maternal health seeking behavior among young pregnant women in rural Kenya. Specific objectives explored in the study are determining the general socio-demographic profiles of target population Kenya as well as establishing the effect of socioeconomic factors on ARIs of target population. The study made use of cross-sectional dataset. There are other factors such as environmental factors that were not considered on the health seeking for ARIs model. Future studies should focus

at establishing the same relationship controlling for environmental factors. Similarly, there is need to conduct such studies comparing different regions say urban or even at county levels in Kenya.

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