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Knowledge and utilization of oral rehydration therapy among mothers in T`He management of childhood diarrhoea in General Hopital Kwoi, Kaduna State, Nigeria

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Abstract
Globally, an estimated 1.8 billion cases of childhood diarrhea are reported which is responsible for more than three million under five children deaths annually. Diarrhea is one of the major causes of morbidity and mortality among young children. In view of this devastating effect of diarrhea, the study was aimed at assessing the knowledge and utilization of Oral Rehydration Therapy [ORT] among mothers in General Hospital, Kwoi, Nigeria. A descriptive hospital based survey was adopted for the study. A self-designed questionnaire, which was validated and found reliable with a content validity index of 0.78 and reliability coefficient of 0.97, was used as instrument. A convenient sampling technique was used to select 232 respondents for the study. Data was collected by administering questionnaires to subjects who visited the hospital for antenatal, immunization or follow-up care services within the first half of 2015. Two hundred and thirty two [232] questionnaires were administered; out of which two hundred and twenty were answered and returned. This represents a response rate of 94.5%/. Data was analyzed using simple frequency distribution tables and percentages. An inferential statistical computation, [Chi-square] was used to test the hypothesis. Findings of the showed that majority, [79%] of respondents were below 36 years [between 16 to 35 years] with the mean age of 28.5 years; and most [98.2%] were married. Further findings revealed that all the respondents [100%] had knowledge on ORT and majority of them, [88.6%] claimed they can prepare ORS/SSS. However a significant proportion [30.3%] of respondents who claimed they know how to prepare ORS/SSS could not prepare it correctly. Utilization of ORT in the management of childhood diarrhea was also high, [80%]. Chi-square analysis [$X^2 = 2.1231$, df = 1, at 0.05 Significant Level, Critical value = 3.8415, P value = 0.15] revealed that there is no significant relationship between knowledge and utilization of ORT. It was therefore recommended that mothers should be educated on the correct preparation of ORS/SSS. Mothers should also be encouraged to make use of already prepared ORS sachets whenever they encounter difficulties with preparation of ORS/SSS.

Keywords: women, children, diarrhea, oral rehydration salt [ORS] sugar salt solution, [SSS] oral rehydration therapy, [ORT] knowledge, utilization

Introduction

Diarrheal disease is a leading cause of child mortality and morbidity in the world and mostly from contaminated food and water sources. Worldwide, 780 million individuals lack access to improved drinking water and 2.5 billion lack improved sanitation. Diarrhea due to infection is widespread throughout developing countries [1].

Diarrhea is the leading cause of death in childhood and is responsible for killing around 760, 000 children every year [2]. Diarrhea can last several days and can leave the body without the water and salt that are necessary for survival. Most people who die from diarrhea actually die of severe dehydration and fluid loss. Children who are malnourished or have impaired immunity as well as people living with HIV are most at risk of life threatening diarrhea.

Diarrhea is the leading cause of childhood morbidity and mortality especially in developing countries where billions episodes and million deaths occur in the first five years of the child. Globally, an estimated 1.8 billion episodes of childhood diarrhea occur every year; a higher annual incidence than that of any other disease and more than three million children under age of five die of diarrhea or diarrhea related causes annually [3].

In India, persistent diarrhea accounted for 5% of episodes but 14%of deaths and a mortality rate 3 times higher than briefer episodes [4]. In Pakistan, persistent diarrhea accounted for 8-18% of episodes of diarrhea but 54% of deaths and mortality higher than mild episodes [5]. In Bangladesh, persistent diarrhea associated with malnutrition was responsible for nearly half of the diarrhea deaths and the relative risk for death among infants with persistent diarrhea and severe malnutrition was 17 times greater than for those with mild malnutrition [6]. Persistent diarrhea occurs more often during an episode of bloody diarrhea that progresses to persistent

diarrhea. HIV infection is another risk factor for persistent diarrhea in both adults and children mostly under five [7].

The African continent accounts for half of the child mortality worldwide and most of the deaths are due to diarrheal disease. Based on the 1991 census, a Nigerian child under five has an average of 4.3 episodes of diarrhea each year. Nigeria records 300, 000 diarrhea-related deaths each year in children and 315,000 deaths of preschool children are recorded annually as a result of diarrhea disease [8].

Various studies have been carried out [in Nigeria, Africa and indeed other developing countries where diarrheal disease continue to be a health nuisance] on the incidence of childhood diarrhea and ORT. A recent hospital based survey in Jos, Nigeria showed that the incidence of acute diarrheal disease in children had not declined; though a substantial reduction in annual diarrheal deaths from 4.5 million in the 1980s to the present level of about 2 million children is attributed to the promotion of ORT [9].

The mother usually is the person responsible for the care of the baby during illness and her attitude and disposition towards the use of ORT during an episode of diarrhea are important factors which influence the course of the illness.

The primary strategy for reducing child mortality from diarrhea had been and remains as ORS. Most infectious cause of diarrhea in children are self-limiting. It has been long recognized that fluid replacement or rehydration in a child with watery diarrhea can prevent or correct dehydration and can be lifesaving.

Researchers have found and revealed that some countries showed a wide gap between knowledge and usage of ORT. A significant population of mothers surveyed, could demonstrate the preparation Oral Rehydration Solution [ORS] correctly whereas only a small population of these women used ORS for treating diarrhea in their children under age five. However, the problem of error in preparation of rehydration drinks is quite prevalent as most mothers prepare the salt and sugar solution with dangerously high salt concentration. This led to WHO discouraging the use of home-made Salt Sugar Solution [SSS] rehydration drinks on the ground that they are often not safely and correctly prepared and the introduction of the already prepared Oral Rehydration Salts sachets with its own peculiar problems which include cost and availability. Amidst these findings, home-made SSS rehydration has in the recent past been the mainstay in the prevention and treatment of diarrhea in developing countries. It is based on this background that the researcher decided to survey the knowledge and utilization of ORT by mothers in the management of childhood diarrhea in general hospital, Kwoi, Kaduna State, Nigeria.

Literature Review

Diarrhea is defined as the passage of 3 or more watery stools in 24 hours by World Health Organization. Diarrhea is as old as mankind. It is a disease that has eaten deep into the developing countries and an increase of under-five child mortality and morbidity [7].

Diarrheal disease affects the rich and poor, old and young, developed and developing countries alike, yet, a strong relationship exists between poverty and unhygienic environment. A large extend of the financial status in a family tends to affect their environmental hygiene as they tend to live in slum areas which make them at risk or prone to diseases and infections.

Diarrhea is usually a symptom of an infection in the intestinal tract, which can be caused by a variety of bacterial, viral, and parasitic organisms, examples include: viruses [such as norovirus, rotavirus] bacteria, [such as campylobacter, clostridium difficile, Escherichai coli, Salmonella and shigella] parasites/protozoans [such as Giardia lambia which is associated with Giardiasis]. These cause food poisoning. Diarrhea caused by contaminated food or water while visiting a foreign country is called travelers' diarrhea. Other short term causes of diarrhea are food allergy, appendicitis, damage to the lining of the intestines due to radiotherapy [2].

Signs and symptoms associated with diarrhea may include: frequent, loose, watery stools, abdominal pain/cramps, fever, blood in the stool and abdominal bloating [6]. Interventions to prevent diarrhea include: safe drinking water, improved sanitation and hand washing with soap can reduce diarrheal disease.

Oral Rehydration Therapy ORT is a medical treatment consisting of liquid solutions [oral rehydration solution - ORS] designed to counteract dehydration. ORS varies in composition, but usually contains a mixture of glucose, sodium, potassium and citrate. ORT is effective in treating fluid loss after acute diarrhea due to various causes such dysentery, and gastroenteritis. ORT dramatically reduces the numbers of deaths experienced during and after epidemic of cholera. ORT is considered to be one of the most relevant public health advances of the 20th century [10]. The definition of ORT has changed over time broadening to include a definition of a specific therapy appropriate for rehydration. Initially in the early 1980s, ORT was defined only as the solution prescribed by the WHO/UNICEF. It later changed in 1988 to encompass recommended locally prepared home fluids, because the official preparation was not always readily available. It was amended again in the later months of 1988 to include continued feeding as appropriate management. In 1991, ORT was defined as increase in administered hydration fluids and in 1993, a more acceptable definition, which is used today in states as ORT is an increase in administered fluid including the official ORS, salted rice water, salted based, yoghurt based drinks, vegetables/chicken with salt and clean water. An ideal ORS consist of glucose and sodium in a ratio of 1:1 which should effectively replace deficit and should be isotonic with plasma. It should also have a potassium concentration of about 20mmol/L and a base concentration of about 10mmol/L of citrate or 30mmol/L of bicarbonate for correction of acidosis due to diarrhea [8].

Ancient prescriptions dating back to over 2500 years from the Ayurvedic Consultant, Sushruta revealed treatment of acute diarrhea with rice water, coconut juice and carrot soup. However this knowledge did not carry over to the western world, as dehydration was found to be the major cause of death secondary to the 1829 cholera pandemic in Russia and Western Europe.

In 1831, William Brooke O.S. noted the loss of water and salt in the stool of cholera patient and prescribed intravenous fluid therapy [IV] to compensate. The results were remarkable, as patients who were on the brink of death from dehydration recovered. The mortality rate of cholera dropped from 70% to 40% with the use of hypertonic IV solutions. IV fluid

replacement became entrenched as the standard of care for moderate/severe rehydration for over a hundred years.

In the 1940s, the first oral rehydration solutions were developed by Harrison in Baltimore, Maryland and Darrow in New Haven, Connecticut. In the early 1960s, the sodium glucose co-transport mechanism for glucose absorption was discovered and it was also proved that the intestinal mucosa was not disrupted in gastroenteritis, as previously thought. These findings helped establish the physiological basis for ORT in medicine. Thus the necessity for IV fluids was significantly reduced [11].

ORT was developed in the late 1960s by researchers in India and international centre for diarrheal disease research in Bangladesh for the treatment of cholera. During the Bangladesh Liberation war in 1971, as medical teams ran out of intravenous fluids to treat the spreading cholera epidemic, Dr. Dilip Mahalanabis instructed his staff to distribute ORS to the 350,000 people in refugee camps. Over 3,000 patients with cholera were treated and the death rate was only 3.6% compared to the typical 30% seen in intravenous fluids.

In 2002, Norbert Hirchhorn, Dilip Mahalanbis, David R. Nairn, and Nathaniel F. Pierce were awarded the 1st Polling prize for paediatric research, in recognition of their work in developing ORT. In the 1980s, nearly 5 million children under 5 years died each year of diarrhea. In 2000 this figure had dropped to 1.8 million. ORT along with improved nutrition and sanitation is central to the package of measures that have helped ensure this fall in mortality. Owing to its immense success, ORT has been described as potentially the most important medical advance of the century and has been incorporated as part of UNICEFs program, a low cost program to increase child survival in developing countries, including growth monitoring, breast feeding and immunization [12].

Early use of ORT at home in children with diarrhea decreases the number of outpatient visits and hospitalization and overall medical cost. Despite relatively high ORT access rate, ORT use is inadequate. This poor result could be a factor of diminished knowledge and inadequate numbers of trained staff in relation to oral rehydration therapy.

Public education campaigns in north eastern Nigeria have since 1986 promoted the awareness, preparation and use of ORT against diarrhea and the prevention of dehydration related deaths.

Awareness and knowledge of ORT and preparation abilities of salt sugar solution [SSS] were investigated by means of focus group discussion and complemented by a structured questionnaire survey of mothers in rural and urban areas of north eastern Nigeria. ORT awareness was high with some intraregional variations. Perception of ORT function was, however, grossly unrealistic, with a third to four fifth of mothers accepting ORT to stop diarrhea. At least, one quarter of mothers lacked adequate SSS preparation abilities and the materials and ingredients required for its preparation [13]. Re-evaluation of the content and method of imparting health education messages in ORT promotion is recommended. Such messages should emphasize the function of ORT. It is also recommended that standardized cups for water, salt and sugar measurement be provided to households as a ready means of ensuring the correct preparation of SSS in the home-based management of diarrhea.

In a community based survey conducted in southwest of Irepodun LGA, Kwara state Nigeria to determine care seeking and diarrhea management practices in a typical rural setting. 4061 children under 5 years of age from a village were studied using the standard of WHO questionnaire on diarrhea case management of morbidity. 21.6% of the children had diarrhea 2 weeks prior to the study and 5.1% had diarrhea 24 hours prior to the study. The rate of use SSS was 16% and ORS was 6%. 73% of the mothers did nothing for the treatment of diarrhea nor understood the mode of treatment. 16% used various drugs [14].

Mothers basic knowledge about diarrhea depends on various factors such as educational status, prior experience of managing the disease, and even ethnicity [15]. Studies in the literature show that though most mothers were familiar with the term ORS, there is knowledge gaps as regards the correct preparation and administration [16]. The signs of dehydration due to diarrhea remain unnoticed by the majority of the mothers [17]. There are certain fluids which are beneficial to give during diarrhea but most mothers in rural community in Kenya were unaware of most of these [18].

Mother's knowledge about diarrhea can be improved through educational interventions; written information only is not enough. It is more effective if pictorials and demonstrations are included along with written material [19].

Method

This hospital-based descriptive survey was conducted in General Hospital Kwoi, Jaba LGA of Kaduna state, Nigeria. Kwoi is a cosmopolitan settlement with the predominant ethnic group being Jaba, other ethnic groups present include Kagoma and Fulani. General Hospital Kwoi is owned by the Kaduna state government. It offers services such as medical, surgical, maternity, immunization, and nursing and laboratory services. The study was approved by the research and ethical committee of the General Hospital; and a written informed consent was obtained from each of the subjects enrolled in the study.

A self-designed structured questionnaire, which was validated and found reliable with a content validity index of 0.78 and reliability coefficient of 0.97, was used as instrument for data collection. The questionnaire was divided into three sections. Section A: socio-demographic data, section B: knowledge of ORT and section C: Utilization of ORT by the respondents. The instrument contained questions with single as well as multiple correct options. The instrument was administered initially to 20 subjects in the pilot phase. Necessary amendments such as addition of suitable options under each of the questions along with modifications in wordings of the instrument were made after valuable comments from research experts and after piloting the instrument.

A total of 232 subjects were enrolled in the study. Subjects of the study were mothers between 15 to 45 years of age, having a child or children below the age of 60 months and are willing to participate in the study. A convenient sampling technique was used to select the subjects. Data was collected by administering questionnaires to subjects who visited the hospital for antenatal, immunization or follow-up care services, within the first half of 2015. Interpretation of content for subjects who can neither read nor understand English was done. Two hundred and thirty two [232] questionnaires were administered; out of which two hundred and twenty were answered and returned. This represents a

response rate of 94.5%/. The collected data was analyzed using simple frequency distribution tables and percentages. Inferential statistics such as chi-square was used to test the hypothesis.

Results

Table1: Demographic Characteristics of Respondents

Variable	Frequency	Percentage [%]
Age		
16 – 25	90	41
26 – 35	84	38
36 – 45	46	21
Total [Mean age = 28.8]	**220**	**100**
Marital status		
Married	216	98.2
Single	4	1.8
Total	220	100
Ethnic group		
Jaba	180	82
Kagoma	25	11
Fulani	15	7
Total	220	100
Religion		
Christian	186	84.6
Muslim	34	15.4
Total	220	100
Occupation		
Housewife	28	12.7
Civil servant	88	40
Self employed	104	47.3
Total	220	100
Educational level		
Primary	88	40
Secondary	34	15.4
Tertiary	78	35.5
None	20	9.1
Total	200	100

The table above shows that: Most of the respondents [98.2%] are married. The largest ethnic group is Jaba, [82%] followed by Kagoma, [11%] with the least being Fulani, [7%]. 40% of the respondents are civil servants while, 29.1% are self-employed. Majority of the subjects [84.4%] are Christians while, 15.4% are Muslims.

Table 2: Knowledge of Respondents on Oral Rehydration Therapy [ORT]

Item	Frequency	Percentage [%]
Knowledge of ORT:		
Yes	220	100
No	0	0
Total	**220**	**100**
Source of Knowledge:		
Media	0	0
Health facility	198	90
Religious institutions	0	0
Friends/neighbours/relatives	22	10
Total	**220**	**100**
What form of ORT do you know:		
ORS	204	92.7
SSS	16	7.3
Others	0	0
Total	**220**	**100**
Can you prepare ORS/SSS?		
Yes	195	88.6
No	25	11.4
Total	**220**	**100**
Knowledge on correct preparation:		
Correct preparation	136	69.7
Wrong preparation	59	30.3
Total	**195**	**100**
Is ORT a Treatment For Childhood Diarrhea?		
Yes	212	96.6
No	8	3.6
Total	220	100

The table above shows that all respondents [100%] know about ORT; and their source of knowledge is mainly from the health care facility [90%]. Majority of respondents [88.6%] claimed to know how to prepare ORS/SSS. However, only 69.7% of them know how to prepare ORS/SSS correctly.

Table 3: Utilization of Oral Rehydration Therapy [ORT] by Respondents

Item	Frequency	Percentage [%]
Has your child ever had diarrhea?		
Yes	182	82.7
No	38	17.3
Total	220	100
Did you use ORT for treatment?		
Yes	176	80
No	44	20
Total	220	100
If yes above, where did you use it?		
Home	128	72.7
Health Facility	48	27.3
Total	176	100
Which type of ORT did you use?		
ORS	150	85.2
SSS	26	14.8
Others	0	0
Total	176	100
How did you administer ORS/SSS to your child?		
Cup and spoon	168	95.5
Feeding bottle	8	4.5
Others	0	0
Total	176	100

Do you think ORT is effective?		
Yes	182	82.7
No	38	17.3
Total	220	100
Do you still visit health care facility after use of ORT?		
Yes	16	12.5
No	112	87.5
Total	128	100
If Yes Above, Why?		
Diarrhea got worse/persisted	22	47.8
Associated fever	8	17.4
Diarrhea contained blood	16	34.8
Others	0	0
Total	46	100
Does any factor hinder the use of ORT?		
Yes	40	18.2
No	180	81.8
Total	220	100
If yes above, which factor(s)?		
Not effective	10	25
It's expensive	4	10
I can't prepare it?	6	15
I prefer drugs	20	50
Others	0	0
Total	40	100
Suggest ways to improve the use of ORT		
Should be made cheap	10	4.6
Should be free	28	12.7
Should be available and accessible	182	82.7
Others	0	0
Total	220	100

The table above shows that; 82.7% of the respondent's children had diarrhea. Majority of mothers, [80%] had used ORT for management of diarrhea. Most of the respondents [85.2%] used ORS form, while the remaining, [14.8%] used SSS. 12.5% of the respondents still visited a health care facility after the use of ORT; while the majority [87.5%] did not.

Null Hypothesis

There is no significant difference between knowledge on correct preparation of ORS/SSS and Utilization of ORT in the management of childhood Diarrhea among mothers in General Hospital Kwoi.

Table 4: Cross Tabulation of Respondent's Knowledge and Utilization of Oral Rehydration Therapy

Do you have knowledge on correct preparation of ORS/SSS?	**Have you ever used ORS/SSS to manage childhood Diarrhea?**		**Total**
	Yes	**No**	
Yes	113	23	136
No	63	21	84
Total	176	44	220

X^2 = 2.1231, ***df*** = 1, at 0.05 **Significant Level**, **Critical value** = 3.8415, **P value** = 0.15

Table 4 shows that the calculated Chi-square [X^2] value [2.1231] is less than the critical value, [3.841] and the P value [0.15] is greater than 0.05; therefore the null hypothesis is accepted. This implies that there is no significant relationship between knowledge on correction preparation of ORS/SSS and utilization of ORT in the management of Childhood diarrhea among mothers in General Hospital Kwoi, Kaduna state, Nigeria.

Discussion of Findings

The socio-demographic characteristics of respondents revealed that majority [79%] of respondents were below 36 years [between 16 to 35 years] with the mean age of 28.5 years. Majority [98.2%] were married and most [84.6%] were Christians. 82% of Respondents are of Jaba ethnicity. This implies that mothers who patronize General Hospital Kwoi are dominantly Christians and Jaba by tribe.

The study also revealed that all the respondents [100%] had heard of ORT; and the health care facility was their major source of knowledge on ORT [90%]. Similarly, a survey conducted in Senegal [20], also showed that most 93% of mothers were aware of ORT. This implies that the health facilities are living up to expectation regarding dissemination of information on ORT.

88.6% of respondents claimed they could prepare ORS/SSS. However, only 69.7% of this sub-population had good knowledge on correct preparation of ORS/SSS. This implies that 30.3% respondents who claimed they know how to prepare ORS/SSS could not prepare it correctly. Similarly, a community based survey conducted in Thailand [21], revealed that 94.9 of mothers said they could correctly prepare ORS; yet only 20.5% could of this number could actually do so. This call for urgent interventions as incorrectly prepared ORS/SSS is not only in-effective but could be life-threatening.

A significantly high proportion of respondents [80%] had used either ORS or SSS in the management of childhood diarrhea. The remaining 20% did not use ORT. Reasons for non-utilization of ORT by mothers were mainly attributed to:

preference for drugs, [50%] and disbelief in its efficacy [25%]. This finding is contrary to that of Murtala [14], who discovered that most mothers [73%] did nothing for the treatment of diarrhea nor understood what to do.

The study also revealed that 72.7% of mothers who used ORS/SSS used it at home. However, 12.5% of this population still visited a health facility after using ORS/SSS; various reasons were given for the visit: diarrhea persisted, [47.8%] diarrhea contained blood, [34.7%] and diarrhea associated with fever [17.4%]. These are all valid reasons and in fact, the action taken by the mothers is recommended

This study found that there was no significant relationship between knowledge on preparation and utilization of ORS/SSS in the management of childhood diarrhea among mothers in General Hospital Kwoi, Nigeria. In other words, the utilization of ORS/SSS among mothers in General Hospital Kwoi, was not dependent on their knowledge on its preparation. Although the percentage of both knowledge and utilization of ORT were significantly high; the two variables were not correlated in the study.

Conclusion and Recommendations

The researcher concludes that, the knowledge of mothers on ORT and its utilization in the management of childhood diarrhea among mothers in General Hospital Kwoi is high. Some of the mothers worsen the diarrhea of their children by giving them ORS/SSS that was incorrectly prepared.

Based on the findings of the study, the researcher made the following recommendations:

1. Intensive ORT training should be organized for community/village health works.
2. Mothers should be educated on the correct preparation of ORS/SSS.
3. Standardized cups for water, salt and sugar measurement should be provided to households as a ready means of ensuring the correct preparation of SSS in the home-based management of diarrhea.
4. Mothers should also be encouraged to make use of already prepared ORS sachets whenever they encounter difficulties with preparation of ORS/SSS.

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