



## EFFECT OF NURSE-LED INTERVENTION ON CHILDHOOD DIARRHOEA HOME MANAGEMENT SKILL OF CAREGIVERS IN EMOHUA, NIGERIA: QUASI EXPERIMENTAL STUDY

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**ABSTRACT: Background:** Diarrhoea causes morbidity and death in children under-five years of age. These deaths can be averted through proper home-based management administered by caregivers who are first responders in childhood diarrhoea episodes. **Purpose:** The effect of nurse-led educational intervention on childhood diarrhoea home management skills of caregivers in Emohua LGA, Rivers state was assessed in this study. **Materials and Methods:** A one group quasi-experimental study design was adopted and 304 consenting caregivers were recruited from Emohua LGA for this study. A structured questionnaire was administered to obtain sociodemographic characteristics and assess childhood diarrhoea management skill of the study participants at baseline. Questionnaire was pretested in Eneka village in Obio-Akpor LGA, Rivers state with Cronbach alpha reliability coefficient of 0.84. Childhood diarrhoea home management skill was assessed with a fourteen-item instrument on a 5-point Likert scale (1-5) generating an overall score range of 14-70. The WHO integrated management of childhood illness module was adopted for Nurse-led intervention, which was administered in English, Pidgin English and the local dialect. Follow-up assessment of caregivers' childhood diarrhoea home management skill was carried out 4-weeks after nurse-led intervention. Data obtained was analysed using statistical package for social sciences version 20. Discontinuous data was summarised as frequency and percentage while continuous data was summarised as mean and standard deviation. Differences in pre- and post- intervention proportions and mean scores were analysed with Chi-square and Paired t-test respectively. Statistical significance was set at  $p < 0.05$ . **Results:** Study participants comprised of 219 females (74%) and 77 males (26%), with majority of the study participants aged 25-34 years (68.9%). The highest level of education of most of the caregivers was Secondary education with Fishing (43.9%) being the most common occupation. There were significant increases in childhood diarrhoea home management skill of caregivers' post intervention compared to pre-intervention in the areas of diarrhoea prevention measures, timing of ORS administration, ORS preparation, drug therapy and care seeking attitude. Mean home management score increased significantly from  $43.24 \pm 7.30$  pre-intervention to  $56.38 \pm 4.03$  post-intervention ( $t = 27.025$ ,  $p = 0.000$ ). **Conclusion/ Implications for Practice:** Childhood diarrhoea home management skill of caregivers improved significantly 4-weeks after nurse-led educational intervention. Provision of continuous education on home management of childhood diarrhoea for caregivers by community health nurses should be encouraged due to its potential to reduce morbidity and mortality associated with diarrhoea diseases.

**Keyword:** Childhood Diarrhoea, Caregiver, Home Management Skill, Nurse-led Intervention



## INTRODUCTION

Diarrhoeal diseases are highly preventable, and proper clinical management when they occur can lead to recovery. Nevertheless, diarrhoeal diseases still rank as the second leading cause of death in children under five years in low- and middle- income countries (Liu et al., 2016; WHO, 2017). This suggests probable failure of preventive measures or a lack of adequate management of childhood diarrhoea cases in these regions. In 2004, the WHO and UNICEF issued a joint statement on clinical treatment of acute diarrhoea, recommending the use of low-osmolality oral rehydration salts (ORS), zinc supplementation, increased amount of appropriate fluids, and continued feeding (Senbanjo et al., 2017). This recommended diarrhoea management approach is a simple and easily administrable measure that can be provided by caregivers at home thereby preventing childhood diarrhoea disease associated complications (Navin, 2018). However, the UNICEF (2015) reported that one in three children receive ORS and less than 5% receive zinc supplements during diarrhoeal episodes in sub-Saharan Africa (Akinyemi et al., 2018).

Studies support home treatment of childhood diarrhoea as the hallmark of control of diarrhoeal diseases in children under five years of age (Shitemi, 2018). This therefore puts caregivers including mothers, fathers and guardians in the forefront of prevention and management of childhood diarrhoea episodes prior to contact with healthcare practitioners (Balouchi et al., 2018). Moreover, in resource poor settings where there is increased prevalence of limited access to healthcare, the relevance of caregivers in regard to taking adequate preventive measures, identification of signs and symptoms, administration of home-based care and the decision to seek professional help needs to be underscored (Semret, & Haraoui, 2019). Thus, continued diarrhoea diseases associated morbidity and mortality could be linked with the level of childhood diarrhoea management skill of the caregivers in low- and middle- income countries (Keusch et al., 2016). Practice gaps and poor levels of practice of home-based management of diarrhoea by caregivers have been previously reported in Northwestern Nigeria (Omole et al., 2019).

Health education is an essential strategy that has been adopted in the control of various disease conditions from promoting proper preventive measures, to enlightenment on signs and symptoms of disease, promotion of care seeking attitude, as well as crucial behavioural and lifestyle adjustments (Broholm-Jørgensen et al., 2019). Nurse-led intervention holds potential to fill gaps in practice of home management of childhood diarrhoea diseases thereby reducing diarrhoea disease associated morbidity and mortality in low- and middle- income countries (Perez et al., 2018). There is paucity of information on the status of childhood diarrhoea management approaches adopted by caregivers in Emohua Local Government Area, Rivers state, Nigeria. Hence, this present study aims to assess baseline childhood diarrhoea management skills of caregivers in Emohua Local Government Area, Rivers state, Nigeria and the effect of nurse-led on these skills.



## **METHODS**

### **Study Design and Sample**

This quasi-experimental study was carried out in Emohua Local Government Area of Rivers State within February and March 2020. Caregivers were selected randomly from 1024 households registered with the Primary healthcare facility within the LGA as obtained from medical records. The sample size for this study was estimated based on a single proportion design. The target population from which study participants were recruited was considered 9,000 and confidence interval of 10% and confidence level of 95% were assumed. The sample size obtained for this study was 290 participants. However, 304 participants were recruited to allow for 5% drop out rate. Study participants were selected from households using appropriate sampling techniques. Multistage sampling technique was used to ensure that all the eight villages within Emohua LGA were captured by the study while purposive sampling was used to select only households with children under-five years of age within the 8 villages. A proportionate sampling technique was adopted to determine the number of households to be selected from each community while simple random sampling technique was used to select caregivers from the eight communities. Caregivers had to be resident in Emohua LGA and aged 18 years and above to be included in this study.

### **Study procedure**

A written informed consent was obtained from each participant at enrolment for this study. A pre-tested structured questionnaire was utilized for the study incorporating sociodemographic characteristics and questions on home management of childhood diarrhoea. Sociodemographic data obtained included gender, age, educational status and occupation. This study was carried out in three phases. The first phase entailed selection of caregivers, notification and proper orientation of participants towards purpose and nature of the study before seeking their consent to participate in the study. The second phase or intervention phase entailed a two-day educational program on childhood diarrhoea. Study participants were assembled at a selected location that was communicated to them well ahead of the commencement of the intervention phase. Participants filled a pre-intervention questionnaire before a two-day nurse-led educational programme on childhood diarrhoea. This study adopted the WHO intervention module of integrated management of childhood illnesses (WHO, 2016) in the areas of signs and symptoms of diarrhoea, prevention of diarrhoea, management of diarrhoea, complications of diarrhoea, home management of diarrhoea, guidelines for preparation of oral rehydration solution (ORS), as well as demonstration of preparation and use of ORS. The third phase involved a post-intervention evaluation of childhood diarrhoeal knowledge of study participants 4 weeks after intervention.

### **Ethical Consideration**

The study protocol was reviewed and approved by the Babcock University Health Research Ethics Committee (BUHREC-725/19). Permission to carry out the study was also sought and obtained from the Chairman of Emohua LGA and Medical Officer in charge of the LGA after careful consideration of the study protocol. Study participants were properly informed of the research aim, objectives and protocol before obtaining consent. They were also made to understand that their participation in the study was voluntary. High levels of anonymity, confidentiality, beneficence and non-maleficence were ensured during the study.



## Statistical Analysis

Data obtained was analysed using SPSS version 20 (SPSS Inc., Chicago, IL). Descriptive statistics of sociodemographic data and childhood diarrhoea home management skill were presented using frequencies and percentages. Overall childhood diarrhoea home management skill score was calculated by scoring correct responses 5 and wrong responses 1 given the five-point Likert scale used for the 14-item childhood diarrhoea home management questions. Home management skill scores were summarized as mean and standard deviation. Pre- and post-intervention mean scores were compared using paired t-test. Statistical significance was set at  $p < 0.05$ .

## RESULTS

A total of 304 caregivers were recruited for this study but upon data collation eight (8) participants were found to have provided incomplete data thereby leading to exclusion of their data from analysis.

Table 1 shows the sociodemographic characteristics of study participants. The study participants comprised of 219 females (74%) and 77 males (26%), with majority of the study participants aged 25-34 years (68.9%). The highest level of education of most of the caregivers was Secondary education with Fishing (43.9%) being the most common occupation.

**Table 1: Sociodemographic Characteristics of Study Participants**

Variable	Frequency (n)	Percent (%)
<b>Gender</b>		
Male	77	26.0
Female	219	74.0
<b>Age</b>		
15-24 years	10	3.4
25-34 years	204	68.9
35-44 years	75	25.3
≥45 years	7	2.4
<b>Education</b>		
NFE	9	3.0
Primary	43	14.5
Secondary	213	72.0
Tertiary	31	10.5
<b>Occupation</b>		
Farming	56	18.9
Fishing	130	43.9
Petty trader	11	3.7
Government	17	5.7
Others	82	27.7



Table 2 shows caregivers home management skill of childhood diarrhoea pre and post nurse-led intervention. There were significant increases in the proportion of caregivers that demonstrated appropriate home management skills post nurse-led intervention compared to baseline in all items of the childhood diarrhoea home management skill instrument ( $p < 0.05$ ). In regard to diarrhoea preventive measures, only 66 (22.3%) of the caregivers agreed to disallow open defecation before and during childhood diarrhoea episode. This however increased to 242 (81.8%) caregivers' post- intervention. Proper hygiene practice particularly hand washing was observed by most of the caregivers, 270 (91.2%) at baseline but increased to 295 (99.7%) post-intervention.

At baseline, only 107 (36.1%) caregivers agreed to administer ORS immediately diarrhoea episode began whereas post-intervention 295 (99.7%) caregivers agreed to this. Most of the caregivers 272 (91.9%) and 295 (99.7%) agreed to the observation of proper hygiene particularly hand washing with soap while preparing ORS both pre- and post- intervention respectively. At pre- intervention only 210 (71.0%) of the caregivers agreed to the use of clean water (boiled water or table water) for the preparation of ORS while this increased to 292 (98.6%) after intervention. The caregivers, 252 (85.1%) agreed that ORS has to be prepared in an appropriate proportional mix pre-intervention whereas 294 (99.4%) did post-nurse-led intervention. At baseline, only 105 (35.5%) caregivers agreed to strict adherence to the 24-hour shelf life of ORS while this number increased to 294 (99.4%) post-intervention.

Though only 59 (19.9%) and 94 (31.7%) of the caregivers agreed to administer adequate fluid and continue meals during childhood diarrhoea episode respectively before intervention. This increased to 294 (99.4%) and 286 (96.6%) respectively post-intervention. About 241 (81.4%) caregivers agreed to give only solid meals during diarrhoea episode pre-intervention. This reduced to 56 (18.9%) post-intervention. Many of the caregivers, 228 (77.0%) agreed to continue exclusive breastfeeding during diarrhoea episode pre- intervention, however this increased to 282 (95.3%) post-intervention.

At baseline, majority of the caregivers 272 (91.9%) and 244 (82.4%) agreed to the administration of anti-diarrhoea agents and antibiotics respectively during diarrhoea episode. However, this decreased to 52 (17.6%) and 50 (16.9%) caregivers respectively following nurse-led intervention. Many caregivers, 275 (92.9%) agreed to seek care at health facility after 24-48 hours with no improvement pre-intervention. Nonetheless, this increased to 293 (99.1%) post-intervention.

**Table 2: Caregivers Home Management Skill of Childhood Diarrhoea Pre- and Post-Nurse-led Intervention.**

Home management skill items	Pre- (n=296), n(%)	Post- (n=296) n(%)	$\chi^2$	p
<b><i>Diarrhoea preventive measures</i></b>				
Disallow open defecation before/during diarrhoea episode	66 (22.3)	242 (81.8)	207.345	0.000*
Ensure proper hygiene	270 (91.2)	295 (99.7)	21.804	0.000*
<b><i>ORS administration timing</i></b>				
Administer ORS at onset of diarrhoea	107 (36.1)	295 (99.7)	272.107	0.000*





<b><i>ORS preparation</i></b>				
Observe proper hygiene during ORS preparation	272 (91.9)	295 (99.7)	26.749	0.000*
Use of clean water for ORS preparation	210 (71.0)	292 (98.6)	88.490	0.000*
Mix ORS in right proportion	252 (85.1)	294 (99.4)	43.256	0.000*
Adhere strictly to recommended ORS shelf life	105 (35.5)	294 (99.4)	274.869	0.000*
<b><i>Feeding practice</i></b>				
Administer adequate fluid during diarrhoea episode	59 (19.9)	294 (99.4)	386.960	0.000*
Continue meals during diarrhoea episode	94 (31.7)	286 (96.6)	268.457	0.000*
Give only solid meals during diarrhoea episode	241 (81.4)	56 (18.9)	275.614	0.000*
Continue exclusive breastfeeding of infant ( $\leq$ 6months) during diarrhoea episode	228 (77.0)	282 (95.3)	82.375	0.000*
<b><i>Drug therapy</i></b>				
Give child anti-diarrhoea agents during diarrhoea episode	272 (91.9)	52 (17.6)	343.316	0.000*
Administer antibiotics during diarrhoea episode	244 (82.4)	50 (16.9)	303.499	0.000*
<b><i>Care seeking attitude</i></b>				
Seek care at health facility after 24-48 hours	275 (92.9)	293 (99.1)	16.697	0.000*

\*Significant at  $p < 0.05$

Table 3 shows paired t-test comparing pre-intervention and post-intervention childhood diarrhoea home management skill mean score among caregivers. There was a statistically significant increase in the childhood diarrhoea home management skill mean score post-intervention compared to pre-intervention.

**Table 3: Paired t-test Showing Pre-intervention and Post-intervention Mean Score of Home Management Skill of Childhood Diarrhoea Among Caregivers**

<b>Time</b>	<b>n</b>	<b>Mean</b>	<b>SD</b>	<b>SEM</b>	<b>t</b>	<b>p</b>
<b>Pre-intervention</b>	296	43.24	7.295	0.424	27.025	0.000*
<b>Post- intervention</b>	296	56.38	4.028	0.235		

\*Significant at  $p < 0.05$



## DISCUSSION OF FINDINGS

Although home treatment has been recommended as the hallmark for control of diarrhoea diseases in children under five years of age, inappropriate diarrhoea management skills of caregivers portends significant risk of treatment failure. This present study observed that the level of childhood diarrhoea management skill of caregivers in Emohua LGA, Nigeria were short of expectation in several regards' pre-nurse-led intervention. In the area of preventive measure, only few of the caregivers (22.3%) agreed to disallow open defecation before and during diarrhoea episode. This indicates a negative practice that poses public health danger in regard to community spread of diarrhoea diseases within the study population. It also shows that these caregivers may not be aware of the potential for community spread of diarrhoea through the practice of open defecation. Lack of latrine, which evidently promotes open defecation, has been previously shown to play a major role in occurrence of childhood diarrhoea (Hajra & Dutta, 2017).

Treatment of diarrhea with ORS is a simple, proven, high-impact intervention that can be provided in home settings by caregivers to prevent dehydration due to diarrhea and decrease related deaths. There is evidence that ORS may reduce diarrhea specific mortality by up to 93% (Florez et al., 2020). However, this present study observed that prior to nurse-led intervention, only few (36.1%) caregivers agreed to administer ORS immediately diarrhoea starts (after first/second motion of watery stool). This falls short of the 54.6% reported by Olopha & Egbewale (2017) in Ibadan, Nigeria. This difference may be due to sociodemographic variations in the study populations. Whereas, Ibadan is largely an urban settlement, Emohua is more of a rural settlement. Notwithstanding, this also indicates that proper timing of ORS administration to children with diarrhoea as recommended by the WHO and UNICEF is yet to gain full coverage in Nigeria, with the rural settlements showing even lower coverage (Makinde et al., 2020). There is the need to intensify campaigns for achievement of adequate coverage in proper timing of ORS administration during childhood diarrhoea episodes.

Before nurse-led intervention, most caregivers agreed that proper hygiene is vital for prevention of childhood diarrhoea (91.2%), during preparation of ORS (91.9%) as well as use of clean water for ORS preparation (71.0%) and mixing ORS salt with the right proportion of water (85.1%). This study also observed at baseline, that only few caregivers (35.5%) agreed with the disposal of ORS 24 hours after reconstitution as recommended. This could indicate storage of ORS beyond the maximum allowable time and possible re-use upon subsequent diarrhoea episodes leading to failure of rehydration therapy in subsequent diarrhoea episodes. This poses danger to proper home management of childhood diarrhoea in this population. There is some evidence that shows harmful practices like food restriction and reduction or stoppage of breastfeeding during diarrhoea episode (Masiha et al., 2015). In this present study, before intervention, only few caregivers agreed to administer adequate fluid during diarrhoea episode (19.9%) and continue meals during diarrhoea episode (31.7%) while most caregivers agreed to give only solid meals during diarrhoea episode (81.4%). This indicates the wrong belief of the participants that feeding pattern may exacerbate diarrhoea and also shows the need for educational intervention.

Despite the recommendation by the WHO on rational use of drug during diarrhoea, there is evidence of use of drugs unnecessary for diarrhoea. In this present study most, caregivers agreed to administer anti-dairrhoea agents (91.9%) and antibiotics (82.4%) to child during



diarrhoea episode post-intervention. The common administration of anti-dairrhoea agents and antibiotics to children by caregivers calls for concern as drug therapy is unnecessary and even contraindicated, due to the viral origin of diarrhoea in children that can be managed without drug (Matsebula-Myeni, 2019). This is also recipe for the development of antibiotic resistance in these children due to inappropriate use of these antibiotics. It further buttresses the need for educational intervention in this study population.

Nurse-led intervention in this study population achieved statistically significant changes in the proportion of caregivers that demonstrated proper home management of childhood diarrhoea in areas where this was lacking before intervention. There was also a significant increase in the mean childhood diarrhoea home management skill score post-intervention compared to pre-intervention. This agrees with previous studies that reported positive impact of educational intervention on caregiver's management of diarrhoea (De Onis, 2017; Sunanda, et al., 2017). Findings from this present study underscores health education as an important component of health care that is very effective in bringing about significant improvement in management practice of caregivers of children under 5 years of age in respect to childhood diarrhoea. Although it is unclear if these caregivers are able to access publicly available childhood diarrhoea management information, it is evident from this present study that there is still need for nurse-led intervention regardless of information available through different public media. In addition, this study finding buttress the need for nurse-led intervention to be continuous to ensure consistent training and re-training of the caregivers until they are able to fully adopt standard good practice in the management of childhood diarrhoea. It also supports the recommendations for structured education of caregivers as well as the need to reinforce knowledge of caregivers on diarrhoea at frequent intervals (Keusch, et al., 2016).

In conclusion, this study demonstrated inadequacies in childhood diarrhoea home management skills of caregivers in Emohua LGA, Rivers state which improved significantly 4-weeks after nurse-led educational intervention.

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