International Journal of Nursing, Midwife and Health Related Cases
Vol.9, No.1, pp.37-51, 2023
Print ISSN: 2397-0758 (Print),
Online ISSN: 2397-0766 (Online)
Website: https://www.eajournals.org/
Publication of the European Centre for Research Training and Development -UK

Effectiveness of the WHO Combination Treatment Regimen in the Management of Dehydration as a Panacea to Diarrhoea Prevention in Under-Five Children in Oyo State

Zaccheus Opeyemi Oyewumi (RN, MPH)
Department of Public/Community Health Nursing,
School of Nursing Science,Babcock University, Ilishan-Remo, Ogun State, Nigeria

Ngozi Anthonia Okafor (RN, PhD)
Department of Public/Community Health Nursing,
School of Nursing Science,Babcock University, Ilishan-Remo, Ogun State, Nigeria

Juliet Ifeoluwa Adegoke (RN, M.Sc.)
Department of Nursing Science, Fountain University, Osogbo, Osun State, Nigeria

Rafiat Anokwuru (RN, PhD)
School of Nursing Science,Babcock University, Ilishan-Remo, Ogun State, Nigeria

doi: https://doi.org/10.37745/ijnmh.15/vol9n13751 Published June 12, 2023

Citation: Oyewumi Z.O., Okafor N.A., Adegoke J. I., and Anokwuru R. (2023) Effectiveness of the WHO Combination Treatment Regimen in the Management of Dehydration as a Panacea to Diarrhoea Prevention in Under-Five Children in Oyo State, *International Journal of Nursing, Midwife and Health Related Cases*, Vol.9, No.1, pp.37-51

ABSTRACT: *This study assessed the effectiveness of WHO combination treatment regimen in diarrhoea prevention through dehydration management amongst under-five children attending primary health care centres in Oyo State, Nigeria. The study used a quasi-experimental design consisting of a pre- and post-test for a single group. Sixty people who met the inclusion criteria were selected at random throughout the admissions process. Children with diarrhoea between the ages of 3 months and 60 months who met the inclusion and exclusion criteria and were hospitalised at the designated PHC Centres were the study's participants. Recovery rates at 24 hours, 2 weeks, and 4 weeks post-intervention were used to evaluate the efficacy of the combined therapy regime using a standardised instrument of the WHO observational check-list. Descriptive and inferential statistics were used to analyse the data. The results of this study demonstrate that the median ages of the participants range from 13 to 24 months (21; 35.0%), 3 to 12 months (18; 30.0%), 25 to 36 months (12; 20.0%), and 36 to 60 months (9; 15.0%). There are a total of 32 men and 28 females in this sample (53.3% vs 46.7%). However, upon arrival (Baseline), 47 individuals (78.3%) were already somewhat dehydrated. However, within 24 hours post-intervention, the majority of subjects (46, or 76.6%) no longer showed any signs of dehydration. After two weeks of intensive monitoring during home visits, the situation had improved significantly, with the vast majority (52, or 86.7%) of participants displaying no signs of dehydration. After 4 weeks of home visits, all 60 participants (100%) were found to be well hydrated upon re-examination. Dehydration status improved significantly after 24 hours, 2 weeks, and 4 weeks post-intervention, suggesting the combination of WHO-ORS and zinc is extremely effective in the treatment of diarrhoea in children younger than five. Therefore, PHC health professionals should use a combination of therapies rather than relying on just one to treat dehydration.*
KEYWORDS: effectiveness, combination treatment regimen, dehydration management, diarrhoea prevention

INTRODUCTION

As the second biggest cause of death in children worldwide, diarrhoeal illnesses pose a significant threat to public health anywhere they occur. About 63% of the world's diarrhoea burden is carried by children under the age of five. The aetiology of these disorders must be identified quickly and accurately, yet traditional approaches are inefficient and sometimes miss identifying difficult-to-culture bacteria. Up to 40 percent of diarrhoea patients have undetermined causes (Ugwu et al., 2019). Deflation is the greatest danger posed by diarrhoea. Fluids and electrolytes (sodium, chloride, potassium, and bicarbonate) are lost by diarrhoea-related bodily functions such vomiting, sweating, urinating, and breathing. In the absence of replenishment, dehydration sets in.

In children, diarrhoea is described as a condition characterised by three or more episodes of loose or watery stools during a 24-hour period or a reduction in the consistency of the stool from that which is typical for the patient (Manetu et al., 2021). Acute bouts of children diarrhoea can cause substantial fluid loss and dehydration, despite the fact that most episodes are mild. Thus, the first symptom of diarrhoea should prompt action to restore lost fluids to prevent potentially fatal dehydration. Pathogens like as viruses, protozoa, and bacteria can all have a role in causing diarrhoea (Manetu et al., 2021). Children under the age of five account for 40 percent of all hospital admissions due to diarrhoea worldwide (WHO, 2022). Rotavirus is one of the most lethal viral and bacterial pathogens affecting people in developing countries.

According to the World Health Organisation (2022), a diarrhoea episode is generally diagnosed based on symptoms and categorised into three groups for the sake of effective patient care and of epidemiological tracking. Significant fluid loss and fast dehydration are associated with acute watery diarrhoea, such as cholera. It might linger for a few hours to a few days. Acute watery diarrhoea can be caused by a number of different organisms, including the rotavirus, E. coli, and V. cholerae. Dysentery, sometimes known as bloody diarrhoea, is characterised by the presence of blood in the faeces. Infected people often have diarrhoea and weight loss as a result of the illness. Diarrhoea, with or without blood, that lasts for at least 14 days is considered persistent diarrhoea; Shigella is the most prevalent bacterial agent responsible for bloody diarrhoea and the most common cause of severe episodes. Persistent diarrhoea is associated with an increased risk of malnutrition and other health problems in children and people with AIDS (Manetu et al., 2021).

Table 1: WHO classification of dehydration

No dehydration	Some dehydration	Severe dehydration
Not enough signs to classify as some or severe dehydration	Two or more of the following signs • Restlessness or irritability • Sunken eyes • Drinks eagerly, thirsty • Skin pinch goes back slowly	Two or more of the following signs • Lethargic or unconsciousness • Sunken eyes • Unable to drink or drinks poorly • Skin pinch goes back very slowly
PLAN A	PLAN B	PLAN C
Treatment at home: 1. Give extra fluids ORS 2. Continue feeding 3. Give zinc 4. Counsel mother when to return immediately	Treatment in observation ward 50-75ml/kg of ORS over 4hrs to correct deficit orally or by tube feeding. Continue extra fluids, feeding and give zinc	IV therapy with RL or DNS over 3 to 6hrs depending on age.

Dehydration is the biggest risk associated with diarrhoea. When someone has diarrhoea, they lose a lot of fluids and electrolytes (such as sodium, chloride, potassium, and bicarbonate) through dehydration and bodily waste. In the absence of replenishment, dehydration sets in. There are no outward indications of dehydration until it reaches a later stage. The symptoms of dehydration grow as the condition worsens. Initial symptoms include dry mouth, irritability, drooping eyelids, and a depressed fontanelle (in babies). Evidence of hypovolemic shock, including lowered consciousness, cold extremities, pale or mottled skin, a rapid and feeble pulse (the radial pulse may be undetectable), low or undetectable blood pressure, prolonged capillary refill time, and peripheral cyanosis, may appear in patients with severe dehydration. If rehydration isn't begun right away, death is inevitable (WHO, 2018).

The ORT is the most important medical breakthrough of the 20th century since it represents the successful transfer of technology from less developed to more developed regions. ORT solutions are made by mixing specified amounts of sodium, glucose, potassium, chloride, and alkali (bicarbonate or citrate) with sterile water. ORT, based on the WHO formula, can be used to treat any kind of dehydration. ORS-WHO (oral rehydration salts) can be considered a universal and all-purpose solution; however, it is pertinent to have a conventional formula that can be recommended and as well promoted globally (Peter & Umar, 2018). It has contributed greatly to the reduction of childhood mortality from diarrhoeal disease.

When used as directed, ORS-WHO poses no threat to patients. Without major side effects, almost two billion ORS units have been given. In cases of acute diarrhoea in children, symptomatic antidiarrheal medications should not be prescribed. Antimicrobials should also be avoided for cases of acute diarrhoea that are not complex. Dysentery, cholera, typhoid fever, and diarrhoea

brought on by parasites including Giardia lamblia, Cyclosporaspp, and E. hystolytica, on the other hand, warrant the use of antimicrobials. Although the intravenous route is usually preferred in the event of shock, oral and nasogastric tube (ORT) administration has shown useful in the treatment of chronic dehydration induced by diarrhoea. The World Health Organisation currently recommends a sodium concentration of 75mmol/L for a single oral rehydration solution (ORS) (Peter & Umar, 2018).

The use of an oral rehydration salts (ORS) solution for rehydration is crucial while dealing with diarrhoea. Children's lives can be saved by using rehydration treatment during spells of diarrhoea. But every year, millions of kids die because their bodies aren't hydrated enough. Over 1.5 million deaths annually, or 15% of all deaths in children under the age of five, might be avoided with the use of oral rehydration treatment (ORT) for diarrhoea (Dawit et al., 2022). The incidence and severity of diarrhoea can be mitigated with well-executed home management. Sixty percent to seventy percent of diarrhoea-related fatalities are attributed to dehydration caused by a lack of fluids and electrolytes. Preventing dehydration during bouts of diarrhoea by using Oral Rehydration Salts and educating carers on the causes and warning signs of diarrhoea are both crucial (Ugwu et al., 2019).

According to the joint statement from the World Health Organisation and the United Nations Children's Fund, the treatment plan centres on two primary components: fluid replacement to prevent dehydration and zinc therapy. Hydrotherapy through the mouth: The ORT is the most important medical breakthrough of the 20th century since it represents the successful transfer of technology from less developed to more developed regions. ORT solutions are made by mixing specified amounts of sodium, glucose, potassium, chloride, and alkali (bicarbonate or citrate) with sterile water. ORT, based on the WHO formula, can be used to treat any kind of dehydration. Its extraordinary efficiency in treating acute, chronic, and watery diarrhoea has helped much to the lowering of childhood mortality from diarrhoea illness. While ORS-WHO (oral rehydration salts) may be thought of as a one-size-fits-all treatment, it is important to have a standard formula that can be suggested and marketed internationally. When used as directed, ORS-WHO poses no threat to patients.

Without major side effects, almost two billion ORS units have been given. Acute diarrhoea in children should not be treated with symptomatic anti-diarrheal medications. Antimicrobials should also be avoided for cases of acute diarrhoea that are not complex. Dysentery, cholera, typhoid fever, and diarrhoea brought on by parasites including Giardia lamblia, Cyclospora spp., and E. hystolytica, on the other hand, warrant the use of antimicrobials. Although the intravenous route is usually preferred in the event of shock, oral and nasogastric tube (ORT) administration has shown useful in the treatment of chronic dehydration induced by diarrhoea. The World Health Organisation (WHO) currently recommends a salt level of 75 mmol/L for a single oral rehydration solution (ORS). Zinc insufficiency is common in the impoverished world despite the prevalence of protein-rich and other dietary sources. This is despite the fact that zinc is linked to increased rates of infectious disease, including diarrhoea, and fatalities from these diseases. Treatment plans that include zinc supplements are especially important for helping youngsters recover from sickness and maintain good health in the long run. There has been a long-term correlation between poor feeding and diarrhoea illnesses, and it is clear that many of the affected children with

diarrhoea show deficiency in vital vitamins and trace elements required by the body system. This is important information for those working to lessen the global burden of diarrhoea. Vitamin A aids in epithelial cross-linkage maintenance, while zinc aids in the healing process of injured skin and helps enhance immunity in children less than 5 years. Children who start taking zinc supplements at a younger age have a lower risk of developing diarrhoea, while those who start taking zinc supplements later have a lower risk of developing diarrhoea that lasts longer. Zinc also appears to boost ORS intake and prevent inappropriate drug usage with antibiotics and anti-diarrheal drugs.

worldwide coverage of this intervention remains extremely poor, especially in sub-Saharan Africa, where coverage was just 18% in 2021, despite the worldwide guideline to incorporate ORS and zinc supplementation for under-five diarrhoea therapy. In children younger than five, the majority of cases of diarrhoea are mild, with 34.7 percent classified as moderate and 0.5 percent as severe. In 84.6% of instances, dehydration is a result of even moderate episodes (Atimati & Eki-Udoko, 2022). moderate episodes typically last 4.3 days.

Overall, considerably more effort is needed to guarantee that all children are treated with ORS and zinc for diarrhoea. ORS coverage is lacking everywhere and for all demographics of households. This therapy is more likely to be given to children in urban areas, where health facilities are more readily available, than in rural regions; nonetheless, coverage is still far from ideal in both urban and rural areas (UNICEF, 2022). Meanwhile, NDHS, 2018 found that among the states in South-West Nigeria, Oyo had the highest prevalence of diarrhoea among children under the age of five. In Oyo state, one out of every five kids under the age of five had diarrhoea in the preceding two weeks.

Suboptimal prescriptions of ORS/Zinc were found to be 30.4% of all prescriptions for paediatric diarrhoea in primary health care clinics in Sub-urban settings in Nigeria (Ogugua, & Chiejina, 2021). The use of oral rehydration salts (ORS) and zinc in the treatment of diarrhoea in children has been extremely low in Nigeria, according to a factsheet published by the World Health Organisation in 2017. The researcher's observations indicate that the use of these two treatments as part of the WHO-recommended "first line" treatment regimen has not taken hold in Oyo State Primary Health Centres.

Many factors were documented to have contributed to this low use of ORS and zinc among which are the caregivers' treatment seeking pattern for diarrhoea and no consideration for the co-administration of ORS and zinc by healthcare providers to manage acute watery diarrhoea among under-five children.

In a study conducted in Nigeria, only two-thirds of nurses were aware of zinc supplementation, 35% of them prescribed zinc when managing childhood diarrhoea and 10% of these do so for every case of childhood diarrhoea. But success in reducing diarrhoea morbidity and mortality by administering zinc to children with diarrhoea depends on the knowledge and acceptance of zinc by the parents/caregivers of these children (Gwarzo, 2018). It therefore become imperative to study the effectiveness of the combination of ORS and Zinc in the management of under-five diarrhoea

disease when used correctly by the healthcare providers at the selected Primary Health care Centers in Oyo State, Nigeria.

The main objective of this study was to assess the effectiveness of WHO combination treatment regimen in diarrhoea prevention through dehydration management amongst under-five children attending primary health care centres in Oyo State, Nigeria. The specific objectives are to:

1. assess the baseline data of dehydration status among the under-five children who reported at the selected primary health care centres pre intervention;
2. assess the clinical dehydration status of under-five children in 24hours, 2 weeks and 4 weeks at the selected primary health care centres post intervention;

Research Questions

1. What is the baseline data of dehydration among the under-five children who reported at the selected primary health care centres in Oyo State, Nigeria?
2. What is the clinical dehydration status of under-five children in 24hours, 2 weeks and 4 weeks at the selected primary health care centres in Oyo State, Nigeria?

Hypothesis

The following Hypotheses were formulated for the study:

H_o1. There is no significant difference between the baseline dehydration status and the post intervention dehydration status of under-five children at the selected primary health care centre in Oyo State, Nigeria.

METHODOLOGY

To evaluate the efficacy of the WHO combined treatment regimen of ORS with zinc supplement in the management of dehydration among children under the age of five presenting to selected primary health care clinics in Oyo State, Nigeria, the study used a quasi-experimental of one group pretest-posttest design. The method was used to collect baseline data on the prevalence of clinical dehydration in children younger than five using the WHO clinical observation checklist. After that, the World Health Organisation (WHO) combined treatment regimen for the management of dehydration was introduced, and the efficacy of WHO-ORS with zinc supplement on dehydration status of children under the age of five was evaluated 24 hours before discharge. Two and four weeks after the intervention, the same instrument (baseline data) was utilised during home visits to investigate the efficacy of the combination treatment.

Children under the age of five who presented with diarrhoea throughout the study period at primary health clinics in Ogbomoso South, Surulere, and Orire Local Government Areas in Oyo State, Nigeria were the major focus of the research. Ogbomoso North Local Government conducted a pilot study at a PHC. These PHC were chosen because they had a high volume of diarrhoea cases among children under the age of five. There are an average of 72 cases per month at the Jabata Primary Health Care Centre in the Orire Local Government Area (LGA), 61 cases per month at the Kajola Primary Health Care Centre in the Ogbomoso South LGA, and 67 cases per month at

the Ikoyi Ile PHC. Sixty individuals made up the sample size determined by the proportion formula.

A standardized WHO clinical observation checklist for the management of dehydration was used for this study and it was divided into two sections. It consists of socio-demographic profile such as age, sex, weight on admission, duration of diarrhoea and the presence of vomiting. It also deals with demographic profile in relation to parent's literacy level, source of drinking water, sanitation, toilet facility and hand washing habit. The second section consisted of world health organization observational check list. Observational checklist on dehydration was used to assess the dehydration. The tool has 11 items in it. Each item was scored between 1, 2 and 3. In dehydration assessment tool, one refers to no dehydration, two refers to the moderate dehydration and three refers to the severe dehydration. Score between 1-11 falls under no dehydration, between 12-22 is categorized as some dehydration and 23-33 is categorized as severe dehydration.

Based on data from a pilot research conducted at Oja Igbo PHC in Ogbomoso North Local Government Area, the instrument's reliability was determined using the inter -rater technique. The instrument's dehydration reliability was determined to be r = 0.88.

The parents of the research subject provided their consent. There were four weeks of data gathering. Each PHC center's experienced research assistants helped pick participants daily, using the predetermined criteria. On a weekly basis, primary care clinics randomly picked between 9 and 12 new patients. Socio-demographic information was gathered on day one. The degree of dehydration was determined using a score calculated from a series of observational check lists. Then, the youngsters received the WHO-recommended ORS with zinc. It was recorded daily, just like the patients are doing at the clinic. For each litre of cooled, boiling water, one teaspoon of WHO-ORS will be added. The recommended daily intake of ORS will be determined using the WHO standard. Zinc will be given to children as a single dosage of either 10 mg (those aged 6 months and under) or 20 mg (those aged 6 months and older) of the mineral. Zinc syrup (5ml = 20mg) will be administered to the children in this trial. All participants were tested for dehydration using the WHO clinical observation structured questionnaire 24 hours, 2 weeks, and 4 weeks following the intervention.

SPSS Version 25 was used to enter data into the computer for statistical analysis. Both descriptive and inferential statistics were employed to investigate the baseline data on the dehydration status of children younger than five. Clinical dehydration status in children under age five was evaluated over the course of 24 hours, 2 weeks, and 4 weeks using a percentage and frequency distribution table.

RESULTS

Table 2: Socio-demographic Characteristics of Participants

S/N	Characteristics	Options	Frequency	Percentage
1.	Age of the child	3-12 months	18	30.0
		13-24 months	21	35.0
		25-36 months	12	20.0
		37-59 months	9	15.0
2.	Sex	Male	32	53.3
		Female	28	46.7
3.	LGA of residence	Ogbomoso South	19	31.7
		Surulere	21	35.0
		Orire	20	33.3
4.	Educational status of mother	No formal education	12	20.0
		Primary	21	35.0
		Junior Secondary School	14	23.3
		Senior Secondary School	9	15.0
		Graduate	3	5.0
		Post graduate	1	1.7
5.	Educational status of father	No formal education	17	28.3
		Primary level of education	16	26.7
		Junior Secondary School level	12	20.0
		Senior Secondary School level	8	13.3
		Graduate	6	10.0
		Post graduate	1	1.7

Table 2 shows the socio-demographic characteristics of the participants. The age of the Under-five children varied from a minimum of 3 months to a maximum of 59 months (5 years) with the mean age being 27 months. Majority of the participants 21(35.0%) are between 12-24 months and only 9(15.0%) are between the age range of 36-59 months. Again, majority 32(53.3%) of the under-five children are male, and their female counterpart are 28(46.7%). With regards to the parents' educational status, majority 21(35.0%) had primary school leaving certificate and 9(15.0%) had no formal education.

Table 3: Characteristics of Participants Home Environment

S/N	Characteristics	Options	Frequency	Percentage
1.	Source of drinking water	Well water Borehole Pipe borne water Stream	42 11 2 5	70.0 18.3 3.3 8.3
2.	Toilet facility	Sanitary toilet with septic tank Single toilet shared by many families Open field defecation	11 38 11	18.3 63.3 18.3
3.	Sanitation	Proper disposal of garbage Improper disposal of garbage	14 46	23.3 76.7
4.	Habit of hand washing before eating	Washing with plain water Washing with soapy water No habit of hand washing	32 10 18	53.3 16.7 30.0
5.	Habit of hand washing after toileting	With plain water With soapy water No hand washing habit	31 15 14	51.7 25.0 23.3

Table 3 shows that, majority 42(70.0%) had their source of drinking water from well water, and 11(18.3%) from Borehole. Majority 38(63.3%) of the participants uses single toilet shared by many families whereas 11(18.3%) uses sanitary toilet with septic tank. Majority 46(76.7%) of the participants engaged the use improper disposal of garbage, 32(53.3%) always wash their hands with plain water before eating, and few 10(16.7%) do wash with soapy water before eating. 31(51.7%) do wash their hands with plain water after toileting, 15(25.0%) do wash with soapy water, and 14(23.3%) do not wash their hands at all after using the toilet.

Research Question 1: What is the baseline data of dehydration among the participants who reported at the selected primary health care centres in Oyo state?

Table 4: Frequency and percentage distribution of participants according to level of dehydration status on admission (Baseline)

Dehydration	**Baseline**	
	Freq.	%
Dehydration status		
No dehydration	4	6.7
Moderate dehydration	47	78.3
Severe dehydration	9	15.0

Table 4 shows that on admission (Baseline), majority 47(78.3%) of the participants had moderate dehydration whereas 4(6.7%) and 9(15.0%) of the participants had no dehydration and severe dehydration respectively.

Research Question 2: What is the clinical dehydration status of the participants in 24 hours, 2 weeks and 4 weeks at the selected primary health care centres?

Table 5: Participants dehydration status in 24 hours, 2 weeks and 4 weeks

Dehydration	**24 hours**		**2 weeks**		**4 weeks**	
	Freq.	%	Freq.	%	Freq.	%
Dehydration status						
No dehydration	46	76.7	52	86.7	60	100
Moderate dehydration	14	23.3	8	13.3	-	-
Severe dehydration	-	-	-	-	-	-

Table 5 shows that in 24 hours of administration of WHO-ORS + Zinc regimen, majority 46(76.6%) had no dehydration while 14(23.3%) had Moderate dehydration with no participants severely dehydrated. On close observation after 2 weeks, the status had changed with 8(13.3%) participants having some dehydration, and majority 52(86.7%) of the participants had no dehydration. However, Re-examination after 4 weeks revealed that all 60 (100%) of the participants had no dehydration.

Hypothesis Testing

H_O1: There is no significant difference between the baseline dehydration status and the post intervention dehydration status of the participants at the selected Primary Health Care Centres in Oyo State.

Table 6: Paired sample comparison of mean dehydration score among under-five children before and after administration of WHO-ORS with zinc

Pairs	Measurement	N	Mean difference	S.D	Paired samples correlations	t-value	Sig.
1	On admission & 24 hours	60	7.41667	3.5334	.260*	16.259	.000
2	On admission & 2 weeks	60	7.58333	3.4753	.257*	16.902	.000
3	On admission &4 weeks	60	7.41667	3.6790	.250*	15.615	.000
4	Dehydration status for 24 hours & 2 weeks	60	0.16667	0.7170	.928*	1.800	.077
5	Dehydration status for 24 hours & 4 weeks	60	0.00001	0.8025	.942*	.0001	.999
6	Dehydration status for 2 weeks & 4 weeks	60	-0.16667	0.7403	.981*	-1.744	.086

* Significant at 0.05 level

From Table 6 shows that since the t-value of 16.259, 16.902 and 15.615 were computed at 0.05 level of significant, a higher score between the baseline dehydration status and 24 hours, 2 weeks and 4 weeks dehydration status indicates that there is significant difference between the baseline dehydration status and the post intervention dehydration status of the participants. Hence the hypothesis was rejected.

DISCUSSION

The age of the Under-five children varied from a minimum of 3 months to a maximum of 60 months (5 years). Majority 21(35.0%) of the participants are between 13-24 months, followed by those within 3-12 months 18(30.0%), 25-36 months 12(20.0%) and 9(15.0%) were between 36-59 months. Majority 32(53.3%) of the participants are males, while 28(46.7%) are females. Again, majority 46(76.7%) participants engaged the use improper disposal of garbage, and do not wash their hands at all after using the toilet. This was evident during the home visit done while the study was being carried out and it could have played significant roles in the rate of occurrence of diarrhoea among this age group.

Consequently, significant numbers of the parents had either primary education or no formal education. This low level of education recorded among the caregivers of these under-five children might have played tremendous roles in the rate at which the children of this age group would be coming down with diarrhoea disease. Moreso, it could be deduced from this study that the reason for higher number 21(35.0%) of children between 13-24 months coming down with diarrhoea may not be unconnected to the fact that this age group is when the children are exposed significantly to weaning diet which most of the time are poorly prepared owing to the factors like parents' low level of education, poor environmental hygiene, poor personal hygiene, unhealthy food combination and unhygienic mode of food preparation.

This finding is in consonance with the finding of Jiwok et al, (2021) in a study conducted in Plateau state, Nigeria among 60,935 children with the cases of diarrhoea out of which age group 12–59 months recorded the highest number of cases (49.3%). Also, the present finding is in line with the report of Nigeria Demographic and Health Survey (NDHS) (2018) which documented that diarrhoea was most common among children aged 12–23 months.

Conversely, the present finding is at variance with the report of Saha et al, (2022) in a survey carried out in rural Indian which submitted that Diarrhoea was less likely to develop among children aged 12–23 months when compared to children aged 0 – 11 months and the submision of Kenya Demographic and Health Survey (KDHS), (2014) which affirmed that the prevalence of diarrhoea is highest in children aged between 6 and 11 months, followed closely by children between the ages of 12 and 23 months.

Additionally, the finding of this study was also supported by Thiam et al, (2017) in a study conducted on Prevalence of diarrhoea and risk factors among children under five years old in Mbour, Senegal which documented that diarrhoea is closely associated with environmental and socio-economic conditions, with the impoverished communities being mostly affected. Also, WHO, (2021) in her annual World Health Statistics reports among the WHO Member States alluded to the fact that in 2016, over 75% of diseases or disease groups listed in the Global Health Observatory had significant links with the environment. Moreso, in a study conducted by Nguyen et al, (2021) on diarrhoea among children aged under-five years and risk factors in informal settlements: A cross sectional study in Cape Town, South Africa opined that informal settlements in Africa are synonymous with public health challenges like under-five diarrhoea as a result of dense population and poor sanitation.

Furthermore, the finding of this study was also in line with Harriet et al, (2021) submission in a Global report where it was reported that mother's educational status, employment status and source of drinking water can significantly be attributed to the occurrence of under-five diarrhoea. Again, this finding is in line with the submission of Peter and Umar, (2018) in a study conducted in Nigeria on combating diarrhoea in Nigeria: the way forward where they opined that about 30 million people (67% of whom are concentrated in the Northern part of the country) still use unimproved sanitation facilities, practice open defecation which increases the risks of diarrhoea diseases. Some sanitation factors, like indiscriminate or improper disposal of children's stool and household garbage, no existence of latrine or unhygienic toilet, sharing latrine, house without sewage system, increased the risk for diarrhea in children under-five years. The unhygenic practices of the parents of the participants may not be unconnected to their low level of education and common societal knowledge of the rural dwellers. Similarly, the present finding was in agreement with the report of the studies done in Ghana and Kenya by Asfaha et al, (2018) that stated that childhood diarrhoea occurrence was significantly lower where mothers had secondary education, compared to mothers with no education

The present findings was also corroborated by Manetu et al, (2021) in a global systematic review on occurrence of childhood diarrhea where it was opined that there are several factors that have been assessed to influence the occurrence of childhood diarrhoea. These are broadly categorized as socio-economic (mother's age, number of children, occupation status, household size and

education level), environmental (sources of drinking water, toilet facilities, water treatment) and behavioral (bottle feeding and hand washing with soap).

The finding of this study shows that on admission (Baseline), majority 47(78.3%) of the participants had some dehydration whereas 4(6.7%) and 9(15.0%) of the participants had no dehydration and severe dehydration respectively. However, the situation changed after 24 hours following intervention with majority 46(76.6%) of the participants presenting with no dehydration although, 14(23.3%) participants had some dehydration and no participants was severely dehydrated. On close observation after 2 weeks, the status had changed with majority 52(86.7%) of the participants having no dehydration although 8(13.3%) of the participants had some dehydration. Re-examination after 4 weeks during home visiting revealed that all the participant 60(100%) had no dehydration in all the three local government areas used for the study.

These results on the dehydration status of participants on admission, after 24 hours, after 2 weeks, and after 4 weeks at the chosen primary health care centres in Oyo state, Nigeria, corroborated the submission of the World Health Organisation (WHO) and the United Nations Children's Fund (UNICEF) on the combine effect of ORS and Zinc, where they affirmed that combining ORS with Zinc in the management of dehydration significantly reduces diarrhoea deaths and reduces the duration In addition, Kassa et al. (2022) believed that research shown that the use of ORS and zinc together can aid in reducing child morbidity and mortality.

Moreover, the findings of this present study showed that there was a significant difference between the baseline dehydration status and the post intervention dehydration status among the participants since the mean dehydration score after administration of WHO-ORS plus zinc was lower than the baseline (On admission) score. This difference in mean scores is an improvement of dehydration status of the under-five children which is a significant index to diagnosing and assessing under-five diarrhoea disease, therefore, the null hypothesis was rejected.

CONCLUSION

Following the administration of WHO-ORS with Zinc the situation improved significantly after 24 hours, 2 weeks and 4 weeks of intervention with no under-five children severely dehydrated. The combination regimen of WHO-ORS with zinc was found effective in managing dehydration among under-five children.

Recommendations

1. Nurses should assess the children with diarrhoea by using observational checklist to detect the dehydration status and treat accordingly.
2. The study has clearly proved that WHO-ORS with zinc was more effective in managing dehydration. Hence, nursing students should be well taught on it usage.
3. Nursing schools should give importance to WHO-ORS with zinc in the management of dehydration among under-five children.
4. Various other oral rehydrating solutions can be administered among children with diarrhoea as a comparative study in different settings.

References

Atimati, A. O., & Eki-Udoko, F. E. (2022). Diarrhoea prevalence, characteristics and outcome among children admitted into the emergency ward of a tertiary hospital in Southern Nigeria. *Annals of Clinical and Biomedical Research*, *3*(2). https://doi.org/10.4081/acbr.2022.218

Dawit, K. Y., Asmamaw, E. K., Mohammed, C., Yeelshaddai, G., Biruktawit, M., Zemene D. K., (2022). Assessment of knowledge, attitude, and practice of child caregivers towards oral rehydration salt and zinc for the treatment of diarrhea in under 5 children in Gondar town. Journal of clinical epidemiology and Global Health. h 14 (1) 100998 2213-398

Gwarzo G.D., (2018). Mothers' awareness and use of zinc in under-five children with diarrhoea in North-Western Nigeria. Nigerian Journal of Paediatrics. Niger J Paediatr 2018; 45 (2): 81 – 85. DOI:http://dx.doi.org/10.4314/njp.v45i2.2

Jiwok, J.C., Adebowale, A.S., Wilson, I., (2021). Patterns of diarrhoeal disease among under-five children in Plateau State, Nigeria, 2013–2017. *BMC Public Health*21, 2086. https://doi.org/10.1186/s12889-021-12110-y

Kassa S.F, Alemu T.G, Techane M.A, Wubneh C.A, Assimamaw N.T, Belay G.M, Tamir T.T, Muhye A.B, Kassie D.G, Wondim A, Terefe B, Tarekegn B.T, Ali M.S, Fentie B, Gonete A.T, Tekeba B, Desta B.K, Ayele A.D, Dessie M.T, Atalell K.A., (2022). The Co Utilization of Oral Rehydration Solution and Zinc for Treating Diarrhea and Its Associated Factors Among Under-Five Children in Ethiopia: Further Analysis of EDHS 2016. *Patient Prefer Adherence*. 2022;16:1713-1721 https://doi.org/10.2147/PPA.S356557.

Kenya Demographic Health Survey, (2014). Available from: www.dhsprogram.com.

Manetu, W.M., M'masi, S. & Recha, C.W. (2021). Diarrhea Disease among Children under 5 Years of Age: A Global Systematic Review. Open Journal of Epidemiology, 11, 207-221. https://doi.org/10.4236/ojepi.2021.113018

Mokomane, M., Kasvosve, I., de Melo, E., Pernica, J. M., & Goldfarb, D. M. (2018). The global problem of childhood diarrhoeal diseases: emerging strategies in prevention and management. *Therapeutic advances in infectious disease*, *5*(1), 29–43. https://doi.org/10.1177/2049936117744429

Nguyen, T. Y. C., Fagbayigbo, B. O., Cissé, G., Redi, N., Fuhrimann, S., Okedi, J., Schindler, C., Röösli, M., Armitage, N. P., Carden, K., & Dalvie, M. A., (2021). Diarrhoea among Children Aged under Five Years and Risk Factors in Informal Settlements: A Cross Sectional Study in Cape Town, South Africa. International journal of environmentalresearch and public health, 18(11), 6043. https://doi.org/10.3390/ijerph18116043.

Nigeria Demographic and Health Survey NDHS, (2018). Available from www.dhsprogram.com.

Peter AK, & Umar U. (2018). Combating diarrhoea in Nigeria: the way forward. J Microbiol Exp. 6(4):191-197. DOI: 10.15406/jmen.2018.06.00213.

Saha, J., Mondal, S.. Chouhan, P., Hussain, M., Yang, J., & Bibi, A., (2022). Occurrence of DiarrhealDisease among Under-Five Childrenand Associated Sociodemographicand Household EnvironmentalFactors: An Investigation Based onNational Family Health Survey-4 in Rural India. Children 2022, 9, 658.https://doi.org/10.3390/children9050658

Thiam, S.; Diène, A.N.; Fuhrimann, S.; Winkler, M.S.; Sy, I.; Ndione, J.A.; Schindler, C.; Vounatsou, P.; Utzinger, J.; & Faye, O., (2017). Prevalence of diarrhoea and risk factors

among children under five years old in Mbour, Senegal: A cross-sectional study. Infect. Dis. Poverty 2017, 6, 109.

UNICEF., (2022): Monitoring the situation of children and women. https://data.unicef.org/resources/

UNICEF. Diarrhoea remains a leading killer of young children, despite the availability of a simple treatment solution. Available from: http://data.unicef.org/topic/child- WHO Regional Office for Africa. 5 children under age 5 die every minute in the African Region. Available from: http://www.afro.who.int/en/media centre/afrofeature/item/7718-5-children-under-age-5-die-every-minute-in-the-africanregion.html [Accessed 16th Feb 2022].

World Health Organization. Children: improving survival and well-being. Geneva: World Health Organization;2018.

World Health Organization. Inheriting a Sustainable World: Atlas on Children's Health and the Environment [Internet]. Available online: http://www.who.int/ceh/publications/inheriting-a-sustainable-world/en/ (accessed on 26 February 2022).
"