Effect of Nurse-Led Intervention On Knowledge of Childhood Diarrhoea Among Caregivers in Emohua Local Government Area, Nigeria

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Abstract:

Background: Diarrhoea causes death and morbidity in children under-five years of age. These deaths are preventable by prompt and appropriate home-based management administered by caregivers who are first responders in areas of symptoms recognition and decision to seek care. The effect of nurse-led intervention on knowledge of childhood diarrhoea among 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 the knowledge level of childhood diarrhoea among 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 knowledge was assessed with a thirteen-item instrument on a 2-point scale (0-1) generating an overall knowledge score range of 0-13. 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' knowledge 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 knowledge level of caregivers post intervention compared to pre-intervention in the areas of diarrhoea definition, causes, preventive measures, symptoms, complications and use of ORS and zinc. Mean knowledge score increased significantly from 7.23±3.74 pre-intervention to 12.93±0.35 post-intervention ($t= 25.742$, $p=0.000$).

Conclusion: Caregivers knowledge of childhood diarrhoea improved significantly 6 weeks after nurse-led intervention. Provision of continuous education on childhood diarrhoea for caregivers by community health nurses should be encouraged due to its potential to reduce morbidity and mortality associated with diarrhoea diseases.

Key Word: Childhood diarrhoea, Caregiver, Knowledge, Nurse-led intervention

I. Introduction

Diarrhoeal diseases are identified as major public health concerns, causing morbidity and mortality in children under five years of age in many regions of the world.[1] It currently ranks as the second leading cause of death in children under five years in low- and middle-income countries.[2,3] The burden of diarrhoeal disease adversely affects children in developing countries where the incidence rate of

diarrhoea is high, and attributable to poor personal hygiene, poor sanitation, suboptimal breastfeeding, as well as zinc and vitamin A deficiency.[4] In Nigeria, diarrhoea has been reported to account annually for about forty percent of under-five deaths[5] with high prevalence of childhood diarrhoea reported in the North-South (77.1%) and South-South (64.82%) regions.[6,7]

Home treatment forms a major part of diarrhoea management and has been supported by many studies as the hallmark of diarrhoeal control.[8,9] Caregivers including mothers, fathers and guardians are the first responders in cases of childhood diarrhoea in resource poor settings where there is preponderance of limited access to healthcare. They play an active role in prevention, identification and determination of an appropriate response to diarrhoeal episodes. Previous studies demonstrated that the caregivers' awareness regarding proper diet, causes, symptoms, management, and prevention strategies for childhood diarrhea is very poor.[10] Also, another study showed that a large percentage of children die at home because their caregivers cannot recognize the signs of common childhood illnesses and therefore do not seek appropriate care.[11] Hence, caregivers' knowledge and awareness of childhood diarrhoea is critical for prevention, identification and early treatment of diarrhoeal episodes with the propensity to reduce associated childhood mortality.[12]

Nurse-led intervention in the form of disease management programs have been proposed to provide adequate information on comprehensive care, including strategies for disease prevention, symptoms identification, first-aid management, psychological and social support, and encourage beneficial lifestyle changes.[13] This could serve as an effective strategy for the proper education of caregivers on preventive measures, causes, symptoms and management of childhood diarrhoea thereby reducing diarrhoea associated morbidity and mortality. Therefore, the main objective of this study is to assess childhood diarrhoea knowledge of caregivers in Emohua Local Government Area, Rivers state, Nigeria before and after nurse-led intervention.

II. Material and Methods

This quasi-experimental study was carried out in Emohua Local Government Area of Rivers State after obtaining ethical approval from Babcock University Health Research Ethics Committee (BUREC). 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. Caregivers were selected randomly from 1024 households registered with the Primary healthcare facility within the LGA as obtained from medical records. A total of 304 caregivers were recruited for this study after obtaining a written informed consent.

Study design: Quasi-experimental study
Study Location: The location for this present study was Emohua Community in Emohua Local Government Area of Rivers state, Nigeria.
Sample size: 304 caregivers
Sample size calculation: 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. A 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.
Subjects and selection method: The study participants were selected from households using a combination of sampling techniques. Multistage sampling technique was used to ensure that all the eight villages within Emohua LGA were captured by the study. Purposive sampling technique was used to select only households with under-five children using the primary health care household number statistical records of 1024 households with children under five years within the 8 villages. A proportionate sampling technique was used determine the number of households to be selected from each community while simple random sampling technique was used to select the caregivers from the eight communities.

Inclusion criteria:
Aged 18 years and above.
Caregiver to at least one child under five years of age.
Resident of Emohua LGA.

Exclusion criteria:
Caregiver not willing to give consent

Procedure methodology

A written informed consent was obtained from each participant at enrollment for this study. A pre-tested structured questionnaire was utilized for the study incorporating sociodemographic characteristics and questions on knowledge 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 being exposed to a two-day Nurse-led educational programme on childhood diarrhoea. This study adopted the WHO intervention module of integrated management of childhood illnesses[14] 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.

Statistical analysis

Data obtained was analysed using SPSS version 20 (SPSS Inc., Chicago, IL). Descriptive statistics of sociodemographic data and childhood diarrhoea knowledge were presented using frequencies and percentages. Overall childhood diarrhoea knowledge score was calculated by scoring correct responses 1 and wrong responses 0 given the two-point scale (True/False) used for the 13-item childhood diarrhoea knowledge questions. Knowledge 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 $p<0.05$.

III. Results

A total of 608 questionnaires were administered to caregivers, with 304 questionnaires administered before intervention and 304 administered after intervention. Eight (8) questionnaires were dropped out due to incomplete data either at pre- or post- intervention stage, giving a response rate of 97.4%.

Table no. 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. Two hundred and eighty-two caregivers (95.3%) had between 3-5 children under five years of age and most of them (63.2%) signified rotavirus immunization of their children. Among the caregivers, 63.5% indicated none of their children under 5 years had a history of diarrhoea while 33.8% indicated history of diarrhoea in 1-3 of their children and 2.7% indicated history of diarrhoea in 4-6 of their children.

Table no. 1: Sociodemographic characteristics of study participants

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

	Others	82	27.7
Children < 5 years	1-2	14	4.7
	3-5	282	95.3
Children with diarrhoea	None	188	63.5
	Yes	108	36.5

Table no. 2 shows caregivers knowledge of childhood diarrhoea pre- and post- nurse-led intervention. Prior to nurse-led intervention, 89.9% of the caregivers defined diarrhoea correctly as the passing of frequent loose stool while all the caregivers (100%) did same post-intervention. Dirty foods, unwashed hands and putting dirty things in the mouth were identified as causes of diarrhoea by 80.1% and 100.0% of the caregivers pre- and post- intervention respectively. The erroneous traditional myth regarding teething and growing tall as causes of diarrhoea were correctly dissociated from childhood diarrhoea by 31.4. % and 97.7% of the caregivers pre- and post-intervention respectively. Whereas 60.5% of the caregivers identified fever, stomach pain, gas, changes in appetite, foul smelling frequent watery stool and nausea as signs and symptoms of diarrhoea pre-intervention, 98.6% of the caregivers did same post-intervention. Only 38.5% of the caregivers knew defecating in open spaces, bushes and in streams can lead to outbreak of diarrhoea prior to nurse-led intervention, but following intervention this increased 98.0%. While 47.6% of the caregivers knew diarrhoea causes dehydration with the symptoms weakness, dry mouth, restlessness and dark colour urine before intervention, 99.7% of the caregivers demonstrated knowledge of this after nurse-led intervention.

About 74.0% of the caregivers knew diarrhoea, if not treated, can cause complications that lead to death pre-intervention, however all caregivers (100.0%) were aware of this post-intervention. Washing hands with soap and using hand sanitizers after toileting, blowing nose, changing diaper and before cooking as a means of prevent diarrhoea was known to 54.4% and 100.0% of the caregivers pre- and post- intervention respectively. Whereas 40.2% of the caregivers knew exclusive breastfeeding for the first 6 months can prevent diarrhoea pre-intervention, all the caregivers (100.0%) were aware of this post-intervention. Just about half of the caregivers (48.0%) knew oral rehydration solution and zinc tablet replace lost body fluid during diarrhoea episode before intervention, whereas 99.7% of the caregivers had this knowledge after intervention. Although all the caregivers (100.0%) knew health education could help prevent diarrhoea post-intervention, only 56.8% of the caregivers knew this pre-intervention. All the caregivers (100.0%) agreed that improved sanitation could prevent diarrhoea occurrence post-intervention though only 62.5% agreed pre-intervention. of the while only 38.9% knowledge of rotavirus immunization for diarrhoea prevention was demonstrated by 38.9% and 100.0% of the caregivers pre- and post- intervention respectively.

In this present study, there were statistically significant increases in caregivers knowledge of childhood diarrhoea in all knowledge items assessed following nurse-led intervention.

Table no 2: Caregivers knowledge of childhood diarrhoea pre- and post- nurse-led intervention.

Knowledge items	Pre- (n=296), n(%)	Post- (n=296) n(%)	$\chi 2$	p
Knowledge about definition of diarrhoea	266 (89.9)	296 (100.0)	31.424	0.000
Knowledge about causes of diarrhoea	237 (80.1)	296 (100.0)	63.869	0.000
Knowledge about erroneous traditional myth associated with diarrhoea	93 (31.4)	289 (97.6)	274.641	0.000
Knowledge about symptoms of diarrhoea	179 (60.5)	292 (98.6)	126.974	0.000
Knowledge about proper disposition of feaces in prevention of diarrhoea	114 (38.5)	290 (98.0)	234.063	0.000
Knowledge about dehydration symptoms present in diarrhoea	141 (47.6)	295 (99.7)	200.153	0.000
Knowledge about complications of diarrhoea	219 (74.0)	296 (100.0)	86.106	0.000
Knowledge about preventive measures	161 (54.4)	296 (100.0)	169.767	0.000
Knowledge about the role of exclusive breastfeeding in	119 (40.2)	296 (100.0)	244.991	0.000

diarrhoea				
Knowledge about ORS and zinc use in management of diarrhoea	142 (48.0)	290 (99.7)	198.294	0.000
Knowledge about the usefulness of health education in prevention of diarrhoea	168 (56.8)	296 (100.0)	157.981	0.000
Knowledge about the role of sanitation in prevention	185 (62.5)	296 (100.0)	132.374	0.000
Knowledge about rotavirus vaccination	115 (38.9)	296 (100.0)	253.345	0.000

Table no. 3 shows paired t-test comparing pre-intervention knowledge mean score and post-intervention knowledge mean score of childhood diarrhoea among caregivers. There was a statistically significant increase in the mean knowledge score post-intervention compared to pre-intervention.

Table no 3: Paired t-test showing pre-intervention and post-intervention mean score of knowledge of childhood diarrhoea among caregivers

Time	n	Mean	SD	SEM	t	p
Pre-intervention	296	7.23	3.74	0.22	25.741	0.000
Post- intervention	296	12.93	0.35	0.02		

IV. Discussion

Diarrhoea is the leading cause of death in children under-five years in low- and middle- income countries including Nigeria,[12] with reports of an annual fatality rate of approximately 1.5-2.5 million. Based on the findings of this study, 36.5% of the caregivers reported ongoing diarrhoeal episode in their children under five years of age. Given that each caregiver represents a nuclear family unit within the study site, it may be inferred that the 'family based prevalence' of diarrhoea in this population is 36.5%. This is higher than a two-week prevalence of 8.1% and 10% reported in children less than 5 years of age in a rural area of Akoko North, Ondo State.[15] The difference from this present study may be due to the socio-environmental variation between these two study sites. The communities in this present study are minor riverine areas and the caregivers were mostly into fishing. This therefore increases the likelihood of exposure of the children to water-bodies as well as seafood that could serve as vectors for transmission of diarrhoea causing microorganisms.

Prevention, identification and early treatment of childhood diarrhoea resulting in reduced childhood mortality,[12] are largely dependent on caregivers' knowledge of childhood diarrhoea. Prior to nurse led intervention, caregivers' knowledge level of childhood diarrhoea was largely inappropriate but with intervention an improvement was observed. Ninety-three (31.4%) of the caregivers dissociated teething and growing tall as causes of diarrhoea whereas two hundred and three (68.6%) indicated teething and growing tall as cause of diarrhoea. This is similar to 68.1% reported by Ogbeyi et al[16] and represents a gap in knowledge of childhood diarrhoea that may have been created by local myths associated with the development of the child. Also, only few (38.5%) of the caregivers identified open defecation as a possible source of diarrhoeal outbreak before intervention. This suggests a non-detrimental perception of open defecation in the community thereby implying possible practice of this act. Practice of open defecation could also explain the high 'family based diarrhoea prevalence' in children below 5 years of age observed in this present study. It also supports the report of world health organization[17] that lack of latrine plays a major role in the occurrence of diarrhoea.

Findings of this study also showed that prior to intervention, less than half of the caregivers were aware that exclusive breastfeeding for the first six months can prevent diarrhoea (40.2%). While this shows that caregivers may not be particularly aware of the benefits of exclusive breastfeeding in the first six months, it also suggests change of feeding practice during diarrhoea episodes. This is supported by previous reports of interrupted/decreased/restricted feeding pattern of children by caregivers in India.[18] These caregivers may be of the notion that feeding may exacerbate diarrhoea. Furthermore, less than half of the caregivers in this study identified weakness, dry mouth, restlessness and dark coloured urine as symptoms of dehydration during diarrhoea. Given that dehydration is a major cause of mortality during diarrhoea, inability of caregivers to identify symptoms of dehydration increases the risk of inappropriate response during diarrhoea episode buttressing the need for proper education of caregivers. Pre-intervention findings of

this present study agrees with the report of Mosweu,[19] and demonstrates the need for education of caregivers to increase knowledge of symptoms, causes and preventive measures for childhood diarrhoea.

Following Nurse-led intervention, there were significant increases in caregivers knowledge of childhood diarrhoea in all aspects assessed by this present study. This is indicative of closure in the childhood diarrhoea knowledge gaps identified pre-intervention by nurse-led intervention. This agrees with the report of Sunanda et al.[10] However, nurse-led intervention did not yield maximum penetration (100.0%) in all areas of knowledge of childhood diarrhoea in this study population. This may be due to the time-lag between nurse-led intervention and post-intervention diarrhoea knowledge assessment. In a previous study,[20] lower retention of childhood diarrhoea knowledge gained post-intervention was reported two years after compared to 2 months after. Fall-outs in caregivers, knowledge post-intervention are indicative of the need for nurse-led intervention to be continued and sustained. It also supports the need to reinforce knowledge of caregivers on diarrhoea at frequent intervals to ensure sustainability of the knowledge gained from nurse-led intervention.[12] Further studies are recommended to determine the optimum time for re-intervention as well as effective frequency of re-intervention.

Improvements in caregivers' knowledge of diarrhoea definition, symptoms, causes and preventive measures following intervention in the study population was also demonstrated by statistically significant increase in mean knowledge score post-intervention compared to pre-intervention. Hence this study corroborates reports that nurse–led intervention programme significantly improves knowledge of childhood diarrhoea among caregivers. Therefore, it's important that community health nurses provide continuous education on knowledge of diarrhoea among caregivers within the community to enhance caregivers' knowledge with the potential to reduce infant diarrhoeal diseases associated morbidity and mortality.

V. Conclusion

In conclusion, this study revealed that several aspects of knowledge of childhood diarrhoea among caregivers in Emohua LGA, Rivers state were poor but improved significantly 4-weeks after nurse-led educational intervention.

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