HOUSEHOLD CHOICE OF DIARRHEA TREATMENTS FOR CHILDREN UNDER THE AGE OF FIVE IN KENYA: EVIDENCE FROM THE KENYA DEMOGRAPHIC AND HEALTH SURVEY 2008-09

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Abstract

This study investigated the factors that influence the household choice of treatments for children suffering from diarrhea in Kenya using a multinomial logit approach. A sample of 771 under-5 children was drawn from the 2008/2009 Kenya Demographic and Health Survey. It was found that 29.86 percent of the children were not administered with any sort of treatment for their diarrhea. It was surprising to note that only 4 of the affected children were given zinc supplements. The study found that prior knowledge/experience of oral rehydration salts, mother's education level, place of residence, household wealth and birth spacing were key factors determining the use of recommended treatments for childhood diarrhea. Given the inadequate and low usage of ORT and zinc respectively, the study recommends strengthening awareness on childhood diarrhea and the recommended treatments that can be used to manage it as well as increasing the availability and accessibility of zinc supplements.

Keywords: Diarrhea treatment, maternal factors, multinomial logit, marginal effects

Introduction

Globally, diarrhea is the second leading cause of mortality and morbidity among children under the age of five years. It is second to pneumonia, which together with diarrhea account for almost 40 percent of all child mortality across the globe every year (United Nations Children's Fund (UNICEF)/World Health Organization (WHO), 2009). Diarrhea is said to kill more children than a combination of malaria, AIDS and measles. On average,

children under the age of 3 years in developing countries experience about three episodes of diarrhea every year.

Whereas in developed countries diarrhea is viewed as "a little more than an inconvenience" (UNICEF/WHO, 2009), in developing countries, the illness causes the loss of lives of approximately 1.5 million children under the age of five every year (UNICEF/WHO, 2009). Reports from the World Health Organization show that the burden of childhood diarrhea varies from one developing region to another, with the greatest burden experienced in Africa and South Asia. In Africa, according to the Millennium Development Goals (MDG) Report of 2010, diarrhea is actually the leading cause of under-five deaths at 19%, followed by pneumonia (17%). Africa and South Asia account for more than 80 percent of all child deaths resulting from diarrhea. In addition, 75 percent of these deaths occur in only 15 countries with Kenya ranked at number 10 in this list.

In the 1970s and 1980s, vigorous efforts by the international community led to a significant reduction in the number of child deaths caused by diarrhea. This was achieved mainly through efforts and programs created to scale up the use of oral rehydration therapy (ORT) as well as education programs for caregivers on the appropriate use of the therapy. Unfortunately, the emergence of global health challenges such as HIV/AIDS shifted the attention from diarrhea and this led to a reversal of the progress made towards eradication of diarrhea. Currently, only 39 percent of children suffering from diarrhea in low-income countries are administered with the recommended therapy. As a result, little progress has been made towards minimizing the impact of childhood diarrhea since 2000 (UNICEF/WHO, 2009).

The Burden of Childhood Diarrhea in Kenya

In Kenya, like in other developing countries, diarrhea is a major cause of child mortality and morbidity and comes third after neonatal causes and pneumonia, respectively. According to the Minister for Public Health and Sanitation, Dr. Beth Mugo, diarrhea kills about 86 children in Kenya every day. Every Kenyan child under the age of five experiences an average of three bouts of diarrhea every year, according to the 2008-09 Kenya Demographic and Health Survey (KDHS 2008-09). Figures from the KDHS 2008 also show that the prevalence of diarrhea is highest in children aged between 6 and 11 months, followed closely by children between the age of 12 and 23 months. The prevalence rate then falls as children reach the age of two years. Moreover, the prevalence rate of childhood diarrhea has been rising steadily since 1998 for most of the age groups. This may indicate a number of possibilities such as the failure of the Kenyan Government to put up aggressive measures to

curb the illness or under-utilization of treatment options by mothers and other caregivers of children.

Although much progress has been made in reducing under-five (U5) mortality, the current rate of 74 per 1000 live births (which implies that 1 in every 14 children in Kenya do not get to celebrate their fifth birthday) is an indicator that a lot of work still needs to be done if the country is to meet the MDG 4 target of reducing the U5 mortality rate by two-thirds between 1990 and 2015. Whereas much attention has been given to illnesses such as malaria and programs such as immunization, diarrhea, which is easy and inexpensive to treat, continues to cut short the lives of dozens of Kenyan children every day.

Data from the KDHS show that few children suffering from diarrhea receive the recommended treatments and a good number receive no treatment at all. In addition, not many mothers have knowledge on the four basic rules of home-based management of diarrhea which include: increasing the intake of fluids, continued feeding, provision of zinc supplements, and taking the child to a health facility if dehydration persists. For instance, only 26% of the children suffering from diarrhea in the 2008 KDHS were given increased fluids and only 29% received the same amount of foods as before. A focus on diarrhea can play a significant role in reducing the under-five mortality rate and quicken the country's footsteps in its journey towards the realization of MDG 4. Using data from the Kenya Demographic and Health Survey 2008-09, this study seeks to examine the child, maternal and household factors that influence mothers' choice of childhood diarrhea treatment in Kenya.

Reviewed Literature

The role of child, maternal and household factors in determining the utilization of child health services has been the interest of many researchers for a long time. The effect of maternal education on utilization of health services has been found to have mixed results. Some studies found a positive effect, others found a negative effect, and yet others found no effect at all. In studying the reasons why many children remained unvaccinated in an urban area of Sao Paulo in Brazil, Barreto and Rodriguez (1992) found that maternal factors – maternal age, education, and marital status – had no impact whatsoever. Instead, the researchers found that the utilization of vaccination mainly depended on the ability of the health system to deliver vaccination to the target groups. Desai and Alva (1998) however found that vaccination status of children is positively correlated with maternal education. Researchers have argued that education influences mothers' health-seeking behavior, both at home and at health facilities, and this in turn impacts on child health (Joshi, 1994). Education

empowers women with knowledge and it is this knowledge that drives them to take certain actions when faced with a health issue.

Maternal education also plays a critical role in the perceptions of mothers towards childhood illnesses. Feyisetan, Asa and Ebigbola (1997) found that mother's education was positively correlated with knowledge on the etiology of childhood illnesses and consequently on utilization of appropriate child health services. In other studies, it was revealed that the relationship between maternal education and child health is not necessarily direct but rather it is moderated by other factors such as regional differences (Shin, 2007). The implication is that maternal education is more important for child health in poor rural areas than in prosperous urban areas. With regards to maternal age and its impact on child health outcomes, many studies (Feyisetan et al., 1997; Kosimbei, 2005) have found a U-shaped relationship; child outcomes are better in children whose mothers are in their twenties or early thirties and poorest in children of very young and old mothers.

In addition to the maternal factors discussed above, household factors – household income, size of the household, place of residence, presence and gender of household head, occupation of household head – have been found to be equally important in explaining child health outcomes. Studies examining the effect of household wealth on child health have found that household wealth is significantly associated with the choice of health facility; that is, whether public or private, which in turn affects child health outcomes (Al-Ghanim, 2004). Poorer households are less likely to visit a reputable health facility, if at all, than richer households (Burton et al. 2011). Mahmood and Nasir (2001) also found that the level of stunting in children was negatively associated with household wealth; stunting was high among children living in households with low household wealth and low among children living in wealthier households. Nevertheless, Taffa and Chepngeno (2005) found that household income was significantly associated with seeking child healthcare but only to a certain threshold after which its impact is normalized.

The place of residence also has a direct impact on child health outcomes as it determines the accessibility of a household to health-promoting social amenities as well as to a health facility (Burton et al., 2011; Adeladza, 2009). Equally important in determining child health outcomes is the occupation of the household heads (Adeladza, 2009) as it is correlated with the household income/wealth. Although most studies examining occupation focus on the household head, Breiman et al. (2011) argued that mother's occupation is also important because it determines the amount of time spent by mothers at home with their children, which they found to be negatively associated with healthcare use for children. The reasons given for

this interesting finding include: lack of (or inadequate) income by the mothers with which to access healthcare services; and the fact that mothers who stay with their children at home may be serving as a healthcare-use proxy, through monitoring their children's health status in the home.

The body of research that examines socio-economic determinants of child health has also focused on child characteristics, particularly child sex and age of the child. Studies on the impact of child sex on child health outcomes have had mixed results. The interest in child sex revolves mainly around the child gender preferences by most households and this preference for a child of a particular sex may affect how the mothers/households allocate resources towards the child's health (Ndiku, Jaceldo-Siegl, Singh and Sabatie, 2011). Other factors that come into play are related to culture that dictates the types and even amounts of foods children of different sexes should have. Based on these factors, Ndiku et al. (2011) found higher rates of moderate and severe malnutrition among girls than among boys in a rural village in Eastern Kenya. The boys in this study had higher energy intake as compared to their female counterparts. Similarly, Burton et al. (2011) found that boys were more likely than girls to be taken to a health facility. Besides, the sex of the child, the age of the child also strongly determines the child health outcomes with better outcomes found in younger children than in older children (Taffa and Chepngeno, 2005; Olack et al., 2011; Burton et al., 2011). The finding from these studies is that mothers/households are more attentive to and more concerned about the health status of younger children than of older ones.

The review of all these studies provides a strong case for the assertion that there are many factors that influence the utilization of child health services. Given that children rely on others for their health status, it is important to study how child, maternal, and household factors affect utilization of child health services. This study will add on to this body of knowledge but with a focus on utilization of various diarrhea treatments for children under the age of five in Kenya.

Data And Method

Data

The study used secondary data obtained from the Kenya Demographic and Health Survey 2008-09. This data set is the fifth of a series of surveys conducted after every five years by the Kenya National Bureau of Statistics with funding from the United States Agency for International Development. The 2008-09 KDHS is a nationwide representative sample survey of 8,444 women of reproductive age, aged between 15 and 49 years and 3,465 men aged between 15 and 54 years chosen from 400 clusters across the country.

Although the survey has data on a wide range of topics, this study used specifically the dataset on child health which had a question on whether the child had suffered from diarrhea in the two weeks preceding the survey. This question was used as the filter question, leaving only data on the respondents who had answered in the affirmative. The data was further filtered based on the diarrhea treatment given to the child. Since the study was interested in the recommended treatments (zinc and ORT-based treatments), no treatment, and other treatments, namely: anti-biotics, anti-motility and herbal medicine, the final sample size was reduced to 771 children aged below the age of five. Thus, data on diarrhea treatment had three categories: recommended treatment (RT), other treatments (OT), and no treatment (NT), and this categorical variable was used as the dependent variable. The explanatory variables of interest included: mother's age at birth, mother's education in years, number of births in the last five years, mother's knowledge of oral rehydration salts (ORS), child's sex, child's birth order, number of children in a household, size of the household, household income, and place of residence.

Model

This study used the multinomial logit model (MNL). The MNL model is used when the number of choices facing an individual is more than two (Greene, 2000). This model is appropriate for this study because diarrhea treatments are numerous and mothers/caretakers are faced with a wide range of options. The MNL, like other choice models, is founded on the *Random Utility Theory* and begins by assuming that the individual chooses an alternative from a set of alternatives that will maximize his/her utility (Greene, 2000). The utility function for each alternative contains characteristics of both the alternatives and the individuals. The utility function is given as:

$$U_{ij} = V_{ij} + \epsilon_{ij} \quad ----------1$$

Where:

U_{ij} is the true utility of the alternative j to the decision maker i

V_{ij} is the deterministic or observable portion of the utility estimated by the researcher

ϵ_{ij} is the portion of utility unknown to the researcher

The multinomial logit model gives the choice probabilities of each alternative as a function of the deterministic portion of the utility of all the alternatives. Assuming that there are J alternatives and that the dependent variable y is defined to take value j if the jth alternative is chosen, then in general, the probability of choosing the jth alternative is given as:

$$\Pr(i) = \frac{\exp(V_i)}{\sum_{j=1}^{J} \exp(V_j)} - 2$$

The implication of equation 2 is that the probability of choosing an alternative from a set of alternatives increases monotonically with an increase in the deterministic utility of that alternative but decreases with increases in the deterministic utility of each of the other alternatives (Greene, 2000).

Based on the choices of diarrhea treatments examined in this study, equation 2 can be re-written as:

$$\Pr(i) = \frac{\exp(V_i)}{\sum_{j=RT,OT,NT}^{3} \exp(V_j)} - 3$$

Equation 3 simply means that the probability of choosing one of the diarrhea treatments is a function of the deterministic utility of that treatment and the sum of the deterministic utility of all the available treatments.

In practice, the deterministic component of the utility takes the form: $\beta'_j x_{ij}$. The explanatory variables do not vary with the alternatives in a MNL but they vary with individuals. Therefore, for a MNL, the probability of an individual (i) choosing one of the diarrhea treatments (j) can be re-written as:

$$\Pr(ij) = \frac{e^{\beta' j x_i}}{\sum_{j=RT,OT,NT}^{3} e^{\beta' j x_i}} - 4$$

The problem with estimating equation 4 is that the model is unidentified in that there will be more than one solution to the coefficients, leading to the same probability for each of the alternatives (Greene, 2000). This problem is overcome by setting one of the coefficients equal to zero. This is equivalent to setting one of the alternatives as the reference category. In this study, the "No Treatment" alternative was set as the reference category.

Estimating a MNL is done using the Maximum Likelihood (ML) technique and therefore the parameter values obtained should be such that they maximize the log likelihood function. The likelihood function is:

$$L(\beta) = \prod_{i=1}^{N} \prod_{j=1}^{J} p_{ij}^{y_{ij}} \; - 5$$

Taking the logarithm of equation 5 gives the log likelihood function, given as:

$$LL(\beta) = \sum_{i=1}^{N} \sum_{j=1}^{J} I_i(y_j) ln\, p_{ij} - - - - - - - - - - - - - - - - - - - 6$$

Where p_{ij} is similar to equation 4 and I_i is an indicator which takes the value of 1 if observation (y) equals a chosen alternative and 0 otherwise.

Estimatable model

The model that was estimated is given in equation 7 below:

$$DT = f(m.age, m.educ, m.births, n.ORT, c.sex, b.order, c.number, hhincome, hhsize, res --7$$

Where:

DT: diarrhea treatment

m.age: mother's age at birth

m.educ: mother's education in years

m.births: mother's number of births in the last five years

n.ORS: mother's knowledge of Oral Rehydration Salts

c.sex: child's sex

b.order: child's birth order

c.number: number of children in a household

hhincome: household income

hhsize: size of the household

res: place of residence

Table 1 shows the measures used for each explanatory variable and their expectations with the dependent variable.

Table 1: Measures of explanatory variables and expected relationships

Variable	Measure	Expected relationship with choice of diarrhea treatment
m.age	The age of the mother at birth, measured as a discrete variable involving different age groups.	A U-relationship: very young and older mothers are likely not to choose any diarrhea treatment
m.educ	The number of years of schooling of the mother	A positive relationship with recommended diarrhea treatments
m.births	The number of live births a mother has had in the past five years	It is expected that more births in the last five years are associated with better ability to manage diarrhea diseases
n.ORS	Mother's knowledge of ORS	It is expected that mothers who have either heard of ORS or used it before are more likely to continue using it to manage childhood diarrhea
c.sex	The sex of the child	It is expected that mothers are more concerned about managing diarrhea in female children than in male children
b.order	A number showing the child's position of birth among his/her siblings	It is expected that mothers become better skilled at managing childhood illnesses with more births.
c.number	The number of children a household has	It is expected that households with more children are better skilled at managing childhood diarrhea than those with fewer children
hhincome	The level of income of the household. Measured by a proxy, the household wealth index, which is a discrete variable	A positive relationship with recommended diarrhea treatments. Richer households will be better off at managing childhood diarrhea than poorer households.
hhsize	The size of the household, measured by the number of children the mother has	Larger households are more likely to use recommended diarrhea treatments than smaller households
res	A discrete variable showing whether the household is located in a rural or urban area	Households living in urban areas are better able to manage childhood diarrhea than rural households.

Findings And Policy Issues

Descriptive statistics

The sample size used in the study was 771 children under the age of five years who had suffered from diarrhea in the two weeks preceding the survey. Tables 2 and 3 show the demographic and socio-economic characteristics of the sample. The sample included children who had not been administered with any treatment, children who had been administered with recommended treatment, and those who had been administered with other types of treatment, specifically: antibiotics, anti-motility drugs, and herbal medicine.

Table 2: Demographic-socio-economic characteristics of the households (continuous variables)

Variable	*Obs.*	*Mean*	*Std. Dev.*	*Min*	*Max*
Mother's age	771	27.35279	6.698909	15	49
Mother's education	771	5.516213	4.03661	0	22
Household size	771	6.230869	2.665047	2	19
No. of children	771	2.040208	0.9560155	0	6
No. of births in last five years	771	1.754864	0.730299	1	5

Table 2 shows that the mothers in the sample were aged between 15 and 49 years with the average age of 27 years. The highest years of schooling of the mothers was 22 years while the mothers with the lowest educational level had not attended any schooling at all. The mean number of years of schooling was 5 years. The largest household had 19 members while the smallest had only 2 members, with the average household comprising of 6 members. The households with the most number of children had 6 children while others lacked any children; however, the mean number of children in a household was 2. Lastly, the highest number of births to the mothers in the sample in the five years preceding the survey was 5 children, while the lowest was one child. On average, though, mothers in the sample had given birth to 2 children in the 5 years leading to the survey.

Table 3: Demographic-socio-economic characteristics of the households and children (discrete variables)

Variable	Freq.	Percent
Type of place of residence		
Urban	179	23.22
rural	592	76.78
Wealth index		
poorest	280	36.32
poorer	135	17.51
middle	111	14.40
richer	132	17.12
richest	113	14.66
Sex of child		
male	413	53.57
female	358	46.43

Table 3 shows that majority of the participants in the sample (76.78 percent) came from rural settings while only 23.22 percent were from an urban setting. The majority of the respondents in the sample are categorized as “poorest” (36.32 percent), followed by “poorer”, “richer”, “richest” and lastly “middle” in as far as wealth index is concerned. Majority of the children in the sample were male (53.6 percent), with females making up 46.4 percent of the sample.

Patterns of Use of Diarrhea Treatments

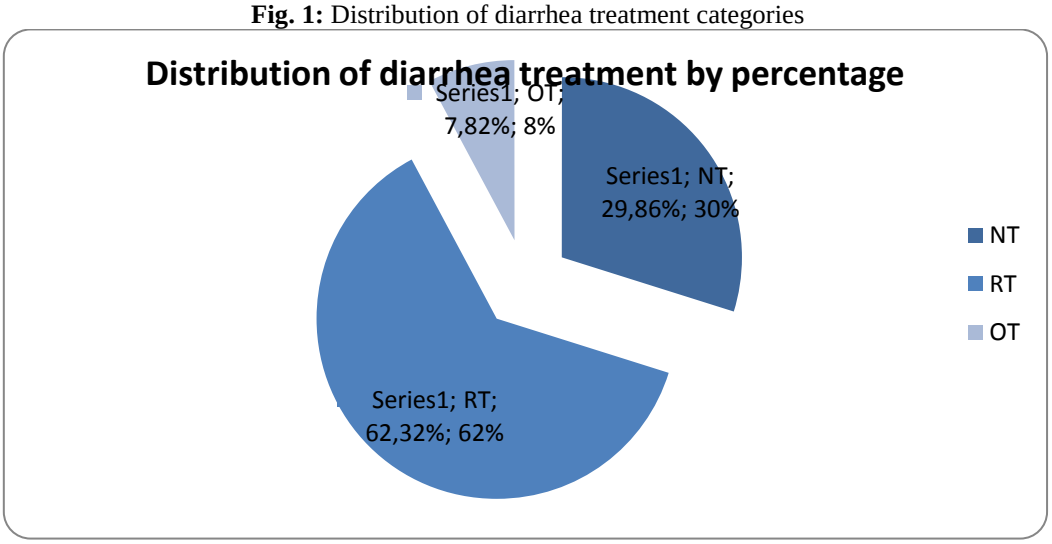
A Note on Zinc

Only four of the 771 under-5 children who had diarrhea during the two weeks preceding the 2008 KDHS were administered with zinc. This shows that at the time, zinc was not popular in managing diarrhea despite its recommendation by the World Health Organization.

Recommended and Other Treatments

Figure 1 shows the distribution of the three categories of diarrhea treatment investigated by the study. The figure shows that 62.32% of the children were administered with recommended treatment while only 7.82 percent were administered with other treatments (antibiotics, anti-motility drugs, and herbal medicine). About 29.86% of the children were not administered with any sort of treatment.

Fig. 1: Distribution of diarrhea treatment categories



Knowledge and Usage of Oral Rehydration Salts

Knowledge of ORS is a key determinant of its use. It is important to determine the status of knowledge of ORS among mothers with children below the age of 5.

Fig. 2: Mother's knowledge and usage of oral rehydration salts

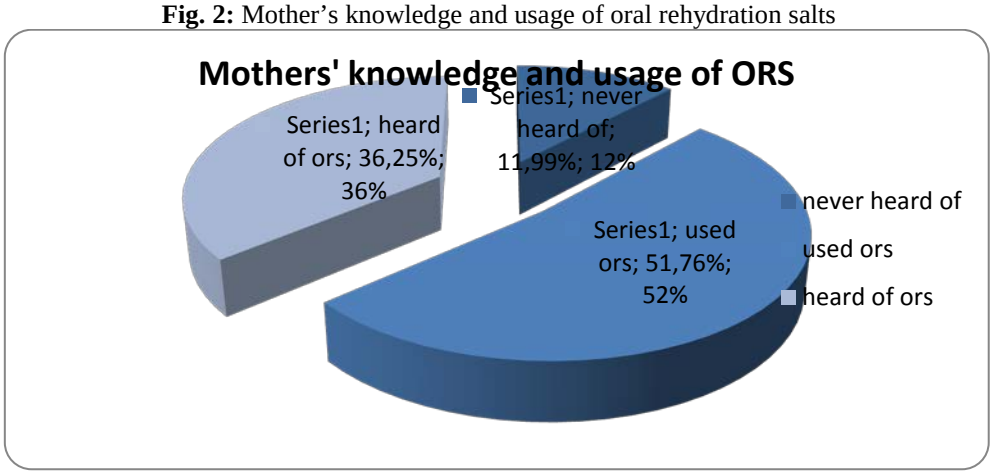


Figure 2 shows that 11.99% of the mothers in the sample had never heard of oral rehydration salts. More than half of the mothers (51.76%) had used ORS and a further 36.25% had heard of ORS but had never used it.

Regression results

Regression analysis was carried out to show how the choice of diarrhea treatments was influenced by different household, maternal and child characteristics. In this case, a multinomial logit model was run to model the dependent variable (which comprised of three categories of diarrhea treatment, namely: Recommended Treatment, Other Treatments, and No Treatment) against a number of explanatory variables. The marginal effects results are shown in table 4 and the discussion of results follows thereafter.

Table 4: Marginal effects after multinomial logit (z statistics in parentheses)

Variables	**No Treatment**	**Recommended Treatments**	**Other Treatments**
Age	-.0144052 (-0.92)	.0053528 (0.29)	.0090524 (1.40)
Agesq	.0001623 (0.62)	.0000175 (0.06)	-.0001798 (-1.54)
*Res_2 (rural)**	-.077206 (-1.24)	.1865487** (2.18)	-.1093427** (-2.12)
Educ	-.0086183* (-1.79)	.010858* (1.98)	-.0022397 (-1.34)
Hhold_size	-.0043068 (-0.65)	.0033542 (0.44)	.0009526 (0.46)
Children_no	-.0000111 (-0.00)	-.0003917 (-0.02)	.0004027 (0.06)
*Wealth_2 (poorer)**	-.272311 (-0.75)	.0080366 (0.17)	.0191945 (0.91)
*Wealth_3 (middle)**	-.421951 (-1.04)	.0069776 (0.12)	.0352175 (1.12)
*Wealth_4 (richer)**	.0326245 (0.59)	-.0481249 (-0.73)	.0155004 (0.66)
*Wealth_5 (richest)**	-.673365 (-1.42)	.0914746* (1.76)	-.024138* (-1.79)
Births	.0193375	.0039305	-.023268**

	(0.75)	(0.13)	(-2.02)
*Heard_ORS_1 (used ors)**	-.6085378*** (-16.17)	.7304108*** (21.30)	-.121873*** (-4.83)
*Heard_ORS_2 (heard of ors)**	.0412128 (1.12)	-.0469035 (-1.11)	.0056907 (0.49)
Bord	.0062592 (0.57)	-.0106849 (-0.84)	.0044257 (1.15)
*Childsex_2 (female)**	-.0273233 (-0.99)	.0291392 (0.92)	-.0018159 (-0.21)
The asterix (*) on the variable represents discrete change of a dummy variable from 0 to 1 **** (**) * Parameter was statistically significant at the 0.01(0.05) and 0.10 level respectively*			

Discussion of Results

Place of residence

Living in a rural area increases the probability of using recommended treatment by 18.65 percent, but it reduces the probability of using other diarrhea treatments by 10.93 percent. This finding however contradicts prior expectations as well as conventional knowledge on the role played by place of residence in the utilization of recommended treatments. It is expected that people living in urban areas are more exposed and have access to sources of information which enable them to utilize the required treatments. The finding of this study could be as a result of the nature of the sample used, which disproportionately favored rural areas. Majority of the participants in the sample (76.78 percent) were from rural areas. The place of residence is important for all sorts of diarrhea treatment. However, there is disparity in the type of residence's importance for the type of diarrhea treatment. For RT, living in a rural area is more important than living in an urban area. On the other hand, for other types of treatment, living in an urban area is more important than living in a rural area. These disparities could be an indication of issues to do with accessibility and availability of drugs. Other studies support this finding on the effect of place of residence on utilization of childhood healthcare services and include: Shin (2007), Mahmood and Nasir (2001), and Adeladza (2009).

Mother's education level

Mothers with more years of schooling have a 1.08 percent higher probability of using recommended treatment than those with fewer years of schooling. On the other hand, mothers with more years of schooling have 0.86 percent lower chances of not using any treatment for childhood diarrhea than mothers with fewer years of schooling. A mother's level of education is important only for recommended treatment but not for other types of diarrhea treatment. The positive relationship between mother's education level and utilization of recommended treatment supports the works of Desai and Alva (1998), Joshi (1994), Feyisetan, Asa, and Ebigbola (1997), Kosimbei (2005) and Adeladza (2009). On the other hand, the lack of a

positive relationship between mother's education level and use of other treatments for diarrhea equally supports the work of Barreto and Rodriguez (1992).

Household wealth

The richest households have a 9.15 percent higher probability of using recommended treatment than the poorest households. On the other hand, the richest households have a 2.19 percent lower chance of using other treatments than the poorest households. The positive effect of household wealth on childhood health services utilization supports the works of Al-Ghanim (2004), Mahmood and Nasir (2001), Taffa and Chepngeno (2005), and Breiman et al. (2011) who equally found a positive correlation between the two variables.

Births in the last five years

Mothers who have more births in a span of five years (from a mean of 2 births) have a 2.33 percent lower chance of using other types of diarrhea treatment than mothers with fewer births. Birth spacing is therefore an important determinant of child health outcomes.

Knowledge of ORS

Mothers who have used ORS previously have a 60.85 percent lower chance of not using any treatment compared to mothers who have never heard of ORS before. Similarly, mothers with past experience of ORS have a 12.19 percent lower chance of using other types of diarrhea treatment compared to mothers who have never heard of ORS before. Most importantly, mothers with past experience of ORS have 73.04 percent higher chances of using recommended treatment compared to mothers who have never heard of ORS before. Knowledge of ORS is very important for RT utilization. This result is similar to the study by Feyisetan et al. (1997) which found that mothers who had knowledge on the etiology of childhood illnesses were highly likely to utilize healthcare services. However, in the latter study, such knowledge was found to be positively correlated with mothers' level of education.

Policy Recommendations

The need to strengthen awareness on childhood diarrhea

The Ministry of Health has tried to create awareness on childhood diseases in the country among them diarrhea. However, it seems from the study, that the level of awareness creation on diarrhea has been inadequate and hence there is need to intensify awareness among mothers/caregivers on the seriousness of childhood diarrhea, particularly in rural areas. There is also the need to increase awareness on management of the illness through the WHO-recommended treatments, ORT and zinc supplements, which are cheap and can easily be prepared at home using readily available ingredients (this applies only to ORT and not zinc). Intensifying awareness can be done through mass education programs and the use of

the mass media to inform the public. In rural areas, it can also be done through the use of public health officials on a door-to-door basis. This is particularly important given that studies show that people in rural areas do not visit health facilities as frequently as those in urban areas. It is therefore the government's responsibility to reach to the rural people through outreach activities.

The need to increase the availability and accessibility of zinc

Zinc is important in managing childhood diarrhea because it not only minimizes the severity of the illness but also it reduces the duration and possible recurrence of the illness in future. Besides lack of awareness on zinc, the under-utilization of the supplement could be an indication of problems with availability and accessibility. Thus, besides strengthening awareness on zinc, the MOH could further increase its availability and accessibility by increasing its stock and offering them free of charge in public hospitals.

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