Treatment of Common Child Diseases in Zambia:

DETERMINANTS OF THE TREATMENT OF ACUTE RESPIRATORY INFECTION (ARI) AND DIARRHEA AMONG UNDER-FIVE CHILDREN IN ZAMBIA

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2011-2012, a year of success!

Studying what my heart desired, at the University I wished for long has been a great way to fruition.

This thesis is developed from the deep Zambian culture situated in the belief that children are the leaders of tomorrow. However, after an encounter with mothers in rural areas carrying their children on their backs ravaged by persistent episode of diarrhea, respiratory infections, and pneumonia among other child illness all I saw was a cycle of poverty, as an unhealthy childhood robes the child of any opportunity for normal growth both physically and psychic.

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AIDS	-	Acquired Immunodeficiency Syndrome
ARI	-	Acute Respiratory Infection
CRC	-	Convention on the Rights of Children
CSO	-	Central Statistical Office
HIV	-	Human immunodeficiency virus
IEC	-	Information Education and Communication
IFPRI	-	International Food Policy Research Institute
MDGs	-	Millennium Development Goals
MOH	-	Ministry of Health
NFNC	-	National Food and Nutrition Commission
ORS	-	Oral Rehydration Solution
SEA	-	Supervisory Enumeration Area
SES	-	Social Economic Status
SPSS	-	Statistical Package for Social Sciences
TDRC	-	Tropical Diseases Research Centre
TV	-	Television
UNFPA	-	United Nations Population Fund
UNICEF	-	United Nations International Children Emergence Fund
UNZA	-	University of Zambia
WHO	-	World Health Organization
ZCHSA	-	Zambia Child Health Situational Analysis
ZDHS	-	Zambia Demographic Health Survey

ABSTRACT

In developing countries children experience repeated episodes of diarrhea and acute respiratory infection (ARI), treatment of these child illnesses still remains a challenge. This study seeks to investigate factors associated with the treatment of ARI and diarrhoea among children under-five years in Zambia based on nationally representative 2007 Zambia Demographic Health Survey (ZDHS) data. Determinants of treatment are varied, thus it is interesting to investigate which ones are, among the many determinants of treatment.

On average, out of the total 909 (15.6%) and 1447 (22.6%) children who had diarrhea and ARI respectively two weeks prior the 2007 DHS, 32.5% and 34.3% did not receive any treatment for diarrhea and ARI respectively. This thesis reveals that the child's and mother's residence, father in the house, mother's access to education and media health programs as well as health care resources are key determinants of child treatment. In fact, this thesis has brings out an interesting dimension of the challenges of child treatment deep rooted location, socio-economic differences in the occurrence and treatment of diarrhea and ARI, access to child health care services and health media programs in the general population. Hence, there is need to translate existing Zambia's child policy into action to ensure all children have access to equitable child health care services.

Key Words: Diarrhea, Acute Respiratory Infection, Children Under-five years, Treatment, Zambia

CHAPTER ONE

1. Background

A health childhood has been recognized as a basis of human capital and productivity since time in memorial. Islam and Gerdtham (2006) argued that poor under-five child health undermines societal development, while improved health is the first step toward enabling children to break out of a cycle of ill-health and poverty that may otherwise continue for generations. The treatment of common childhood diseaseses in developing countries still remains a challenge unlike significant improvements in most developed countries. It is estimated that every year 9.7 million children under the age of five years die in developing countries due to preventable diseases such as malaria, respiratory infections, pneumonia and diarrhea (UNICEF, 2010).

The 2007 Zambia Demographic Health Survey (ZDHS), reported that 70 (7%) of the 1,000 children born die before their first birthday and 119 (12%) out of 1,000 live births die before reaching their firth birthday. An analysis of infant and under five mortality rates between 1992 and 2007 shows a steady decline over the four successive surveys (1992, 1996, 2001-2002 and 2007). Despite a steady decline in both infant and under five mortality rates, Zambia still remains one of the countries with high rates Sub-Saharan region (Uwazurika, et al., 2006; ZDHS, 2007).

Despite the fact that child health has generally improved overall, developing countries are still locked up in a situation of preventable and treatable child illnesses. Two of the ten main causes of childhood morbidity and mortality are respiratory infections, diarrhea and these claim millions of children each year (WHO, 2004). The Zambia Demographic Health Survey (2007) shows that 5% of the children showed symptoms of acute respiratory infection, 16% with diarrhea within two weeks prior to the survey. The treatment of these common childhood diseaseses is characterized by a varied number of factors ranging from political, socio-economic, cultural and behavioral factors (Kapungwe, 2005) these factors vary at different levels such as individual, community as well at national level.

Mosley and Chen (1984) in their attempt to explain the determinants of child health viewed child morbidity and mortality as being influenced by an interaction of what they termed the proximate determinants and the social and economic determinants that result into child morbidity and mortality. They categorized the proximate determinants into five areas namely; maternal factors, environmental contamination, nutrient deficiency, injury and personal

diseases control (Mosley and Chen 1984 cited by Ogunjuyigbe, 2004) and they further categorized the socio-economic determinants into three broad areas, namely individual level variable, household level and community level variables. The framework is based on the principle that all social and economic determinants (indirect factors) operate through a set of biological determinants (direct factors) to result into child morbidity and mortality in a society. Thus, since child mortality is as a result of cumulative factors related to morbidity, it is possible to analyze factors affecting the treatment of common child's diseases such as acute respiratory infection (ARI) and diarrhea at various levels of causality using the ideas as postulated in the Chens framework.

However, the framework provides a stronger basis of explaining the determinants of the treatment of the ARI and diarrhea as the determinants such as the personal diseases control and the socio-economic determinants may explain not only the determinants of child mortality but also the determinants of treatment for children with ARI and diarrhea. Whereas socio-economic factors and personal disease control determines the child's survival (Mosley and Chen, 1984), these factors can also directly or indirectly explain why a child with diarrhea and ARI is treated or not.

In an attempt to identify the salient determinants to the treatment of these common child diseases, the social Darwinism paradigm is used in this thesis. Social Darwinism states that as a species coped with its environment, those individuals most suited to success would be the most likely to survive long enough to reproduce (Babbie, 2010) and those less suited would perish. This paradigm provides a framework that could explain the determinants to the treatment of child diseases as those close to the health facility, educated, have income, have access to trained manpower their children are more likely to survive as opposed to others.

The treatment of child illnesses is a critical element of the push to achieve the Millennium Development Goals (MDGs), alongside skilled attendance at birth and immunisation. However it is an area that has been rather neglected amongst population researchers. One reason for this is that although the number of children visiting health facilities when ill is simple to calculate, it is difficult to assess the quality of care received; ascertain the attitudes and practices of parents/mothers; what drives them to access treatment when the child is ill, what their social economic characteristic are which are clearly related to the outcomes of child diseases and mortality. Thus this study draws the attention of population researchers to explaining the determinants of the treatment of common child diseases such as ARI and

diarrhea. The identification of the determinants of these diseases is particularly important for policy and program design as the incidence of diarrhea and ARI is quite high ranging between 2-4 and 2-6 episodes per child annually respectively (WHO, 2005 cited by Jain, et al., 2006).

1.1 Objective

The objective of the study is to determine factors affecting the treatment of ARI and Diarrhoea among children under-five years in Zambia.

1.2 General Research Question

What determines the treatment of acute respiratory infections (ARI) and diarrhea among under-five children in Zambia?

1.2.1 Specific Research Questions

a. What determines whether the child with Diarrhea or ARI is treated or not?

b. What are the determinants of child treatment between those taken to Public health facilities compared to children treated by other methods?

c. What is the difference in the determinants of treatment between children with diarrhea and ARI?

1.3 Thesis Structure

Chapter one outline the background and sets out the goal of the study. The subsequent two chapters discuss the theoretical, literature review and the methods used. In chapter two Mosley and Chen's and Kroeger's frameworks are discussed outlining their relevance in explaining determinants of child treatment. Further, it gives an account on past studies that explain some salient factors associated with child treatment.

Chapter three discusses the methods used in the analysis outlining how logistic and multinomial regression methods were employed on the ZDHS data to identify and explain determinants of treatment of diarrhea and ARI among under-five children in Zambia. It also shows the models that were estimated in both logistic and multinomial methods.

Chapter four presents the findings of the research based on the methods described in chapter three. It shows that the determinants of treatment of diarrhea and ARI in Zambia are situated within the socio-economic conditions of their mothers, access to health information and provision of health care resources. Differences in the sources of treatment are discussed in the last part of chapter four and discussed in detail in chapter five.

Lastly, reflections and conclusion are provided in chapter five- summarizing and linking the findings to both theory and literature, highlighting on the objectives and research questions of this undertaking, thus drawing recommendations for addressing ARI and diarrhea, and consequently enhancing child health in Zambia (chapter six).

CHAPTER TWO

2. Literature Review and Theoretical Framework

2.1 Literature Review

Zambia like many sub-Saharan countries continues to bare the heaviest burden not only of lack of child protection but also the burden of child diseases (Save the Children, 2011). Economic hardship coupled with unclean environment are among the causes of the persistent diseases burden, the commonest conditions affecting Zambians children have persistently been malaria, malnutrition, diarrhea, pneumonia, acute respiratory infections, with malaria, diarrhea and acute respiratory infection accounting for over 50 percent and occurring and recurring at short intervals and in most cases untreated. The determinants identified as being of importance for the studying of child treatment almost invariably revolve and operate within the context of the determinants of child survival. These include the socio-economic, medical, demographic and cultural variables by focusing on the mothers' level of education, income, residence, social status, cultural beliefs and practices as well as personal diseases control (preventive measures and treatment) of parents particularly mothers (Masuy-Stroobant, 2001). These determinants tend to have a direct effect on child's health as they influence the parent's choice of care, treatment among other direct effects on Childs health especially when the child is ill of common diseases such as diarrhea and respiratory infection, ARI and diarrhea have been labeled as common child diseases because the incidence of ARI and diarrhea during early childhood is often high in developing countries as such most children spend their childhood striving with diarrhea and ARI (Enzley, et al., 1997 cited by Jain, et al., 2006). Generally, a number of maternal factors have been identified to influence the treatment of child illnesses such as socio-economic, maternal education, access to income (Haddad, 1999), while others have argued that cultural factors have a direct influence on the health of the child especially in rural areas, access to health facilities, access to media, religion have also been identified.

2.1.1 Socio-economic Status (SES) and the Treatment of Children

The importance of socio-economic factors on child survival became the center of attention in the Mosley and Chen (1984) determinants of child survival in developing countries framework and Caldwell (1979) seminal paper on Nigeria. Factors such as mother's level of education, occupation, marital status, residence, and accesses to cash income are usually argued to influence the treatment of children (Hobcraft, 1993). A study by International Food

Policy Research Institute (IFPRI) (2010) in Nigeria found that, the occupation of household heads and that of mothers in particular appears to be the major factor influencing the level of wasting and the treatment of children. Similarly, education has a direct influence not only on the general child survival but also the treatment of diseases once they manifest as mother's or father's education permits them to exert greater control over health choices for their children (Hobcraft, 1993).

According to a study by Avachat, et al., 2002 cited by Bbaale, 2011, in India socio-economic class, was closely associated with not only recurring diarrhea but its treatment too. In Egypt, a study highlighted that age of the mother, education level of mothers and fathers, occupation and residence either rural or urban were significantly linked to incidence and treatment of diarrhea (El-Gilany, et al., 2000). Other studies (Suzanne and Celia 1995; Arif, et al., 1998) have also shown that children from the poorest household not only have the risk of malnutrition and other infectious diseases, but also have the lower chance of being treated. Other socio-economic determinants associated with the treatment of ARI and diarrhea includes residence either rural or urban, wealth status, mothers' occupation and type of dwelling.

Education plays an important role in the well being of the population as it influences the decisions people make and widens not only the resource base but also widens their choices, in both cases they have a direct influence on the treatment of child illnesses. Particularly, schooling provides women with knowledge about health issues, increases their power in intra-household decisions, and makes their use of healthcare services more effective. Mothers' education has a direct effect on the health of the child at birth. In addition, the most educated women are less exposed to traditional norms with negative effects on health (Adeladza, 2009). Brieger, et al. (1990) in a study among the Yaruba people showed a significant association between education and the choice of treatment. It can be argued therefore that, the treatment of child illness is closely associated with the level of maternal education; particularly the mother's level of education (Kristensen, et al., 2006), the argument is that an educated mother will have a better health seeking behavior and choice of care and treatment for the sick child. Similar findings were observed in a study in Turkey were ARI was associated with the mothers and fathers education (Etiler, et al., 2002). According to Bbaale (2011), mothers' level of education, especially at post level had an influence in the probability of the treatment of diarrhea but had no significant effect on ARI.

2.1.2 Poverty and Access to Health Care

Zambia like many developing countries is locked up in a vicious cycle of extreme poverty, food insecurity, persistent infectious diseases especially among children and women. UNFPA (2011) state of the world population highlights that investing education especially for women and girls breaks the vicious cycle and ensures that their children survive. Silver & Stein (2001) notes that children with parents of higher income level had higher odds of having a provider for medical care and routine or preventive care in the United States of America (USA) as opposed to other peers. In developing countries, Poverty is closely linked to access to treatment and health care. According to David, et al. (2008) the relationship between poverty and the treatment of child diseases is within a bigger poverty cycle, where poverty leads not only to persistent ill health of children but also inadequate access to health care services due to inadequate cash income to pay for health care user fees, buy prescribed drugs or seek specialized treatment, pay for transport to the health facility (ZCHSA, 2005, Kapungwe, 2005, 2005 and Wagstaff, 2002 and Wang, 2002).

2.1.3 Access to Health Media Information (IEC) and Treatment

Exposure to media has an influence not only on the broader perspective of access and choice of treatment, but also on the treatment of child illness. Studies have revealed that while education has a major impact on access to any form of information including access to health and child care because exposure increases steadily with an increase in education attainment (CSO, MOH, TDRC, UNZA and Macro Inc., 2009) access to health related information has an influence on the treatment on one hand and the choice of health care on the other hand. Rahman (2009) argued that people who are exposed to mass media tend to have more access to health care compared to their counter parts with no exposure to mass media.

2.1.4 Cultural Factors and the Treatment of Child Illnesses

Cultural factors associated with the treatment of ARI and diarrhea mainly are as a result of the beliefs associated with the cause of child diseases and the beliefs surrounding exposure of babies to the public especially in African culture (Kapungwe, 2005). In Nigeria, a study by Ogunjuyigbe, (2004) revealed that women in rural areas preferred traditional health facilities to treat child diseases, facilities mentioned by mothers include; traditional healers, church and other traditional facilities, this mainly was due to the beliefs associated with cause of diseases among Abiku children.

In some cultural groups of Zambia, when a child has persistent diarrhea it may suggest that the spirits of the ancestors are not happy with the name given to the child, thus only traditional treatment or facilities such as the traditional healer or the church may provide the treatment (Gausset, 1998).

Gausset (1998) further notes in his study conducted among the Tonga speaking people of southern Zambia that people classify diseases in two main categories: the diseases of "black people" and the diseases of "white people". The diseases of the white people are seen to be "natural diseases", their origins are unknown and do not have any moral aspect. They can only be explained by western medicine in terms of germs, viruses, hygiene, etc. The diseases of "black people", on the other hand, are believed not to affect white people, and cannot be treated in hospitals. Thus, these perceived differences in the cause or cure of diseases influence not only treatment but also choice of health care. However, Gausset (1998) argue that the differences in the perceived cause and treatment of diseases are more vivid in rural areas.

2.1.5 Health Care Resources, Utilization for the Treatment of Child illnesses

The 1978 World Health Organization (WHO) conference on primary health care recognized that in many countries there is co-existence of two common models of health care system. The modern and traditional medical system; both models have been recognized as being critical in mitigating and curing of diseases. In Zambia, following the health reforms of 1995/97 other models of care have since become common such as private health care provision as well as the coming up of pharmacies and the selling of drugs in shops (World Bank, 1997).

The choice of health model to access when ill is influenced by a variety of reasons. Stekelenburg, et al., (2004) states that the existence of different models of health care systems such as modern health care (Both Public and private), traditional model as well as the existence of pharmacies and drug stores as described by Kroeger (1983) are within themselves determinants of individual choice of healer/health care. While ZCHSA (2005) on one hand notes that distance to the health facility as one factor influencing the choice of one source of treatment for the other, Annis on the other hand argued that when effectiveness is guaranteed people will be willing to cover long distances to access health care (Annis, 1981, cited by Stekelenburg, 2004). The Zambia Child Health Care Situational Analysis (ZCHSA) (2005) further highlights that some women reported difficulties in getting money for treatment or

transport, availability of transport as big problems to access health care, it is based on these that a women would choose what is available, accessible for the treatment of the child.

Further, a study of home management of diarrhea in Nigeria among the Yoruba mothers (Brieger, et al., 1990) showed that mothers with some education are more likely to use a combination of modern and traditional treatments however few mothers were inclined to use modern treatment alone.

2.1.6 Demographic Factors and Treatment of Children

Other factors of theoretical importance to the study of child treatment are those related to the parity of the mother (the number of children born), the number of children in the household, sex of the child. These factors are said not only to accelerate the risk of getting ill but also influences the chance of treatment.

In summary, literature presents different associated factors in different countries on the determinants of child illnesses and treatment thereof. Education of the mother and father, income, residence and culture as well as personal response to care and disease prevention are a powerful determinant of under-five child health in developing countries as they cut across many proximate and socio-economic determinants as suggested by Mosley and Chen.

2.2 Theoretical Framework

Today, most population researchers and their medical counterparts have adopted the Mosley and Chen (1984) framework of child survival in developing countries in explaining the child mortality and survival. This theory provides a whole inclusive framework to explain the chances of child survival in developing countries. Thus, in an attempt to explain the determinants of the treatment of the common child diseases in Zambia particularly acute respiratory infection and diarrhea, the Mosley and Chen Framework is used in this study.

The framework attempts to integrate both the socio-economic and biological variables as well as methods used by social and medical scientists to explain child survival (Mosley and Chen, 1984). Besides, the framework attempts to explain child survival in developing countries and not the determinants of the treatment of the processes (diseases) to mortality. However, the framework provides a stronger basis of explaining the determinants of the treatment of the ARI and diarrhea as it appears that the determinants of the causes are closely related to determinants that might influence treatment. The framework is based on the premise that all

social and economic determinates operate through a set of biological determinates (proximate determinants) to result into child morbidity and mortality in a society (Mosley and Chen, 1984).

Further, to explain why children are treated from different sources, the choice of healer relation framework (Kroeger, 1983) is used in this study.

2.3 Theories

2.3.1 Mosley and Chen Framework of Child Survival in Developing Countries (1984)

Mosley and Chen (1984) in their attempt to explain the determinants of child health viewed child morbidity and mortality as being influenced by an interaction of what they termed the proximate determinants and the social and economic determinants that result into child morbidity and mortality. Mosley and Chen (1984) categorized the proximate determinants into five areas namely; maternal factors, environmental contamination, nutrient deficiency, injury and personal diseases control (Mosley and Chen 1984 cited by Ogunjuyigbe, 2004) and they further categorized the socio-economic determinants into three broad areas namely; individual level variables, household level and community level variables.

The framework highlights that the first four proximate determinants such as the maternal factors, environmental, nutrient deficiency and injury influences the rate of change from health individuals towards sickness on the other hand, the personal diseases control relates to the rate of recovery from diseases through preventive measures and measures taken to cure the diseases once they become manifest (Mosley and Chen, 1984). This is particularly the interest of this study, in terms determining what happens when a disease such as diarrhea and ARI become manifest in children. Similarly, the socio-economic determinants as explained in Chen's framework may explain not only the determinants of child mortality but also the determinants of treatment for children with ARI and diarrhea.

The socio-economic determinants which include such variables such as the parent's level of education, which determines the type of parents' skills and the availability of time to provide care, occupation, income and household assets as well as the traditional norms and attitudes, beliefs about disease causation, community and political economy variables. These variables can determine the type of health choices to make, hygiene, preventive care and disease treatment (Mosley and Chen, 1984). These determinants may equally explain the determinants that surround the treatment of children with ARI and diarrhea in Zambia.

2.3.2 Kroeger's Choice of Healer Relation Framework (1983)

Kroeger (1978) in his explanation of the framework notes that the choice of health healer is determined by three main factors namely the characteristic of the subject (age, sex, education, income, occupation, and wealth/assets), characteristics of the perceived illness (severe or trivial, natural or supernatural) and characteristics of health care services (accessibility, acceptability, quality of care, cost of care). He argues that these factors independently or collectively influence the choice of health healer.

The two frameworks (Mosley and Chen, 1984; Kroeger, 1983) provide a strong theoretical base in an attempt to explain the determinants of the treatment of child illnesses in Zambia. Based on the aforementioned theories, this study attempts to draw the attention of population researchers to explaining the determinants of the treatment of common child diseases such as acute respiratory infections and diarrhea on one hand, and why some children are treated from public modern health facilities while others are treated from other sources on the other hand.

2.4 Conceptual Model

The following framework illustrates some of the casual factors that influence the treatment of child illnesses.

Figure 2.1: Conceptual Model

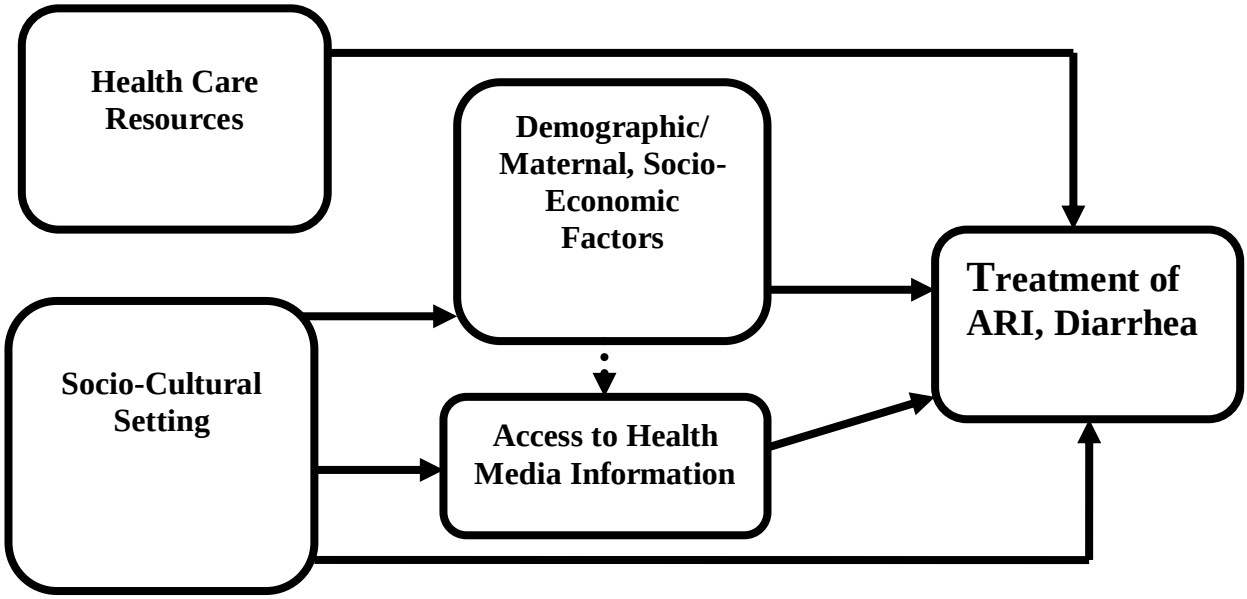


Figure 2.1 shows that at macro level, health care resources and the cultural setting could influence whether the child is treated or not. Similarly, at micro level the socio-economic factors, demographic factors and access to health media information affect the possibility of

the child being treated. The framework further shows that socio-cultural setting can have an influence on demographic, socio-economic factors and access to media information which ultimately may determine whether a child is treated or not. These factors influence directly or indirectly the treatment of a child once a disease becomes manifest.

Figure 2.1 further shows that there is interplay of factors, as such it is difficult to attribute one single factor as to why the child was treated or not, thus the importance of this study is to determine among the various factors which ones are associated with the treatment of ARI and diarrhea in Zambia.

2.5 Hypotheses

a. Younger under-five children with diarrhea and ARI respectively are more likely to be treated compared to older under-five children.

b. Mothers in rural areas are more likely to have their children treated by traditional healers for diarrhea and ARI respectively than those in urban areas.

c. Mothers who are literate (able to read and write) are more likely to take their children with ARI and diarrhea for treatment compared to those who are not able to read and write.

d. Availability of drugs in health facilities increases the mother's willingness to take their children for treatment of diarrhea and ARI.

e. Children with diarrhea are more likely to be taken for treatment than children with ARI.

CHAPTER THREE

3. Data and Methodology

3.1 Source of Data

The study used the 2007 Zambia Demographic Health survey. The Zambia Demographic health survey is a nationally representative population based cross sectional survey of 7,146 women aged 15-49 and 6,500 men aged 15-59, whose main aim is to provide information on levels and trends in fertility, childhood mortality, use of family planning methods, and maternal and child health indicators including HIV and AIDS at national level for both rural and urban areas of the country (ZDHS, 2007).

3.2 Type of Study

This is an explanatory study based on the positivist approach of understanding social reality as described by Bbabie (2010).

3.3 Description of the Data Set

The 2007 Zambia Demographic Health survey data set provides demographic estimates of the country based on a sample of 7,146 women aged 15-49 and 6,500 men aged 15-59 (ZDHS, 2007). Three questionnaires were used namely; the Household questionnaire, women's questionnaire and the men's questionnaire. For this study, the women's questionnaire was used; it is from the women's questionnaire where the child file was drawn. This questionnaire contains information related to reproductive health history, child health, maternal health and mortality, nutrition, domestic violence from all the women identified in the household aged 15-49.

The study will concentrate on women of child bearing age (15-49) and children below the age of five (6-59 months). This is because children below the age 5 are the most vulnerable to ARI and diarrhea. In addition, these diseases have got a huge influence on the health status of the children below the age of five. The focus on women of child bearing years is based on information on child health in ZDHS as reported by women (mothers) (ZDHS, 2007)

The 2007 Zambia Demographic health Survey provides good quality data as it adhered to the standard quality control protocols as stipulated by measureDHS (ZDHS, 2007). However, due to the magnitude of the data set, caution will be exercised when performing analyses.

3.4 Sample Size

The sampling frame for the 2007 ZDHS was adopted from the 2000 Census of population and Housing (CPH) of Zambia. The frame consisted of 16,757 standard enumeration areas (SEA) from which a probability sample of 8,000 households was selected. A total of 6401 under-five children were captured. Of these, 1447 and 909 children under-five years were reported to have had diarrhea and ARI two weeks prior the survey. This constituted the sample units of analysis.

3.5 Operationalisation of Variables

3.5.1 Dependent Variables

From the samples, dependent variables were constructed as follows: A discrete binary variable coded as (1) if the child was reported to have had diarrhea or stool with blood in the two weeks prior the survey and (0) if otherwise was constructed for *diarrhea prevalence*. Whereas *ARI prevalence* was constructed on the basis of the child reported to have had a cough and running nose, difficult breathing and blocked chest two weeks preceding the survey as (1) and (0) otherwise. As such only children reported to have experienced diarrhea and ARI two prior the survey were considered and defined the sample units.

On the basis of the sample units for diarrhea and ARI respectively, the dependent variables were constructed where (1) if the child was reported to have received any treatment for diarrhea and ARI respectively and (0) otherwise. The Multinomial dependent variable was constructed only among children who were reported to have received treatment; where (0) where those children who *did not receive treatment* for diarrhea and ARI respectively, (1) for those children taken to *public health facilities*, (2) those take to *private health facilities* and (3) for those children only treated through counter drugs from *shops and pharmacies* whereas (4) where those treated taken to traditional healers or treated by other means.

3.5.2 Independent Variables

Table 3.1 shows the classification of independent variables into four broad categories

Table: 3.1 Independent Variables

Socio-economic and Demographic	Access to Health Media	Health Care Resources	Socio-Cultural Setting
sex of the child	Seen TV Health Program	Distance to the Health facility	Place of Residence
Age of the child	Listened to the Radio	Availability of Health care Providers	Province
Age of the Mother		Availability of Drugs	
Literacy (able to read & write)		Having to take Transport to the Facility	
Mother Worked last 12 months			
Mother' type of earnings			
Level of Education of Father			
Wealth Quintile			
# of children in the H/H			
Father in the house			

The social economic and demographic variables included wealth index as provided in the data set and constructed by combining information on household assets, such as ownership of consumer items, type of dwelling, source of water, and availability of electricity into a single asset index, the index split into five equal quintiles from 1 (lowest, poorest) to 5 (highest, richest). Mothers were asked if they were able to read and write thus defined as one (1) if the mother was able to read and write and zero (0) otherwise, the age and number of children under-five in the household were taken as continuous variables, the sex of the child was defined as one (1) if the child is male and zero otherwise. Age of the mother was categorized into 7 five year intervals as 1=15-19, 2=20-24, 3=25-29, 4=30-34, 5=35-39, 6=40-44 and 7=45-49. The mother working in the last 12 months is given in the data set defined as 0=did not work in the past year, 1=currently working and 2=working but on leave in the last 7 days, others included whether the father lives in the house and mother's ability to make her own decisions on health defined as one (1) if yes and zero (0) otherwise. Mother's type of earnings where defined as 0=Not paid, 1=Cash only, 2=Cash and kind and 3=payment in kind only. The level of education was categorized as 1=primary education, 2=secondary education, 3=postsecondary education and the father living in the house as (1) if the father lives in the house and (0) otherwise.

Access to health related media information was computed into a dichotomous variable where (1) if the mother had seen or listened to any TV and radio health program respectively six months prior the survey and (0) if otherwise.

Health care resources variables included variables such as perceived distance to the health facility, having to take transport, availability of drugs and health care providers where zero (0)

was coded for women who reported distance, having to take transport, availability of drugs and staff at the facility as a big problem to access medical care and one (1) for mothers who reported otherwise.

The socio-cultural setting included variables such as the province was categorized in the data set as 0=Central, 1=Copper belt, 2=Eastern, 3= Luapula, 4= Lusaka, 5= Northern, 6= North Western, 7= Southern and 8=Western and type of residence where one (1) was urban and zero otherwise.

3.6 Data Analysis

The analysis was done at two steps. The first step involved bi-variate analysis in order to generate the average percentages of children with diarrhea and ARI who were treated or by some background characteristics. The second approach, logistic and multinomial regression were used to measure the effect of independent variables on the dependent variables treatment of ARI and diarrhea and the effect of independent variables on different sources of treatment accessed for children with diarrhea and ARI. The logistic model is as described by a logit function below:

$$\text{Logit}(y)=\beta_0+\beta_1X_1+\beta_2X_2\ldots..\beta_nX_n$$

To estimate the probability of the child being treated or not the function is denoted as:

$$p(y=1)=\frac{\exp(\beta_0+\beta_1x_1+\beta_2x_2....+\beta_nx_n)}{1+\exp(\beta_0+\beta_1x_1+\beta_2x_2....+\beta_nx_n)}$$

Where y= the dichotomous dependent variables called logit defined as:

a) *1=Treated for Diarrhea*
   0=Not treated for Diarrhea
b) *1=Treated for ARI*
   0=Not treated for ARI
   β_0=Intercept
   β_1,β_2,β_n=Logistic Regression coefficient of X_1,X_2,X_n
   X_1,X_2,X_n= Independent variables
   Exp=Exponential Value

The Intercept in the model is the value of **(y)** when the value of all independent variables is zero. Coefficients describe the size of the effect of independent variables to the dependent variable. In simple interpretation, positive regression coefficient means that the explanatory variable increase the probability of the outcome **(y)**, where as negative regression coefficient

means that the explanatory variable (x) decrease the probability of that outcome (y), big regression coefficient means that the explanatory factor strongly influences the chance of the outcome and near-zero or zero regression coefficient means that the explanatory factor has little or no influence on the probability of that outcome.

To examine the relationship between the types of treatment accessed (formal visits to public facility, Formal visit to private or formal visit to shop pharmacy dispensary, and or Traditional healer) the multinomial regression was used. This method is used when the dependent variable has more than two categories. One category is used as a reference category and for each of the categories, the log ratio of the probability of being in that category compared to the reference category is computed and all coefficients of the reference category are zero. The function is denoted as:

$$\log \frac{p(categoryi)}{p(categoryj)} = \beta_{i0} + \beta_{i1}x_{i1} + \beta_{i2}x_{i2} .... + \beta_{in}x_{in}$$

Where:

$$\log \frac{p(categoryi)}{p(categoryj)} = Logit,\ natural\ log\ of\ odds\ that\ an\ event\ occurs$$

j is the reference category of the i^{th} *categories*
β_{i0}=*Intercept*
$\beta i_1, \beta_{i2}, \beta_{in}$=*Logistic Regression coefficient of* X_1, X_2, X_n
X_1, X_2, X_n= *Independent variables*

Two different binary models were estimated for the treatment of diarrhea and ARI respectively, variables were entered into the model using the backward selection criteria and the final models were estimated. This means that even those variable at $p<0.1$ (10%) level were permitted into the model, this was done in order to retain as many determinates as possible. In both models an interaction of the place of residence and variables under the category health care resources were included as variables together with their main effects. For the multinomial models, all variables were entered into the model and variables that were not significant at $p<0.1$ (10%) level in all the categories were removed until at least one category was significant for each covariate.

Analyses were done using Statistical Package for Social Scientists (SPSS) version 18.0.

3.6 Ethical Consideration

As the ZDHS data set are managed by micro-international under the measureDHS. Permission and approval was sort from micro-international to use the data sets.

CHAPTER FOUR

4. Findings

4.1 Overview

This chapter presents results of the analyses based on the research question outlined in section 1.2.1. Results are presented at three steps, descriptive statistics, results from logistic models and results from multinomial model.

4.1.1 Diarrhea and ARI Zambia's Child Diseases Burden and Treatment

Zambia's childhood diarrhea and acute respiratory infection disease burden has been experiencing a steady rise and fall over the four successive demographic health surveys dating back 1992, 1996, 2001 and 2007. Though showing a tendency of declining, the overall disease burden on children still remains one of the highest in the Sub-Saharan region (ZDHS, 2007). The highest reported cases of diarrhea where reported in the 1996 survey with 24.4 percent of children reported with diarrhea where as ARI child disease burden has seen a similar pattern over the surveys (1992, 1996, 2001; ZDHS). As of 2007 ZDHS about 16% and 23% of the total 6401 children captured in the survey suffered from diarrhea and ARI respectively two weeks prior the survey (Table 4.1). Bearing in mind that information is collected retrospectively only in the two weeks prior the survey, the number of children reported to have had the diseases two weeks prior the survey may suggest that most children suffer from diarrhea and ARI not only once or twice but more times during childhood and thus these diseases remain among the main cause of child illness and death (Hamer, et al., 1998)

Treatment of these common child illnesses still remains a challenge in Zambia due to a varied number of factors. Table 4.1 shows that 15.6 (909) and 22.6 (1447) percent of the total children reported to have suffered from diarrhea and ARI respectively two weeks prior the survey, 67.5 and 65.7 percent sought treatment for diarrhea and ARI respectively, whereas 32.5 and 34.3 percent of children did not receive any treatment. While treatment from public health facilities remains an important source of treatment (84.7%, diarrhea and 80.2%, ARI) some children are treated from other means and sources.

Table 4.1: Distribution of the Number of Children Reported with ARI and Diarrhea and Percentage type of Treatment Accessed DHS 2007

	ZDHS 2007	
	Diarrhea	**ARI**
Total number of Children captured in the 2007 ZDHS	6401	
Number of children suffering from Diarrhea and ARI	909	1447
Percentage of Children with diarrhea/ ARI in the previous 2 weeks	15.6	22.6
If Treated, % Sought treatment from anywhere	67.5	65.7
% of Children who were ill but not treated	32.5	34.3
If Treatment was sought , % Treated from Public Health Facilities	84.7	80.2
If Treatment was sought , % Treated from Private Health Facilities	3.2	4.4
If Treatment was sought , % Treated by Counter drugs from Shop, Pharmacy or Dispensary	3.9	10.7
If Treatment was sought , % Treated from Traditional Healers and others	8.2	4.6

Source: ZDHS 2007, own computation

Among the varied places where women sought treatment for the treatment of children with diarrhea or ARI, treatment private facilities, access to counter drugs from pharmacies and shops as well as traditional healers are among the most common.

Further, comparing the relative percentages between the treatment of diarrhea and ARI respectively, it appears that traditional methods (8.2%) are still pronounced for the treatment of diarrheal disease whereas counter drugs from pharmacies and shops (10.7%) are common for ARI.

4.2 Background Characteristics and the Treatment of Diarrhea and Acute Respiratory Infection (ARI)

This section presents the results of the relationship between treatment status of children with diarrhea and ARI respectively and background characteristics. Table A.1 shows a cross tabulation of the outcome variables (Treated or Not treated for diarrhea and ARI) by a variety of independent variables.

4.2.1 Maternal Factors and the Treatment of Diarrhea and ARI

The sex and age of the child can be an important attribute for the treatment of a child especially in more traditional societies where sex preference still exists. Table A.1 shows that both sex and age of the child is statically significant at $p<0.05$ and $p<0.01$ respectively for the treatment of ARI, there are not significant for the treatment of diarrhea. However, in both cases the percent of treatment of a child with diarrhea and ARI appear to decrease with increasing age of the child.

4.2.2 Socioeconomic Characteristics and the Treatment of Diarrhea and ARI

Table A.1 shows that women's ability to read and write (literacy) and their work status are significantly related at $p<0.05$ level where as women's type of earnings received for work done is at $p<0.01$ for the treatment of children with ARI however not significantly with the treatment of diarrhea. In both cases (Diarrhea and ARI) the highest relative percentages of treatment where recorded for children born of women who had either cash or both cash and payment in-kind earnings. The presence of the father in the house is significantly related with treatment of children with diarrhea ($p<0.1$) and ARI ($p<0.01$). The father's level of education is significantly related to the treatment of children with diarrhea ($p<0.05$) whereas father's occupation for children with ARI ($p<0.05$).

More cases of diarrhea and ARI were reported in rural areas relative to urban areas; however, there were few cases of children treated in rural areas relative to urban areas as shown in table A.1. The differences in treatment between rural and urban areas were not significantly different in both cases at $p<0.05$ level.

4.2.3 Health Care Resources and the Treatment of Diarrhea and ARI

Better access to basic health care services is an essential step towards not only achieving a healthy childhood but also the treatment of illnesses once becomes manifest. Table A.1 shows that concerns of the availability of health care providers as well as having to take transport to the health facility are significantly ($p<0.05$) related with the treatment of children reported to have had diarrhea whereas the treatment of children with ARI is significantly ($p<0.01$) related to concerns of distance to the nearest health facility and having to take transport.

4.2.4 Access to Health Related Media Information and the Treatment of Diarrhea and ARI

Table A.1 shows that whereas only access to television (TV) health programs are significantly related with the treatment of children reported to have had ARI ($p<0.05$) and not for diarrhea, the importance of access to both radio and TV health media program cannot be overlooked in this context as both access to radio and TV health program can be important explanatory determinants of the treatment of children.

4.3 Determinants of the Treatment of Diarrhea and ARI in Zambia

The descriptive statistics have reflected that the problem of the treatment of children with diarrhea and ARI transcends one single explanation but is deep rooted in the maternal and socioeconomic factors, availability of adequate health care resources as well as access to health related information. Whereas descriptive analyses have shown the relationship between different factors and the treatment of diarrhea and ARI, they do not provide a conclusive explanation as to what determines the treatment of children with diarrhea and ARI.

The following two sections present the two models of the determinants of treatment of diarrhea and ARI respectively.

4.3.1 Determinants of the Treatments of Diarrhea among Under-five Years Children in Zambia

Table 4.3 presents the model outlining the determinants of the treatment of diarrhea in Zambia based on the 2007 ZDHS data. The variables age of the child, able to read and write (literate), heard of ORS and whether the mother had access to radio and TV health program, concerns of the distance to the health facility and availability of drugs in health facilities were retained in the final regression model.

Based on *Nagelkerke's* R^2, the observed variability in the treatment of under-five children with diarrhea is 36.6 percent. This proportion of variation explained by all the nine independent variables is quite good for the estimation of parameters. The model further shows that overall, 78.4 percent of the predictions in the model are correct.

Table 4.3: Determinants of the Treatment of Diarrhea among Under-fives in Zambia, 2007 ZDHS-Results from Logistic Regression

Covariate	Category	β (Exp β)	Wald	df	sig	R^2 (36.6)
Age of the Child		-0.148(0.862)	3.98	1	0.046**	
Residence	**Urban (Ref)**	0 (1)	…	..	…	
	Rural	-0.743(0.683)	4.674	1	0.031**	
Literate	**No (Ref)**	0(1)	…..	-	…..	
	Yes	1.129(3.093)	4.392	1	0.036**	
Mother Worked last 12 Months	**No (Ref)**	0(1)	8.470	2	0.014	
	Currently Working	0.890(2.436)	4.890	1	0.038**	
	On leave last 7 days	-1.585(0.373)	0.915	1	0.240	
Heard of Oral Rehydrated Solution (ORS)	**Never Heard (Ref)**	0(1)	80.366	2	0.000	
	Used ORS	2.231(9.311)	15.593	1	0.000***	
	Heard of ORS	-0.198(0.821)	0.129	1	o.719	
Listened to Radio Health Program	**No(Ref)**	0(1)	….	…	….	
	Yes	0.784(2.190)	6.164	1	0.013**	
Seen TV Health Program	**No (Ref)**	0(1)	….	…	….	
		1.143(3.136)	2.421	1	0.120	
Distance to the Nearest Health Facility	**Not a Problem (Ref)**	0(1)	…	..	….	
	Big Problem	-0.714(0.490)	5.947	1	0.015**	
Availability Drugs at Health Facility	**Not a Problem (Ref)**	0(1)	…	..	…	
	Big Problem	-0.705(0.494)	6.421	1	0.011**	
Constant		-0.189(0.828)	0.080	1	0.778	

P-value in the parenthesis; *** p<0.01, ** p<0.05, * p<0.1, Ref: Reference

Table 4.3 shows that the odds of child being treated for diarrhea decreases significantly (p<0.05) by a factor of 0.86 with each additional year of life of the child. Thus, younger children have higher odds of being taken for treatment as opposed to their older under-five counterparts.

Women's ability to read and write (literacy) and use of ORS are yet other important determinants of the treatment of a child with diarrhea. The odds of a child being treated is 3.09 (p<0.05) and 9.31 (p<0.01) times higher for children with diarrhea born of women who are literate and used ORS before respectively compared to children born of women who are not literate and without knowledge of ORS respectively.

The rural-urban differentials in the treatment of child illness are clear, table 4.3 shows that Children in rural areas have lower odds 0.68 (p<0.05) of being taken for treatment compared to their urban counterparts.

Further, Table 4.3 shows that the odds of a child treated is 0.49 ($p<0.05$) and 0.49 ($p<0.05$) times for children born of women who reported distance to the health facility and availability of drugs as a big problem.

Access to media health programs show a direct influence on the treatment of child illnesses (Diarrhea and ARI). Table 4.3 shows that the odds of a child being treated is 2.19 ($p<0.05$) times higher for children born of women with access to radio health program compared to children born of women with no access to radio health programs.

4.3.2 Interaction between Location (Rural-Urban) and Availability of Drugs in Health Facilities, Distance to the Nearest Health Facility

Because the main effects in table 4.3 showed that rural children have lower odds of being taken for treatment compared to children in urban areas, distance to the nearest health facility and availability of drugs showed a similar picture. Further, literature and hypothesis suggests that there could be an interaction between health care resources and people's residence (rural-urban). Thus, an interaction between residence (rural-urban) and distance to the health facility and availability of drugs was introduced.

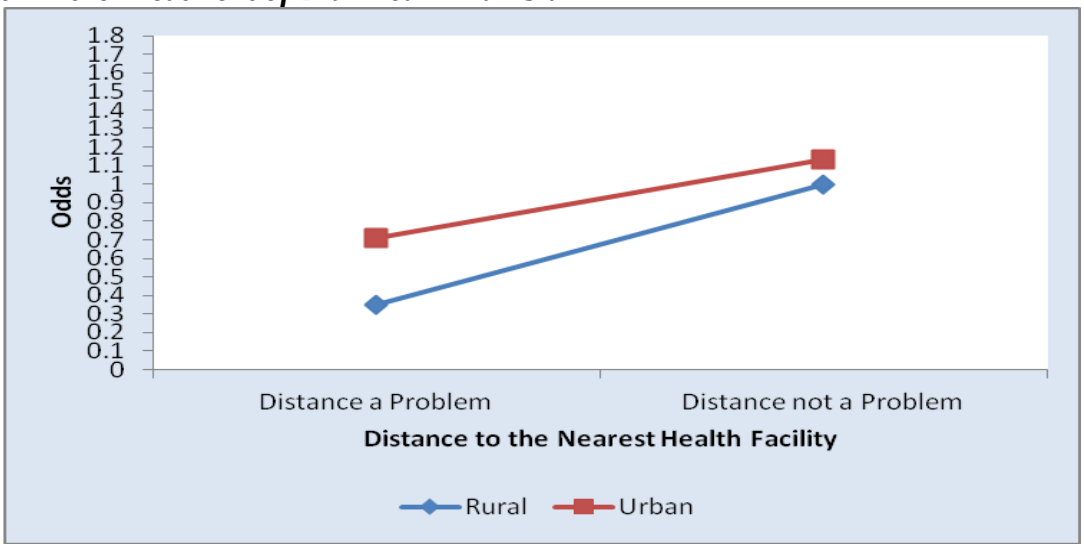
When a model with the main effects and the interaction was fit, the interaction between residence and distance to the nearest facility and availability of drugs are significant at ($p<0.05$) and ($p<0.1$) respectively. The *Nagelkerke's* R^2, shows an improvement in the explained variability in the treatment of child diarrhea and ARI from 36.6 percent without the interaction effects to 38.8 percent with the interaction effects. Figure 4.3.1 and 4.3.2 shows the interaction effects between rural-urban and the distance to the nearest facility and availability of drugs in health facilities.

Figure 4.3.1 shows that the odds (rural versus distance as a problem) of taking the child for treatment of diarrhea increases from rural-distance a problem to rural-distance not a problem. The interaction between residence (urban-urban) and availability of drugs show a similar pattern, with rural mothers who reported distance as a problem having lower odds of taking the children for treatment of diarrhea relative to rural mothers who reported distance not to be a problem.

Furthermore, based on the Wald test parameter for type of place of residence (rural) versus distance (big problem) and residence (rural) and availability of drugs (big problem) are significant at ($p<0.05$) and ($p<0.1$) respectively. This implies that rural mothers who reported

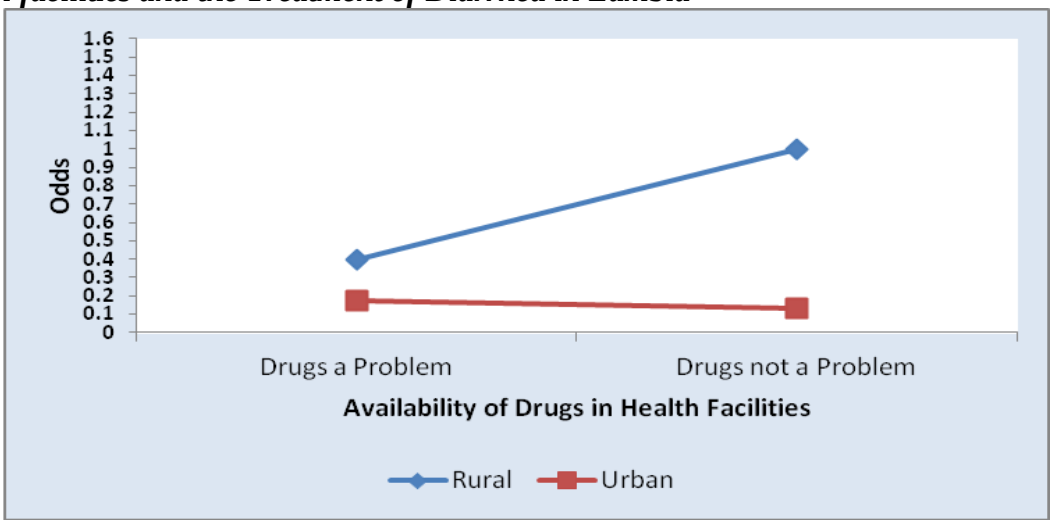
distance to the health facility and availability of drugs in health facilities not to be a problem are likely to take their under-five children for the treatment of diarrhea as opposed to rural mothers reporting otherwise.

Figure 4.3.1: Interaction between Location (Rural-Urban) and Distance to the Nearest Health in the Treatment of Diarrhea in Zambia



Source: 2007 ZDHS data, own Calculation

Figure 4.3.2: Interaction between Location (Rural-Urban) and availability of drugs in Health facilities and the Treatment of Diarrhea in Zambia



Source: 2007 ZDHS data, own Calculation

4.3.3 Determinants of the Treatments of ARI among Under-five years Children in Zambia

This section presents the determinants of the treatment of ARI in Zambia among under-five children based on the 2007 ZDHS dataset. The variables sex and age of the child, mother's ability to read and write (literacy) and concerns of the distance to the health facility and availability of drugs at the facility, whether the woman works, and their type of earnings were retained in the final regression model.

Based on *Nagelkerke's* R^2, the observed variability in the treatment of under-five children with diarrhea is 14.4 percent. The model further shows that overall, 64.7 percent of the predictions in the model are correct.

Table 4.3.1 presents the model outlining the determinants of the treatment of ARI in Zambia.

Table 4.3.1: Determinants of the Treatment of ARI among Children under-five in Zambia, 2007 ZDHS-Results from Logistic Regression

Covariate	Category	β (Exp β)	Wald	df	sig	R^2 14.4%
Sex of the Child	**Male (Ref)**	0**(1)**	…..	-	…..	
	Female	-0.732**(0.481)**	18.729	1	0.000***	
Age of the Child (Years)		-0.181**(0.834)**	8.697	1	0.003***	
# of Children under-five in the H/H		0.220**(1.246)**	4.511	1	0.034**	
No Drugs	**Not a Problem (Ref)**	0**(1)**	…..	-	…..	
	Big problem	-0.382**(0.682)**	4.480	1	0.032**	
Distance to the Health Facility	**Not a Problem (Ref)**	0**(1)**	…..	-	…..	
	Big problem	0.638**(0.529)**	13.230	1	0.000***	
Literate	**No (Ref)**	0**(1)**	……	-	……	
	Yes	0.792**(2.208)**	4.043	1	0.044**	
Worked in last 12 months	**No (Ref)**	0**(1)**	6.279	2	0.043	
	Currently working	0.511**(1.667)**	4.418	1	0.036**	
	on leave last 7 days	1.083**(2.954)**	4.214	1	0.040**	
Type of earnings for work	**Not paid (Ref)**	0**(1)**	13.576	3	0.004	
	Cash only	0.594**(1.812)**	9.919	1	0.002***	
	Cash and kind	0.149**(1.161)**	0.277	1	0.598	
	In kind only	-0.361**(0.697)**	0.908	1	0.341	

P-value in the parenthesis; *** p<0.01, ** p<0.05, * p<0.1, Ref: Reference

Tables 4.3.1 shows that the odds of a female child with ARI taken for treatment is 0.48 (p<0.01) times compared to male children with ARI, this entails that female under-five children with ARI have lower odds of being taken for treatment compared to their male counterparts.

As observed for the treatment of diarrhea, the odds of children with ARI being treated also decreases significantly ($p<0.01$) by a factor of 0.83 with each additional year of life of the child, this brings out an interesting aspect of child care among the Zambian women where child care tends to decrease with increasing age of the child.

The number of under-five children in the household shows that, each additional child in the household increases the odds of treatment of ARI by a factor of 1.264 ($p<0.05$). This implies that the higher the number of children under-five in the household the higher the odds of treatment.

Health care resources are yet other critical determinants of treatment of children, table 4.3.1 shows that children with ARI born of mothers who reported distance to be a big problem to access treatment their odds of being treated is 0.529 ($p<0.01$) times compared to children born of mothers who reported distance to the health facility as not a big problem whereas the odds of a child with ARI taken for treatment is 0.68 ($p<0.05$) times for children born of mothers who reported availability of drugs at the facility to be problem compared to others. These findings entail that reported distance to the facility and availability of drugs results into lower odds of treatment.

Table 4.3.1 shows that as observed in the determinants of treatment of children with diarrhea, the odds of being treated is 2.28 ($p<0.05$) times higher for children with ARI born of mothers who are literate relative to others. Further, the odds of being taken for treatment is 2.95 ($p<0.05$) times higher for children with ARI born of mothers who currently work compared to children born of mothers who did not work in the last one year prior the survey. The odds of a child being treated are much higher for children born of mothers who were on leave one week prior the by the time of the survey.

Based on the fact that women participation in labor force is not always paid for, some women spend much of their time in the fields, the work that often goes unpaid. Thus, mothers were asked what type of earnings they earned for the work done. Table 4.3.1 shows that the odds of being taken for treatment for a child with ARI born of mothers who had cash earnings is 1.81 ($p<0.01$) times higher compared to children born of mothers who were not paid.

Interaction between residence (rural-urban) and distance to the health facility and availability were entered into the model with their main effects based on literature and hypothesized

possible interaction effect. The interactions were neither significant nor improved the explained variability of the model.

4.4 Determinants of Child Treatment in Public health Facilities, Private Health Facilities, Shops/Pharmacies and Traditional Methods compared to those not treated

As indicated in table 4.1, women sought treatment from different places for their children with diarrhea and ARI respectively. Therefore, determining the treatment of children with diarrhea and ARI respectively transcends determining whether the child was treated or not but also soliciting determinants as to why children are taken to different places for treatment.

This section presents determinants as to why some children with diarrhea and ARI respectively are treated in government run public health facilities, privately owned health facilities while others are treated at home through counter drugs bought from shops and pharmacies and others taken to traditional healers compared to those who are not treated at all. To achieve this, multinomial regression was used to determine the effect on the independent variables on the outcome variable, the analysis entailed the calculation of the natural log of odds (logit) of a child taken to Public, Private health facilities, treated by counter drugs from shops or pharmacies and or taken to traditional healers compared to the reference group (children not treated). Two models for diarrhea and ARI respectively were modeled. Descriptive statistics are given in table B.1 and B.2 (Appendix).

Tables B.1 and B.2 (appendix) show that maternal factors age and sex of the child are not significantly related to the type of the source of treatment for children with diarrhea, where as the age of the child is significantly ($p<0.01$) related to the type of the source of treatment for children with ARI.

Socio-economic factors such as whether the child lives in rural or urban area ($p<0.01$),province ($p<0.01$) mothers level of education ($p<0.01$), wealth index ($p<0.01$), type of earnings for the mother ($p<0.01$) and whether the father lives in house are significantly related to where the child is taken for the treatment of diarrhea and ARI respectively. The relative percentages show that in both cases, children in rural settings and provinces which are predominantly rural such as Luapula, Eastern, Northern, Southern and Western had a relatively higher percentage share of children treated by traditional healers equally for children born of women who reported to receive no cash payment for the work done, father not being in the house and women who currently work.

Health care resources are yet other factors that show a clear significant relationship with the type of treatment. Tables B.1 and B.2 (appendix) show that concerns of distance to the nearest health facility, availability of drugs and having to take transport to the health facility are significantly related to the type of treatment the child with ARI ($p<0.01$) receives where as concerns of the lack of care providers and availability of drugs for the treatment of children with diarrhea at $p<0.05$ level.

Access to health related media information factors are also significantly related to the type of treatment for children with diarrhea and ARI respectively. Table B.1 and B.2 (appendix) show that access to both Radio and TV health programs are significantly ($p<0.01$) related to the type of treatment received by children with diarrhea and ARI respectively.

4.4.1 Determinants of Treatment of Diarrhea in Public, Private Health Facilities, Shops/Pharmacies and Traditional Methods Compared to those not treated in Zambia.

To ascertain the determinants of the treatment of children with diarrhea from different modes and sources, multinomial regression was used. Table 4.4.1 shows that access to health related information and mothers' socio-economic status could explain the determinants of the different types of treatment received by children reported to have had diarrhea. The variables whether the mother had seen and listened to any TV or radio health program, 6 months prior the survey, had heard/used ORS as well as the mother's level of education and wealth index were retained in the final model.

Table 4.4.1: Determinants of Treatment of Diarrhea in Public, Private Health Facilities, Shops/Pharmacies and Traditional Methods compared to those not treated in Zambia-Results from Multinomial Regression.

		Diarrhea (N=909)				
Covariates	**Category**	**β**	**Wald**	**df**	**sig**	**Exp(β)**
Government Run Public Health Facilities						
Intercept	-	-1.351	22.185	1	0.000	
TV Health Program Last 6 months	No	0.662	4.437	1	0.035**	1.939
	Yes (Ref)	0	-	-	-	1
Radio Health Program Last 6 months	No	-0.455	4.284	1	0.038**	0.635
	Yes (Ref)	0	-	-	-	1
Heard of ORS	Never Heard of ORS	-0.548	0.899	1	0.343	0.578
	Used ORS	2.833	223.932	1	0.000***	16.989
	Heard of ORS (Ref)	0		-	-	1
Mothers Level of Education	No Education	0.216	.392	1	0.531	1.241
	Primary	0.326	2.036	1	0.154	1.386
	Secondary and Above (Ref)	0	-	-	-	1
Wealth Index	Poorest	-0.174	0.178	1	0.673	0.841
	Poorer	-0.124	0.095	1	0.788	0.883
	Middle	-0.222	0.334	1	0.563	0.801
	Richer	-0.111	0.106	1	0.744	0.895
	Richest (Ref)	0	-	-	-	1
Private Run Health Facilities						
Intercept	-	-2.568	21.106	1	0.000	
TV Health Program Last 6 months	No	0.927	1.984	1	0.159	2.528
	Yes (Ref)	0	-	-	-	1
Radio Health Program Last 6 months	No	-1.157	3.819	1	0.051**	0.315
	Yes (Ref)	0	-	-	-	1
Heard of ORS	Never Heard of ORS	2.146	4.906	1	0.027**	8.552
	Used ORS	1.793	11.343	1	0.001***	6.007
	Heard of ORS (Ref)	0	-	-	-	1
Mothers Level of Education	No Education	0.410	0.122	1	0.727	1.507
	Primary	0.244	0.200	1	0.654	1.277
	Secondary and Above (Ref)	0	-	-	-	1
Wealth Index	Poorest	-5.561	0.000	1	0.000***	0.004
	Poorer	-3.096	6.139	1	0.013**	0.045
	Middle	-2.294	5.804	1	0.016**	0.101
	Richer	-0.605	0.923	1	0.337	0.546
	Richest (Ref)	0	.	0	.	1
Shop, Pharmacy						
Intercept	-	-3.521	22.405	1	0.000	
TV Health Program Last 6 months	No	1.565	3.899	1	0.048**	4.783
	Yes (Ref)	0	-	-	-	1
Radio Health Program Last 6 months	No	-0.148	0.082	1	0.774	0.862
	Yes (Ref)	0	-	-	-	1
Heard of ORS	Never Heard of ORS	0.071	0.004	1	0.948	1.073
	Used ORS	0.674	2.071	1	0.150	1.962
	Heard of ORS (Ref)	0	-	-	-	1
Mothers Level of Education	No Education	0.372	0.097	1	0.756	1.451
	Primary	1.258	4.215	1	0.040**	3.519
	Secondary and Above (Ref)	0	-	-	-	1
Wealth Index	Poorest	-3.066	6.274	1	0.012**	0.047
	Poorer	-2.178	5.674	1	0.017**	0.113
	Middle	-1.902	5.044	1	0.025**	0.149
	Richer	-0.559	0.631	1	0.427	0.572
	Richest **(Ref)**	0	-	-	-	1

Traditional Healers and others						
Intercept	-	-4.160	20.317	1	0.000	
TV Health Program Last 6 months	No	-0.070	0.006	1	0.936	0.933
	Yes (Ref)	0	-	-	-	1
Radio Health Program Last 6 months	No	0.151	0.112	1	0.738	1.163
	Yes (Ref)	0	-	-	-	1
Heard of ORS	Never Heard of ORS	0.862	2.675	1	0.102	2.368
	Used ORS	0.875	6.014	1	0.014**	2.400
	Heard of ORS (Ref)	0	-	-	-	1
Mothers Level of Education	No Education	2.430	8.264	1	0.004***	11.363
	Primary	1.700	4.631	1	0.031**	5.476
	Secondary and Above (Ref)	0	-	-	-	1
Wealth Index	Poorest	1.179	1.369	1	0.242	3.250
	Poorer	0.013	0.000	1	0.990	1.013
	Middle	0.402	0.161	1	0.688	1.494
	Richer	-1.781	1.852	1	0.174	0.169
	Richest **(Ref)**	0	-	-	-	1

P-value in the parenthesis; *** p<0.01, ** p<0.05, * p<0.1, Ref: Reference

Table 4.4.1 shows that the odds of a child being treated at the government run public health facility relative to not treated is 1.94 ($p<0.05$) times higher for children born of mothers who had not seen any TV health program 6 months prior the survey compared to children born of mothers who had access to TV health program. On the other hand, the odds of children with diarrhea being treated at the public health facility relative to not treated was 0.64 ($p<0.05$) times for children born of mothers who did not listen to any radio program 6 months prior the survey compared to children born of mothers with access to radio health program.

The odds of being treated at the government run public health facility relative to not treated is 16.99 ($p<0.01$) times higher for children born of mothers who had used ORS compared to children born of mothers who has just heard of ORS. This implies that mother's access to health information and knowledge of the first line treatment (ORS) determines whether the child is taken to a public health facility or not treated at all.

Table 4.4.1 shows that the odds of a child treated at a privately owned health facility relative to not treated is 0.32 ($p<0.05$) times for children born of mothers who did not listen to any radio health program 6 months prior the survey compared to children born of mothers who had access to the radio health program. For children born of mothers who had used ORS before, their odds of being treated at a private health facility relative to not being treated is 6.01 ($p<0.01$) times higher compared to children born of mothers who heard of ORS before. Mother's wealth index is yet another determinant of whether the child is taken to a private health facility or not treated at all. Table 4.4.1 shows that the odds of a child taken to a private health facility relative to not treated increases with increasing wealth index, this means

that the poorest have the lowest odds 0.01 ($p<0.01$) of taking their children to a private health facility compared to the richest for the treatment of diarrhea.

The treatment of children through counter drugs from shops and pharmacies shows another dimension of the treatment of children with diarrhea. Table 4.4.1 shows that the odds of a child treated by counter drugs from shops and Pharmacies relative to not treated is 4.78 ($p<0.05$) times higher for children born of mothers who did not have access to TV health programs compared to others. similarly, the odds of a child treated by counter drugs from shops and pharmacies relative to not treated is 3.52 ($p<0.05$) times higher for children born of mothers with primary education compared to children born of mothers with secondary and higher level of education. As observed for the treatment of children at the private health facility, the odds of children treated through counter drugs from shops and pharmacies appears to increase with increasing wealth index of the mother.

Table 4.4.1 shows that children born of mothers with the poorest index have the lowest odds 0.05 ($p<0.05$) compared to the richest mothers. This implies that mother's level of education and wealth index determines whether the child is treated by drugs from shops and pharmacies or not treated at all.

Treatment of children by traditional healers shows that mother's level of education and knowledge/use of ORS are important. Table 4.4.1 shows that the odds of a child taken to the traditional healers for the treatment of diarrhea relative to not treated is 11.36 ($p<0.01$) times higher for children born of mothers with no education compared with children born of mothers with secondary education. The odds of children born of mothers with primary education compared to children born of mothers with secondary and higher level of education is 5.48 ($p<0.05$) times higher. This means that the odds of a mother taking a child with diarrhea to a traditional healer is higher for those mothers without education compared to those with primary and higher level of education. However, the knowledge of ORS is consistent with the odds of a child taken to the government health facility, private, or treated through counter drugs (2.40) ($p<0.05$).

4.4.2 Determinants of Treatment of ARI in Public, Private Health Facilities, Shops/Pharmacies and Traditional Methods compared to those not treated in Zambia.

The multinomial model of the determinants of the treatment of children with ARI from different sources show that health care resources, access to health related information, father

living in the house as well as the child's age explained why children are treated from different sources. Table 4.4.2 shows the results from the multinomial regression.

Table 4.4.2: Determinants of Treatment of ARI in Public, Private Health Facilities, Shops/Pharmacies and Traditional Methods compared to those not treated in Zambia-Results from Multinomial Regression.

		Acute Respiratory Infection (N=1447)				
Covariates	**Category**	**β**	**Wald**	**df**	**sig**	**Exp(β)**
Government Run Public Health Facilities						
Intercept		0.269	0.919	1	0.338	
Age		-0.172	13.184	1	0.000***	0.842
Distance to the Health Facility	Big Problem	-0.447	5.130	1	0.024**	0.640
	Not a Problem (Ref)	0	-	-	-	1
No Drugs at the Health Facility	Big Problem	-0.320	5.751	1	0.016**	0.726
	Not a Problem (Ref)	0	-	-	-	1
Having to take Transport the Health Facility	Big Problem	-0.142	0.511	1	0.475	0.868
	Not a Problem (Ref)	0	-	-	-	1
Father in the House	Lives in the House	0.641	7.549	1	0.006***	1.898
	Lives Elsewhere (Ref)	0	-	-	-	1
TV Health Program Last 6 months	No	-0.127	0.453	1	0.501	0.881
	Yes (Ref)	0	-	-	-	1
Radio Health Program Last 6 months	No	0.041	0.080	1	0.777	1.041
	Yes(Ref)	0	-	-	-	1
Privately Run Health Facilities						
Intercept	-	-1.894	3.134	1	0.077	
Age		-0.093	0.518	1	0.472	0.911
Distance to the Health Facility	Big Problem	-0.256	0.189	1	0.664	0.774
	Not a Problem (Ref)	0	-	-	-	1
No Drugs at the Health Facility	Big Problem	-0.783	4.075	1	0.044**	0.457
	Not a Problem (Ref)	0	-	-	-	1
Having to take Transport the Health Facility	Big Problem	-0.629	1.134	1	0.287	0.533
	Not a Problem (Ref)	0	-	-	-	1
Father in the House	Lives in the House	1.452	1.962	1	0.161	4.273
	Lives Elsewhere (Ref)	0	-	-	-	1
TV Health Program Last 6 months	No	-1.632	13.809	1	0.000***	0.195
	Yes (Ref)	0	-	-	-	1
Radio Health Program Last 6 months	No	-0.502	1.186	1	0.276	0.605
	Yes(Ref)	0	-	-	-	1
Drugs from Pharmacy and Shops						
Intercept	-	-1.946	10.432	1	0.001	
Age		-0.075	0.730	1	0.393	0.927
Distance to the Health Facility	Big Problem	0.731	4.214	1	0.040**	2.077
	Not a Problem (Ref)	0	-	-	-	1
No Drugs at the Health Facility	Big Problem	0.124	0.253	1	0.615	1.132
	Not a Problem (Ref)	0	-	-	-	1
Having to take Transport the Health Facility	Big Problem	-0.823	5.457	1	0.019**	0.439
	Not a Problem (Ref)	0	.	0	.	1
Father in the House	Lives in the House	0.854	2.518	1	0.113	2.350
	Lives Elsewhere (Ref)	0	-	-	-	1
TV Health Program Last 6 months	No	-0.290	0.763	1	0.382	0.748
	Yes (Ref)	0	-	-	-	1
Radio Health Program Last 6 months	No	-0.249	0.883	1	0.347	0.780
	Yes(Ref)	0	-	-	-	1

Traditional Healer and Others						
Intercept	-	-3.376	17.346	1	0.000	
Age		-0.129	1.005	1	0.316	0.879
Distance to the Health Facility	Big Problem	-0.663	1.919	1	0.166	0.515
	Not a Problem (Ref)	0	-	-	-	1
No Drugs at the Health Facility	Big Problem	-0.645	2.643	1	0.104	0.525
	Not a Problem (Ref)	0	-	-	-	1
Having to take Transport the Health Facility	Big Problem	-1.236	5.204	1	0.023**	0.291
	Not a Problem (Ref)	0	-	-	-	1
Father in the House	Lives in the House	-0.060	0.012	1	0.914	0.941
	Lives Elsewhere (Ref)	0	-	-	-	1
TV Health Program Last 6 months	No	-0.067	0.012	1	0.912	0.935
	Yes (Ref)	0	-	-	-	1
Radio Health Program Last 6 months	No	0.640	2.179	1	0.140	1.897
	Yes(Ref)	0	-	-	-	1

P-value in the parenthesis; *** p<0.01, ** p<0.05, * p<0.1, Ref: Reference

Table 4.4.2 show that the odds of a child with ARI taken to a government health facility relative to not treated is 0.84 ($p<0.01$) times for the very young under-five children, this means that the odds of a child taken to a government public health facility reduces with each additional year of the child's age.

The Distance to the nearest public health facility is yet another determinant. Table 4.4.2 show that the odds of a child with ARI taken to a public health facility relative of not being treated is 0.64 times ($p<0.05$) for children born of mothers who reported distance to the health facility as a problem compared to children born of mothers who reported distance as not a problem. The odds of children born of mothers who reported availability of drugs as a problem to access the public health facility for treatment is 0.73 ($p<0.05$) times relative to children born of mothers who reported availability of drugs not as problem. This means that distance to the health facility, lack of availability of drugs in health facilities lowers the odds of treatment from public health facilities.

The father living in the house has direct influence on the odds of treating the child from public health facilities. Table 4.4.2 shows that the odds of a child with ARI taken to a government public health facility relative to not treated is 1.90 ($p<0.01$) times higher for children who had the father in the house compared to those who reported otherwise. This entails that children with their fathers in the house have higher odds of treatment.

Table 4.4.2 shows that the odds of a child with ARI taken to a privately run health facility relative to not treated is 0.46 ($p<0.05$) and 0.20 ($p<0.01$) times for children born of mothers who reported lack of drugs at the health facility to be a problem and had no access to any TV health program respectively compared to those who born of mothers who reported otherwise.

This means that the inadequacy of drugs in health facilities and the lack of access to TV health related media information reduce the odds of being treated at the privately owned health facilities.

Similar results are observed for the treatment of a child with ARI through counter drugs from shops and pharmacies relative to not treated with distance and having to take transport to the health facility having odds of 2.08 ($p<0.05$) times higher, 0.44 ($p<0.05$) times for children born of mothers who reported distance and having to transport to the nearest facility as a problem respectively as compared to others. This means that, the distance to the nearest health facility increases the odds of treating the child by counter drugs.

Table 4.4.2 shows that the odds of a child with ARI taken to a traditional healer relative to not treated is 3.44 ($p<0.05$) times higher for children born of mothers who reported having to take transport to the nearest health facility as a problem compared to those born of mothers who reported otherwise.

The findings show that age of the child, distance to the nearest health facility, and availability of drugs in public health facilities and the father of the child determines the type of treatment the child receives.

CHAPTER FIVE

5. Discussion and Conclusion

5.1 Overview

This thesis aimed to identify the determinants of treatment of child illnesses (Diarrhea and ARI) among children under-five years in Zambia and why they are treated from different sources. The thesis has identified several factors affecting the treatment of children with diarrhea and ARI respectively.

This section discusses the findings. Firstly, a brief overview of the main findings is highlighted. Determinants of the treatment of diarrhea and ARI are comparatively discussed around key variables/determinants in an attempt to draw differences in determinants of treatment between diarrhea and ARI respectively.

5.2 Overview of Main Findings

The diarrhea and ARI disease burden continue to ravage children in Zambia. The study reveals that out of 909 and 1447 children who had diarrhea and ARI respectively, slightly over one-third of the children with diarrhea and ARI respectively did not receive any treatment.

The determinants of the treatment of children with diarrhea and ARI are varied. The study reveals that sex and age of the child, location (rural/urban), number of children under-five years in the household, mothers ability to read and write (literacy), whether the mother worked in the last months prior the survey, mothers' concern of the distance to the health facility, availability of drugs at the local health facility and access to radio and TV health program explained why children were either treated or not.

Father living in the house, distance to the nearest health facility, availability of drugs in health facilities, wealth status of the mother, mother's level of education explained why children with diarrhea and ARI were treated from different sources.

5.2.1 Age and Sex of the Child and the Treatment of Diarrhea and ARI

The study reveals that as the age of the child increases, their odds of being treated reduces significantly both for diarrhea and ARI respectively. There is no clear explanation as to why the care/treatment of children tends to decline with age. However, this might be because of

the reproductive roles of the mother emphasized within the framework of having many children for old age security, prestige and respect (Dow, et al., 1994) - common in most developing countries like Zambia. Hence with the birth of another child, child care on one hand decreases for the older child and on the other hand emphasized for the new born.

These findings corroborate the study conducted in Kenya among the Gussi people (LeVine, et al., 1994) which revealed a significant decline in the child's care with the increase in the child's age and the birth of siblings. These findings affirm the hypothesized statement that young under-fives are more likely to be treated and thus reject the null hypothesis that there is no difference.

The sex differences in the treatment of children was only observed in the treatment of ARI where it showed that female under-fives have less odds of being taken for treatment relative to males. This might suggest a tendency of sex preference in the treatment of children with ARI- it is however unclear how deep the degree of sex preference is.

5.2.2 Socioeconomic Determinants and the Treatment of Diarrhea and ARI

Mothers' literacy (ability to read and write) was observed to be a significant determinant of the treatment of both diarrhea and ARI. Results show that children born of mothers who are able to read and write (literate) had higher odds of being taken for treatment as opposed to others. The results corroborate Caldwell's argument that mother's ability to read and write in own language often, if not always, not only facilitates a mother's integration into a society impacted by traditional customs and cultural beliefs but also heightens her ability to make choices, and increases autonomy necessary to advocate for her Child's health (Caldwell, 1989). Therefore, the hypothesis that mother's ability to read and write increases the chances of mothers taking their children for treatment holds.

These findings corroborate the child health situational analysis of Zambia (ZCHSA, 2001) which indicated that children born of mothers without formal education are more likely to die before their firth birthday. The hypothesis that mothers who are able to read and write are more likely to take their children for treatment as opposed to others therefore holds. However, there is need to invest in the advancement of women's formal education and not only their ability to read and write as functional literacy is a phenomenon by which one can enhance his/her communication, professional and social skills, (Arnove and Graff, 1992) thus bringing

economic prosperity at both micro (individual) level and macro level (Gary and Murphy, 2001).

The mother's participation in labor force in the last 12 months was found to be a significant predictor in determining whether a child is treated for ARI or not – however, not for diarrhea. It was observed that mothers who work but were on leave at least 7 days prior to the survey had higher odds of taking their children for treatment. This means that mother-child close contact especially when the child is ill enhances care and increases the odds of treatment. These findings corroborate LeVine, et al. (1994) findings in their anthropological study in Kenya among the Gussi people, which revealed that mother-child close contact in early years of the child's life enhanced the child's survival. However, mothers' care and mother-child contact declined significantly as the child grew older and with the birth of siblings also consistent with this study.

Access to cash income among mothers was observed to have a significant influence on the treatment of children with ARI. This arises from the realization that mothers' participation in labor is not usually measured, quantified or paid (ZDHS, 2007). However, their access to cash income has a direct influence on their ability to take the child for treatment when the disease becomes manifest.

The socio-economic determinants discussed in this study consistently corroborate Mosley and Chen (1984) framework which illustrated that socioeconomic factors operate through the proximate determinants to influence the risk of a disease and the outcome of the disease processes. In this context, determinants of treatment of diarrhea and ARI respectively have provided a deep reflection explaining why children are treated or not. Thus, parents' socio-economic well-being is vital not only in ensuring child survival as illustrated by Mosley and Chen (1984), but also in ensuring a healthy childhood.

5.2.3 Health Care Resources and the Treatment of Children with Diarrhea and ARI

Better access to basic health care services is an essential step towards not only achieving a healthy childhood but also the treatment of illnesses once becomes manifest. Thus, not only proximity to the health facility is an essential force in the treatment of children, but also the availability of trained staff, availability of drugs in health facilities. The study reveals that distance to the nearest health facility and availability of drugs determines whether the mother takes the child for treatment, and the choice of treatment. It also shows that the problem of

the distance to the nearest public health facilities and availability of drugs is an endemic problem in rural areas thus affecting the treatment of children with diarrhea and ARI respectively. These findings are contrary to the current efforts and policy reforms of 1997 anchored on the principle of providing "all Zambians with equity of access to cost-effective, quality health care as close to the family as possible" (World Bank, 1997).

The significant reduction in the odds of treatment due to the lack of drugs in health facilities and distance to the nearest health facility as observed in the treatment of diarrhea and ARI especially in rural areas brings out an aspect of not only the quality of health care services but also the lack of equitable distribution of health care services. Based on these findings, the hypothesis that availability of drugs in health facilities increases the willingness of mothers to take their children for treatment of diarrhea and ARI respectively holds. This also conforms to the child health situational analysis (ZCHSA, 2001) which cited the lack of drugs in health facilities and the long distances to the health facilities especially in rural areas as determinants of accessing treatment. This underscores the need for absolute equity of access to healthcare for all children irrespective of residence (urban or rural).

5.2.4 The Media and the Treatment of Children with Diarrhea and ARI

Access to radio and TV health programs were observed to have significant influence not only on the treatment but also on the choice of healthcare for children with diarrhea and ARI. The results show that mothers who had access to TV and radio health program had higher odds of taking the child for treatment as opposed to others.

The results consistently corroborate Rahman (2009) observations that improved access to the media enhances the knowledge base of people regarding a cross cutting issues affecting them, particularly health care. He further notes that women who have access to the media have more and better access to health care. This entails that access to the media can be a resourceful method of enhancing child treatment in Zambia.

5.2.5 Choice of Healthcare (Source of Treatment) for Diarrhea and Acute Respiratory infection (ARI) in Zambia

Despite majority of the children reported to have had diarrhea and ARI two weeks prior the 2007 survey being treated from government public health facilities 84.7 % and 80.2% respectively, a proportion of children treated by other means is reasonably high. While

traditional healers are common for the treatment of diarrhea (8.2%), treatment by counter drugs from Shops and pharmacies is for ARI (10.7%).

The study shows that the importance of mother's location (rural/urban), education, father of the child in the house, whether she worked in the last 12 months prior the survey, the type earnings she received as well as wealth index are significant determinants of the choice of health care treatment for the child with diarrhea and ARI, mother's access to health media information, distance to the nearest health facility, availability of drugs in health facilities also explained the mothers choice of the source of treatment for child illness. These findings are an illustrative picture of the many reasons why children are treated from different sources, a pattern also observed by Tanahashi (1978) and Kroeger (1983).

a. Treatment from Public Health Facilities

The results show that children born of mothers who reported distance to the nearest public health facility, availability of drugs in health facilities as a problem had lower odds of being taken to the public health facility for the treatment of ARI, whereas, children who had their fathers living in the house had higher odds of being taken to the public health facility. This entails that children with their fathers living in the house have higher odds of being treated, an interesting aspect of child care showing that child care is not only influenced by the mother's presence, well being but of their father's too. Treatment of diarrhea in public health facilities is influenced by access to health media information (radio) and knowledge and use of ORS. The findings consistently show that distance to the health facility and availability of drugs and access to radio health programs does not only influence whether a child is treated or not but also where the child is treated from. It is however interesting to note that mother's level of education and wealth quintile were not significant determinants of treatment from public health facility.

b. Treatment from Private Health Facilities

The study shows that access to information and wealth status of mother's determines access to private health facilities for the treatment of children with diarrhea. It is clear from the results that accessibility of private health facilities tends to increase with increasing wealth status of the mother. This entails that there is a cost attached to accessing private health care, thus accessibility is only among those with a high wealth status as opposed to others.

The choice of private health facilities for the treatment ARI among children under five on the other hand is shown to be explained by the perceived lack of drugs in public health facilities as well as access to health media. This is, of course illustrative of the weak health care delivery system in public health facilities in Zambia, thus people opt for private health care often if not always at high cost.

The results are illustrative of the growing private health sector business in Zambia, Private health institutions were recognized into the category of formal health care system in Zambia after the health reforms of 1995 (World Bank, 1997). Since then there has been a rapid growth of the private health sector business from small clinics to large health care facilities (World Bank, 2009). However, there accessibility is determined by a lot of factors thus not all people have access to private health facilities.

c. Treatment of Child illness-Counter Drugs (Shops, Drug Stores)

It is interesting to see that the odds of treatment of children with diarrhea through counter drugs reduces significantly as the wealth status of the mother increase, this entails that the odds of treating a child through counter drugs as opposed to not treating them is much lower for richer people. This underscores the need for the improvement of the living conditions of people not only in terms of their wealth status but also their education and the general well being (Mkandawire, 2010).

d. Treatment from Traditional Healers

The findings show that mother's level of education has a direct influence on the mother's choice of treatment for the child, as mothers without any formal or with primary education had higher odds of taking the child to traditional healers. Thus in a country characterized by high female illiteracy rates estimated around 33.8 percent (UNESCO, 2009), these findings underscores the need to improve women's participation in education. This is because just a mare ability to read and write in own language increases the odds of treatment of the child as observed in this study.

These findings could be situated within the premise of Mkandawire's (2010) argument that women's education enhances not only the individual well being but also the community and most importantly Caldwell (1989), who premised his argument that the mothers education or basically her ability to read and write in own language often if not always facilitates a women's integration into a society impacted by traditional customs and cultural beliefs and

heighten her ability of choice, increases autonomy necessary to advocate for her Childs health.

Thus, it makes sense to assume that people with more education, wealthier, live in urban areas, and have access to media information have more knowledge of modern health care are likely to have their children treated from health facilities. However, evidence in this study shows that as much as the wealthier, more educated have more knowledge and access to modern and public health facilities, it is difficult to conclude that women in rural areas are more likely to treat their children by traditional methods. Thus, in order to draw conclusions on the hypotheses that rural women being more likely to treat their children with diarrhea and ARI respectively from traditional healers requires further evidence. Thus, these results corroborate Pretorius (1991) observations, which showed that in developing countries urban people visited traditional healers just as frequently as people in rural areas.

The evidence provided by this study has shown that the treatment of children from different sources has many facets. For example, Kroeger's (1983) model of the choice of health care/healer outlined that the availability of different source of treatment such as modern health institutions both public or private, drugs from shops/pharmacies, and or traditional healers are determinants in themselves of individual's choice of health care when ill (Stekelenburg, et al., 2003). Thus, in a country like Zambia where the aforementioned sources of treatment are common, the explanation of the determinants of the treatment of children with diarrhea and ARI respectively transcends just determining why the child was treated or not but also determining why a child was treated from a given source of treatment.

5.2.6 Differences in the Determinants of Treatment of Diarrhea and ARI among under-fives in Zambia

The treatment of diarrhea and ARI respectively appear to be consistently influenced by age of the child, mothers' ability to read and write, distance to the nearest health facility, availability of drugs in health facilities. However, the differences in the determinants of treatment are also distinct; sex of the child, the number of under-five children in the household and mothers type of earnings were significant determinates of the treatment of ARI solely whereas child's residence (rural/urban), access to radio and TV health programs were for the treatment of diarrhea.

As much as distance to the nearest health facility and availability of drugs in health facilities are a concern in accessing modern treatment for childhood diarrheal and ARI diseases, there

is a regional connotation with regards to the treatment of diarrhea. The study reveals that children born of mothers from rural areas and had a concern of distance and or availability of drugs in public health facilities were significant determinants of the treatment of diarrhea as opposed to the treatment of childhood ARI where a mare concern of distance and availability of drugs were observed. Findings reflect an interesting dimension to the determinants of treatment of childhood diarrhea and ARI respectively. This suggests the rural/urban differences in the quality of care both in terms of the distance to the nearest facility and adequacy of supplies in rural areas. However further research is required to provide deeper insights on the matter.

It was hypothesized that children with diarrhea are more likely to be taken for treatment as opposed to those with ARI; the evidence provided by this study tends not to provide a clear cut conclusion. However, their tends to be a difference in the perceived severity of diarrheal and ARI disease on the child as suggested by the determinants where there was regional connotation exhibited in the treatment of diarrhea and sex preference indicator in the treatment ARI, but to draw final conclusion on the hypothesized statement further research is required.

It is generally believed that a disease with a high perceived severity on the child's health often will receive almost immediate attention. Thus, assuming that determinants of treatment of child diarrhea and ARI respectively are the same is not only a failure to provide deeper insight but also incapacitates planning for interventions. While other studies show that diarrhea is the major cause of morbidity and mortality among under five children (Hammer, et al., 1998) others also show that ARI among children are the most frequent cause of health services used around the world (Leonor, et al., 2011).

5.3 Limitations of the Study

The major limitation with this study stems from the inherent limitations of the ZDHS data set, aspects such as variables on the perceived severity of the child diseases (diarrhea and ARI); direct variables as reported by mothers why the child was not treated and why the child was treated from different sources. Thus the assessment of the determinants of the treatment of child illness in this study were based on variables that do not directly measure why the child with diarrhea or ARI were treated or not.

5.4 Conclusion

Despite the commitment by the Zambian government as stated in the 1997 health care reforms aimed at providing Zambians with "equity of access to cost-effective quality health care as close to the family as possible", It is clear that treatment of child diarrhea and ARI in the country is persistently challenging. The major determinants of the treatment of childhood diarrhea and ARI in Zambia include: literacy levels particularly among women, maternal socio-economic well being especially access to paid labor force and cash income, adequate health care resources characterized by long distances to the facilities, prolonged shortages of essential drugs as well as the unavailability of health care providers especially in rural areas. However, there impact on the urban dwellers cannot be ignored too. These factors often not only influences whether a child is treat or not, but also force people to seek alternative treatment of their children thus, the observed different places where mothers sought treatment for children with diarrhea and ARI respectively.

Based on the findings, it can be argued that the current efforts to provide care and treatment for children and improve child survival is threatened by limited access to health care services especially in rural areas where the childhood diarrhea and ARI are relatively more prevalent. Other challenges include inadequate resource investment both in infrastructure and provision of supplies (drugs) hence equity of access for quality child health care has not been adequately archived for children in Zambia. Further, the masses and women in particular should be universally sensitized on the importance of treatment of child illnesses from health facilities and to protect their children from diarrhea and ARI.

The treatment of childhood diarrhea and ARI has far reaching consequences. Thus, for childhood treatment or rather child survival to significantly improve, there is need for improved general maternal education, promoting and strengthening health care systems and improve family and community practices that are vital for child health.

Despite the limitations inherent in the ZDHS data to adequately identify the determinants, the study has provided insightful determinants of the treatment of child illnesses in Zambia.

CHAPTER SIX

6. Recommendations

6.1 Overview

Bearing in mind that Zambia, just like many developing countries are signatory to the 1990 Convention on the Rights of Children (CRC) as well as existing international protocols and policy documents that emphasize child survival and good health. Drawing recommendations for the treatment of child illnesses can be daunting and multifaceted. The following section provides among other salient issues, recommendations for policy, suggestions for future research as well as planning in an attempt to address the diarrheal and ARI childhood disease burden.

6.2 Policy Recommendation

The determinants of the treatment of childhood diarrhea and ARI have shown that they are deep rooted in the socio-economic status of parents, weak health care system, inadequate access to child-care health information, the rural-urban differentials in the quality of care, the importance of other forms of care givers and providers such as traditional healers, pharmacies and drug stores. The Ministry of Health in Zambia should firstly develop a whole encompassing and comprehensive child health policy to better articulate not only the treatment of child illnesses but the general child health.

The determinants of treatment of childhood diarrhea and ARI reflected in this study show that they are cross cutting thus affecting many sectors of the economy, health, general social well being, and education sector among others. The recommendation for immediate intervention would be to address such things as the inadequacy of health care providers, drugs in health facilities. In the long run however, there has to be the development of a comprehensive plan for an effective mechanism that would reverse the childhood diseases burden, treatment differentials both location and regional by investing in more infrastructure development, human capital development and promotion of female education that often translate to better well being among mothers and their infants.

There is need to scale up dissemination and access to health related information to all parts of the country through all possible means. Such as investing in health delivery system (both preventive and curative), system strengthening through training more health care providers, infrastructure development as well as scaling up the coverage of critical interventions of child

health that worked in the developed world of today for not only diarrheal and ARI diseases but other diseases too.

Realizing the role of traditional healers in the provision healthcare, there is need for the Zambian government and its collaborating partners in the health sector to sensitize traditional healers on basic illness control, hygiene and introduce an effective referral system from traditional healers to hospitals and clinics.

Moreover, the development of a holistic child health policy should be consistent with the system strengthening in human capital, infrastructure development and general service provision while emphasizing on equitable access to health care services.

6.3 Possibility for Further Studies

While acknowledging the fact that this study has highlighted salient determinants of the treatment of children with diarrhea and ARI in Zambia based on the 2007 ZDHS, it is however clear that providing answers to the topic in question still has gaps due to lack of other variables that measure directly why the child was treated as well as unexplained determinants such as the perceived severity of the child disease. Thus, there is need to incorporate this study with qualitative methods to provide the possible insightful in-depth information on the treatment of child illnesses thus exploring the different dimensions of child diseases burden, treatment and care. Hence, adding deeper insights and explanation to the topic at hand.

Further, bearing in mind that the Demographic Health surveys do not collect direct information on why the child was treated or not rather only collects information on how many children had the illness and how many were treated, there is need for DHS to solicit information directly from the mother as to why the child was not treated, why did they treat the child by the method of choice, such variables will make the explanation of determinants more robust. Further, information on the perceived severity of the child diseases and acceptability of the treatment type may add detail to the topic at hand.

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APPENDIX A:

Table A.1: A cross Tabulation of Under-fives' who suffered and Treated for Diarrhea and Acute Respiratory Infection (ARI) by Background Characteristics

Characteristic	Diarrhea Treatment (N=909)			Acute Respiratory Infection Treatment (N=1447)		
	Yes	No	sig (2 sided)	Yes	No	sig (2 sided)
sex of Child						
Male	67.2	32.8	0.834	68.4	31.6	0.027**
Female	67.8	32.2		62.9	37.1	
Age of Child (In Months)						
>1 year	68.9	31.1		72.2	27.8	
1 year	69.0	31.0		67.9	32.1	
2 years	68.3	31.7	0.519	65.7	34.3	0.002***
3 Years	60.4	39.6		61.5	38.5	
4 Years	63.3	36.7		56.3	47.7	
Socioeconomic Factors						
Location						
Rural	65.6	34.4	0.368	64.2	35.8	0.093*
Urban	68.6	31.4		68.8	31.4	
Region						
Central	64.8	35.2		68.4	63.6	
Copperbelt	56.7	43.3		63.6	34.1	
Eastern	77.9	22.1		63.5	63.6	
Luapula	66.2	33.8		62.4	34.1	
Lusaka	56.5	43.5	0.003***	65.5	63.6	0.478
Northern	68.3	31.7		68.0	34.1	
North Western	70.5	29.5		63.4	63.6	
Southern	78.5	21.5		73.9	34.1	
Western	64.0	36.0		62.1	63.6	
Literacy (Able to read and Write)						
Yes	80.6	19.4	0.150	78.7	21.3	0.015**
No	69.2	30.8		63.4	36.6	
Worked Last 12 Months						
No	67.6	32.4	0.279	65.7	34.3	0.026**
in the Past year	58.5	41.5		54.0	46.0	
Currently Working	69.2	30.8		67.2	32.8	
Have a job, but on leave last 7 days	57.9	42.1		72.1	27.9	
Type of earnings for work (Mother)						
Not paid	67.4	32.6	0.945	58.5	41.5	0.000***
Cash only	67.7	32.3		72.4	27.6	
Cash and kind	69.4	30.6		63.4	36.6	
In kind only	58.3	41.7		53.8	46.2	
Man in the House						
Yes	69.4	30.6	0.089*	65.7	34.3	0.003***
No	58.6	41.4		50.5	49.5	
Fathers Level of Education						
No Education	59.7	40.3	0.027**	64.0	36.0	0.918
Primary	71.7	28.3		65.2	34.8	
Secondary	65.6	34.4		65.6	34.4	
Higher	55.3	44.7		66.3	33.7	
Dont Know	46.2	53.8		57.1	42.9	
Final say on women's own Health						
Women	70.9	29.1	0.857	63.6	36.4	0.014**
woman and Husband	67.2	32.8		68.9	31.1	
Husband/Partner alone	68.5	31.5		59.4	40.6	
Someone else	66.7	33.3		88.9	11.1	
Health Care Resources						
Concerned No Provider						
Yes (Big Problem)	73.6	26.4	0.015**	64.1	35.9	0.432
No (Not a Problem)	65.2	34.8		66.3	33.7	

Concerned No Drugs						
Yes (Big Problem)	69.8	30.2	0.124	67.1	32.9	0.209
No (Not a Problem)	64.9	35.1		64.0	36.0	
Concerned Distance to Health Facility						
Yes (Big Problem)	65.3	34.7	0.179	60.7	39.3	0.000***
No (Not a Problem)	69.8	30.2		69.7	30.3	
Having to take Transport						
Yes (Big Problem)	65.7	34.3	0.266	62.1	37.9	0.008***
No (Not a Problem)	69.2	30.8		68.8	31.2	
Has Bicycle						
Yes	71.6	28.4	0.038**	66.5	33.5	0.132
No	64.4	35.6		65.7	34.3	
Access to Health Related Media Information						
Have seen any TV Health Matters Program last 6 months						
Yes	62.6	37.4		70.7	29.3	0.042**
No	68.7	31.3	0.114	64.4	35.6	
Have seen Listened to any Radio Health Program Last 6 months						
Yes	69.8	30.2	0.242	68.0	32.0	0.113
No	66.1	33.9		64.0	36.0	

Source: ZDHS 2007, Own Computation
P-value in the parenthesis; *** p<0.01, ** p<0.05, * p<0.1

APPENDIX B:

Table B.1: Cross Tabulation of where treatment for Diarrhea was sought by Maternal, Socio-Economic, Health Care resources and access to Health Information Factors

Convariate/Factor	Diarrhea (N=909)					
	Not Treated	Public	Private	Shop/Pharmacy	Traditional and Others	sig (2 sided)
sex of Child						
Male	33.6	55.8	2.6	2.4	5.5	0.897
Female	32.5	57.7	1.8	2.6	5.5	
Age of Child (In Months)						
>1 year	31.4	59.0	2.6	2.6	4.4	
1 year	44.5	79.0	3.5	3.9	9.6	
2 years	27.5	51.1	2.2	1.7	4.4	0.939
3 Years	16.6	21.4	0.4	1.3	2.2	
4 Years	10.9	14.8	0.0	0.4	1.3	
Socioeconomic Factors						
Location						
Rural	35.2	57.1	3.1	3.7	0.9	0.000****
Urban	31.8	56.6	1.7	1.9	8.0	
Region						
Central	35.8	57.5	0.9	2.8	2.8	
Copperbelt	43.3	46.2	4.8	2.9	2.9	
Eastern	22.1	66.3	2.1	1.1	8.4	
Luapula	34.8	47.8	1.4	1.4	14.5	
Lusaka	44.2	43.0	7.0	2.3	3.5	0.000***
Northern	32.8	51.2	0.0	6.4	9.6	
North Western	30.7	62.3	2.6	3.5	0.9	
Southern	21.5	71.1	1.7	0.0	5.8	
Western	36.0	59.6	0.0	1.1	3.4	
Mothers Level of Education						
No Education	33.0	49.5	0.9	0.9	15.6	
Primary	30.2	59.2	1.8	3.2	5.6	0.042**
Secondary and Above	39.5	54.3	3.7	1.6	0.8	
Worked Last 12 Months						
No	33.2	57.2	2.2	2.5	4.9	
in the Past year	41.5	56.9	0.0	0.0	1.5	0.146
Currently Working	31.3	57.1	2.2	2.8	6.6	
Have a job, but on leave last 7 days	42.1	42.1	10.5	5.3	0.0	
Type of earnings for work (Mother)						
Not paid	32.9	56.5	1.4	2.3	6.9	
Cash only	32.7	56.6	3.6	3.2	3.9	0.008***
Cash and kind	30.6	64.5	0.0	1.6	3.2	
In kind only	37.5	37.5	0.0	0.0	25.0	
Father in the House						
Yes	31.1	58.1	2.5	2.0	6.3	0.086*
No	41.4	41.4	1.7	5.2	10.3	
Wealth Index						
Poorest	29.7	56.0	0.0	0.5	13.7	
Poorer	32.0	61.1	0.5	1.5	4.9	
Middle	36.1	54.5	1.0	2.1	6.3	0.000***
Richer	32.9	57.5	4.1	5.0	0.5	
Richest	35.1	52.6	7.0	3.5	1.8	
Heard of oral rehydration Solution						
Never heard of	54.8	12.9	6.5	3.2	22.6	
Used ORS	13.1	79.6	2.2	1.6	3.5	0.000***
Heard of ORS	63.8	23.0	1.9	4.1	7.2	
Final say on women's own Health						
Women	30.2	58.3	2.5	3.0	6.0	
woman and Husband	33.3	54.7	4.0	1.8	6.2	0.244
Husband/Partner alone	31.5	58.1	0.4	2.3	7.7	
Someone else	33.3	50.0	16.7	0.0	0.0	
Health Care Resources						
Concerned No Provider						
Yes (Big Problem)	26.7	64.7	2.0	1.2	5.5	0.029**
No (Not a Problem)	35.4	53.8	2.3	3.1	5.5	
Concerned No Drugs						
Yes (Big Problem)	30.7	59.3	1.4	2.0	6.6	0.043**
No (Not a Problem)	35.7	53.8	3.2	3.2	4.2	

Concerned Distance to Health Facility						
Yes (Big Problem)	35.1	53.8	1.5	2.7	6.9	0.157
No (Not a Problem)	31.2	59.2	2.8	2.4	4.4	
Having to take Transport						
Yes (Big Problem)	34.5	54.8	1.7	2.0	7.1	0.179
No (Not a Problem)	31.7	58.5	2.6	3.0	4.2	
Access to Health Related Media Information						
Have seen any TV Health Matters Program last 6 months						
Yes	37.4	54.2	5.0	1.7	1.7	0.003***
No	31.9	57.4	1.5	2.7	6.4	
Have seen Listened to any Radio Health Program Last 6 months						
Yes	30.8	60.2	4.0	2.3	2.8	0.000***
No	34.4	54.6	1.1	2.7	7.2	

P-value in the parenthesis; *** p<0.01, ** p<0.05, * p<0.1

Table B.2: Cross Tabulation of where treatment for ARI was sought by Maternal, Socio-Economic, Health Care Resources and access to Health Information Factors

Convariate/Factor	Acute Respiratory Infection (N=1447)					
	Not Treated	**Public**	**Private**	**Shop/Pharmacy**	**Traditional and Others**	**sig (2 sided)**
sex of Child						
Male	31.6	54.5	3.5	7.3	3.1	0.184
Female	37.1	50.8	2.3	6.8	3.0	
Age of Child (In Months)						
>1 year	27.8	60.5	2.5	5.6	3.7	
1 year	32.1	52.9	3.3	8.5	3.3	
2 years	34.3	53.7	2.2	7.3	2.5	0.061*
3 Years	38.5	49.2	4.1	6.1	2.0	
4 Years	43.7	42.7	2.5	7.5	3.5	
Socioeconomic Factors						
Location						
Rural	35.8	51.7	2.1	5.9	4.5	0.000***
Urban	31.4	54.7	4.3	9.2	0.4	
Region						
Central	31.6	54.0	0.0	14.4	0.0	
Copperbelt	36.4	44.8	6.7	10.5	1.7	
Eastern	36.5	61.2	0.6	0.6	1.2	
Luapula	37.6	45.2	1.1	5.4	10.8	
Lusaka	34.5	52.3	7.5	2.3	3.4	0.000***
Northern	32.0	50.3	1.2	13.0	3.6	
North Western	36.6	49.7	2.6	5.8	5.2	
Southern	26.1	64.1	2.8	3.5	3.5	
Western	37.9	56.8	0.0	4.2	1.1	
Mothers Level of Education						
No Education	36.5	50.4	0.0	5.8	7.3	
Primary	35.6	53.0	2.0	6.3	3.1	0.000***
Secondary and Above	30.2	52.9	6.1	9.4	1.3	
Worked Last 12 Months						
No	34.3	55.4	2.6	6.1	1.6	
in the Past year	46.0	42.1	1.6	8.7	1.6	0.062*
Currently Working	32.8	52.4	3.3	7.4	4.1	
Have a job, but on leave last 7 days	27.9	60.5	2.3	4.7	4.7	
Type of earnings for work (Mother)						
Not paid	41.5	47.2	1.8	5.6	3.9	
Cash only	27.6	55.6	4.6	9.3	2.9	0.000***
Cash and kind	36.6	49.5	0.0	7.9	5.9	
In kind only	46.2	43.6	2.6	0.0	7.7	
Father in the House						
Yes	34.3	52.0	3.3	7.4	2.9	0.030**
No	49.5	40.9	1.1	4.3	4.3	

Wealth Index						
Poorest	34.1	54.3	0.7	5.8	5.1	
Poorer	35.8	52.5	0.6	6.3	4.7	
Middle	35.8	52.4	1.6	6.2	3.9	0.000***
Richer	33.0	55.1	3.0	8.3	0.6	
Richest	32.1	47.6	10.8	9.0	0.5	
Final say on women's own Health						
Women	36.4	51.6	4.5	5.5	1.9	
woman and Husband	31.1	52.8	3.9	8.9	3.3	0.028**
Husband/Partner alone	40.6	48.9	1.0	6.2	3.3	
Someone else	11.1	77.8	11.1	11.1	11.1	
Health Care Resources						
Concerned No Provider						
Yes (Big Problem)	35.9	54.1	1.7	5.2	3.0	0.245
No (Not a Problem)	33.7	52.3	3.4	7.6	3.1	
Concerned No Drugs						
Yes (Big Problem)	32.9	54.8	1.4	7.0	4.0	0.000***
No (Not a Problem)	36.0	50.4	4.8	6.9	1.9	
Concerned Distance to Health Facility						
Yes (Big Problem)	39.3	46.7	1.9	7.9	4.3	0.000***
No (Not a Problem)	30.3	57.8	3.8	6.1	2.0	
Having to take Transport						
Yes (Big Problem)	37.9	49.2	1.6	6.4	4.9	0.000***
No (Not a Problem)	31.2	56.0	4.0	7.4	1.4	
Access to Health Related Media Information						
Have seen any TV Health Matters Program last 6 months						
Yes	29.3	51.4	8.2	9.5	1.7	0.000***
No	35.6	53.1	1.6	6.4	3.4	
Have seen Listened to any Radio Health Program Last 6 months						
Yes	32.0	53.3	4.7	8.3	1.6	0.000***
No	36.0	52.3	1.6	6.1	4.1	

P-value in the parenthesis; *** p<0.01, ** p<0.05, * p<0.1