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## Diarrhoea Discuss Corner: A School-Based Intervention to Promote Basic Diarrhea Awareness and Common Control Practices Among School-Age Children

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### Abstract

**Background:** Diarrhoea remains a disease of public health importance in Nigeria. There have been limited studies accounting for the microorganisms responsible for causing diarrhoea among children and also no specific and deliberate strategies and programmes in primary schools in Nigeria focused on promoting basic diarrhoea awareness and control practices among children of primary school age. Therefore, this study assessed the effectiveness of diarrhoea discuss corner (DDC), which is a school-based intervention in the promotion of basic diarrhea awareness and common control practices among children of primary school age.

**Methods:** A quasi-experimental design was employed. The DDC was designed and set up in the intervention school (with 103 children) while the control school (with 103 children) was offered diarrhoea health talk. Two variables were presented in this study The Independent Variable, which was the intervention and the dependent Variables that included awareness of diarrhea causes, symptoms, prevention, and management practices. Primary data collected using pre-tested structured questionnaires. Data was analyzed using Statistical Package – Stata version 14.1 (Stata Corp, College Station, TX, USA).

**Results:** Results showed that there was a significant increase in the knowledge about diarrhoea-causing microorganisms;  $p = 0.0003$ , awareness on common preventive and management practices was ( $p = 0.0202$ ) among children in the intervention primary school compared to those in the control primary school this made the overall knowledge increase to be (intervention vs. control):  $p = 0.0071$ .

**Conclusion:** This study demonstrated the potential of the DDC in promoting basic diarrhoea awareness and common preventive practices among children.

**Keywords:** Diarrhoea, diarrhoea discuss corner, diarrhoea-causing microorganisms, control primary schools, intervention primary schools



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## Introduction

Diarrhoea is one of the commonest health problems militating against the development of infant and young children in all developing nations, Nigeria inclusive. It is also a common problem of early childhood which can cause death and diseases like malnutrition among many others. However, Diarrhoea is widely known to be one of the major childhood diseases that lead to the children to their early grave; and it is incidence use to be much among family members suffering from higher rate of esteem poverty in most of the communities. Diarrhoea counts directly and indirectly for between a quarter and half of all sickness and death of children from 0 –59 month of age i.e birth to five years in the developing nation.<sup>6</sup> As a result of this, the researcher seems to have agreed that diarrhoea constitutes a great problem nationally and globally. The disease is one of the most common children's illnesses as pointed out in this research earlier. However, the disease is normally reported to have occurred in the area of higher rate of poverty, dirty environment, poor nutritional status, traditional behaves and taboos and lastly an area exposed to contaminated cycle. Diarrhoea ranks as major killer disease in paediatric age group. Diarrhoea is of the cause very serious disease or illness in newborn and young children those cannot create small upset in fluids and electrolyte balance in the body. This is because they are more confronted by the danger of disease i.e diarrhoea disease.

Globally, diarrhoeal diseases remain a significant cause of mortality, particularly among children under five. According to the World Health Organization (WHO), diarrheal disease is the third leading cause of death in children aged 1-59 months, resulting in approximately 443,832 deaths annually in this age group alone. In total, nearly 1.7 billion cases of childhood diarrheal disease occur each year globally.<sup>13</sup> In Nigeria, diarrhoea is a major health issue, contributing significantly to child mortality. In 2021, diarrhoea accounted for about 9% of all deaths among children under the age of five, translating to approximately 444,000 child deaths worldwide. Nigeria, being part of sub-Saharan Africa, faces a considerable burden from this disease, with substantial mortality rates despite available treatment solutions like oral rehydration therapy. Specifically, in Bayelsa State, while precise local data is scarce, it is known that the region faces challenges similar to other parts of Nigeria due to inadequate access to clean water,

sanitation, and healthcare services. Nationwide efforts are ongoing to address these issues through various health interventions and policies aimed at reducing the incidence and impact of diarrhoeal disease.<sup>7</sup>

Overall, most countries noted a reduction of diarrhoeal disease between 2000 to 2015, but the burden of diseases was distributed unequally across the continent. According to the study, 9.4% of all the severe cases of diarrhoea (2.8 million cases; 95% credible interval, 2.39 million to 3.3 million) in 2015 occurred in two countries: Ethiopia and the Democratic Republic of Congo. Nigeria had the most variance of disease rates among African countries, with estimates ranging from 1.6 deaths per 1,000 children in Bayelsa state in the southwest to 9.5 deaths per 1,000 in Yobe state in the northeast. Certain parts of the Central African Republic, Gabon, Ivory Coast, Nigeria, and Zimbabwe saw disease increases over the 15 years. The highest diarrhoea-related case fatality rates in Africa were in Lesotho (18 cases per 10,000 children; 95% credible interval, 12 to 25), Mali (17, 12 to 24), Sierra Leone (16, 11 to 23), Benin (16, 11 to 21), and Nigeria (16, 11 to 21).<sup>8</sup>

Diarrhoea is a common disease among school pupils in Nigeria and other tropical endemic countries. In fact, in a previous study in Bayelsa State, South South Nigeria, by Duru et al,<sup>7</sup> the pattern and outcome of admissions in the paediatric emergency ward of the Niger Delta Teaching Hospital Okolobiri, Bayelsa State from 2008 to 2011 showed that out of the 1,756 patients who were admitted into the ward during this period, 1,386 (78.9%) of them were below the age of five and one of the major causes of admissions was diarrhoea, which accounted for 389 (22.2%) of the total admissions. In addition, of the 133 (7.6%) of the children who died, diarrhoea was responsible for 11.3% of the deaths. This therefore shows that diarrhoea exerts a serious health burden to the populace of Bayelsa State.<sup>5</sup> It is quite common for primary schools to record absenteeism of pupils and loss of school days due to diarrhoea. However, diarrhoea prevention and treatment intervention programmes at present less commonly focus on children of primary school age (those between the ages of 6 and 13 years). Most diarrhoea control interventions for children only focus on the under-five children. This is despite the fact that children of primary school age are an important group that should also be essentially given priority attention in diarrhoea control interventions.



Evidence has shown that school pupils are powerful carriers of messages taught in schools. They openly share experiences and materials with their families, peers and the surrounding community. They serve as a medium of communication to their respective households and communities including health messages.<sup>3</sup> They also tend to influence activities at home by practicing what they learnt at school.

There are very limited studies accounting for the microorganisms responsible for causing diarrhoea among children of this age group. There are also no specific and deliberate strategies and programmes in primary schools in Nigeria and probably in other diarrhoea endemic areas focused on promoting basic diarrhoea awareness and control practices among children of primary school age. This is even though a previous UNICEF report had observed that diarrhoea education on knowledge communicated in schools has the potentials of permeating the community from pupils.<sup>9</sup> Furthermore, school-based interventions have been used and judged successfully in child nutrition improvements. It has been suggested that equipping children with appropriate basic awareness about health issues and common ways to control them could translate to getting them empowered to promote community healthy life using the approach they learned in schools.<sup>11</sup> This study therefore aimed to design and assess the effectiveness of a school-based intervention named diarrhoea discuss corner (DDC) in promoting basic diarrhoea awareness and common control practices among children of primary school age in Sagbama, Bayelsa State South South Nigeria.

## Methodology

### Study design

This is a quasi-experimental study that was used in assessing the effectiveness of the DDC in promoting basic diarrhoea awareness and common control practices among children of primary school age in Sagbama, Bayelsa State, South - South Nigeria. Two primary schools were involved in this study, of which DDC was introduced in one school (intervention) while health talk was offered to the other primary school (control). These two schools were randomly selected from the register of public primary schools in Sagbama Local Government Area of Bayelsa State after stratification into the different constituencies in Sagbama LGA. This was done to avoid contact between

pupils of the respective schools, preventing exchange of experience or ideas concerning the project. Only the pupils in the primary 4 and 5 classes were included in the study due to their abilities to read, comprehend and draw more than pupils in the other classes.

### Study setting

The study was carried out in two primary schools in Sagbama Local Government Area, South South Nigeria. Sagbama has typical tropical rain forest vegetation with two seasons, the rainy season (February/March–October) and the dry season (October–March). The temperature is 30.8°C and the humidity is 81%. These conditions are typical for diarrhoea endemicity. The two primary schools involved in the study were the Community Primary School Bolou – Orua (intervention primary school), and the Community Primary School, Ebedebiri (control primary school). These areas are all within the Sagbama LGA, South South Nigeria. The Bayelsa State Universal Basic Education Board manages both schools.

### Study population and sample size

There was a total of 1,135 pupils at Community Primary School, Ebedebiri and 1,156 pupils in Community Primary School, Bolou -Orua. Since the study design required pupils that could read and understand the displays, only the pupils at primary 4 and 5 classes were included in the study comprising 164 pupils from the Community Primary School, Bolou -Orua and 140 pupils from the Community Primary School, Ebedebiri. To determine the study sample size, we assumed 50% diarrhoea incidence and targeted a 10-percentage point increase in knowledge about diarrhoea among the pupils over the period of three months, with 5% level of statistical significance ( $\alpha$ ) and 80% statistical power of the study ( $1 - \beta$ ), leading to sample size of 103 for each group.

### Sampling technique

At first, schools in Sagbama were stratified into those located in Sagbama constituency one and those located in Sagbama constituency two as captured in the register of primary schools in Sagbama LGA, South South Nigeria. One school was then randomly selected in each group through balloting, leading to the selection of Community Primary School, Ebedebiri and Community Primary School, Bolou-Orua all in Sagbama LGA, Bayelsa State, South South Nigeria.



### **The intervention (Diarrhoea discuss corner)**

The Diarrhoea Discuss Corner (DDC) was designed and introduced only in the primary 4 and 5 classes of Community Primary School, Bolou-Orua, Sagbama, Bayelsa State Nigeria, selected as the intervention school. The DDC was set up in a convenient corner at the back of the selected classrooms with a height of 4ft from the floor. In this corner, simple posters, messages and drawings about diarrhoea were arranged and displayed for easy access for the pupils. Prior to setting up the DDC, an oral assessment was first conducted on the pupils to ascertain their attractions and how they wanted the corner to look like. This helped inform the design and materials used for designing the DDC. The messages displayed include those on the causes, symptoms, microorganisms responsible for causing diarrhoea in very simple and plain language and playful manner. Other materials displayed include a tippy tap for hand washing, liquid soap and disposable towels within the corner. The pupils were allowed access to read and experience the DDC at designated periods and during their free periods, with their classroom teachers giving explanations when necessary. Each pupil who had read and understood the messages wrote about or made their own drawing on the diarrhoea message and the best ones went into the DDC space. This also made the pupils to exhibit creativity through this process. The DDC was displayed for a period of two months (2 months) and was followed by post-intervention data collection, two weeks later

### **Control**

The control group comprised of primary 4 and 5 class pupils at Community Primary School, Ebedebiri, Sagbama, Bayelsa State Nigeria. They only received the health talks on diarrhoea on their moral instruction days. A trained Environmental health officer delivered the health talk.

### **Data collection**

Data was collected pre- and post-intervention using a structured pre-tested questionnaire. Initially, self-administration of the questionnaire to the pupils was a challenge. However, the respective classroom teachers were trained and involved as facilitators in this process. They helped in distributing as well as clearly and slowly reading out the questions and options to the pupils for them to tick their preferred options. Explanations were made to the pupils including using the local language

where and when necessary. Completed questionnaires were checked and collected immediately after completion by the classroom teachers who properly arranged and transmitted them to the researcher who closely supervised the entire process.

The study examined the effectiveness of the Diarrhoea Discuss Corner (DDC) intervention on children's awareness and practices related to diarrhoea. The independent, dependent, and control variables were measured using structured questionnaires and observations.

### **Independent Variable**

Diarrhoea Discuss Corner (DDC) intervention  
Measurement: The presence of the intervention (Yes = intervention school; No = control school). The intervention school had a dedicated corner with posters, messages, and hand washing facilities, while the control school received only a health talk.

### **Dependent Variables (Outcome Measures)**

The study measured changes in the following outcomes before and after the intervention

#### **Awareness of diarrhoea**

Measurement: Responses to knowledge-based questions on diarrhoea, its causes, symptoms, and transmission. Measured in nominal terms (Yes/No).

#### **Knowledge of microorganisms causing diarrhoea**

Measurement: Assessed by asking pupils to identify germs/bacteria/viruses as causes of diarrhoea. Responses were recorded as correct or incorrect.

#### **Awareness of diarrhoea symptoms**

Measurement: Pupils were asked to identify symptoms such as frequent loose stools, stomach cramps, dehydration, and fever. Measured using multiple-choice responses (correct vs. incorrect).

#### **Hygiene practices related to diarrhoea prevention**

Hand washing frequency: Measured on an ordinal scale (Always, Sometimes, Rarely, Never).

Hand washing timing: Measured by asking pupils when they washed their hands (e.g., before eating, after using the toilet).



Hand washing duration: Assessed by asking how long they washed their hands with soap (5 seconds, 10 seconds, 20 seconds, or 1 minute).

### Data analysis method

Data was analysed using the Statistical Package for Social Sciences version 23.1 (Stata Corp, College Station, TX, USA). Initial data analysis included construction of frequency distribution based on responses to questions. The study generated quantitative primary data through structured pre- and post-intervention questionnaires administered to primary school pupils. The data collected were:

**Categorical (Qualitative) Data:** These include variables such as gender, class level, caregiver type, and awareness of diarrhea (Yes/No responses).

**Ordinal Data:** These include frequency-based responses such as hand washing practices (Always, Sometimes, Rarely, Never).

**Continuous (Quantitative) Data:** These include knowledge improvement scores (measured before and after the intervention).

The effectiveness of the Diarrhoea Discuss Corner (DDC) intervention was assessed using pre- and post-intervention comparisons in both the intervention and control groups with the aid of statistical tests to measure the increase in awareness and hygiene practices. The data was carefully examined and non-parametric method was used to test differences in the data. Wilcoxon signed rank test was used to test for paired differences between the pre and post-intervention responses for the intervention and control schools, respectively. Wilcoxon rank-sum test (Mann–Whitney U test) was also used to compare post-intervention scores in the two primary schools of study, so as to establish the effect of DDC intervention. Statistical analysis was performed at 5% significant level. Although non-parametric tests were used due to the nature of the data, the mean was chosen over the median for knowledge scores because it provides a more interpretable, sensitive, and comprehensive measure of overall changes in awareness and hygiene practices.

### Justification for the use of a non-parametric test

A non-parametric approach was the best choice due to ordinal data measurement, potential skewness, small sample size, and the need for paired comparisons. This

ensured a more reliable and valid analysis of the intervention's effectiveness.

### Manipulation of Data to Obtain the Mean Score

The mean score in this study was calculated to measure changes in knowledge, awareness, and hygiene practices before and after the Diarrhoea Discuss Corner (DDC) intervention. Below is a breakdown of how the data was manipulated to obtain the mean scores:

#### 1. Data Collection and Scoring System

The study used a structured pre-tested questionnaire to collect data on pupils' knowledge and hygiene practices before and after the intervention.

Responses were scored numerically based on correctness:

Correct answers (e.g., identifying the correct microorganism causing diarrhea) received 1 point.

Incorrect answers received 0 points.

For frequency-based responses (e.g., handwashing practices), ordinal values were assigned scores (e.g., Always = 4, Sometimes = 3, Rarely = 2, Never = 1).

#### 2. Summation of Individual Scores

After assigning numerical values, each pupil's total score was calculated by summing up their responses across all relevant questions.

This process was done separately for:

Pre-intervention scores (before the DDC exposure).

Post-intervention scores (after the DDC exposure).

#### 3. Mean Score Calculation

The mean score was obtained using the formula

$$\text{Mean Score} = \frac{\sum X}{N}$$

Where:

$\sum X$  = Sum of all individual scores

$N$  = Total number of pupils in each group

This was done for

Pre-intervention mean score (baseline knowledge before exposure to DDC).

Post-intervention mean score (improvement in knowledge after exposure to DDC)

#### 4. Group Comparisons

The mean scores were calculated separately for:

Intervention school (DDC group)

Control school (health talk group)

The differences between pre- and post-intervention means were analyzed using:



Wilcoxon signed-rank test (to compare pre- and post-scores within each group).

Mann–Whitney U test (to compare post-scores between the intervention and control groups).

### 5. Presentation of Results

The final mean scores were reported along with their standard deviations (SD) to indicate variability.

Example from the study results:

#### Intervention group:

Pre-intervention mean score: 4.011 (SD = 10.079)

Post-intervention mean score: 91.911 (SD = 5.361)

#### Control group:

Pre-intervention mean score: 39.789 (SD = 6.397)

Post-intervention mean score: 60.967 (SD = 6.219)

#### Ethical considerations

Permission for this study was obtained from the heads of the two primary schools involved. Informed consent was sought and obtained from the parents or guardians of the participating school children. Ethical approval was given by the Bayelsa State Ministry of Education, Yenagoa, Bayelsa State, Nigeria.

#### Results

The study sought to collect data from two hundred and six (206) pupils from two primary schools namely; Community Primary School, Ebedebiri (Control) and Community Primary School, Bolou-Orua both in Sagbama Local Government Area of Bayelsa State, Nigeria. The study achieved a response rate of 100% as all the pupils participated in the study.

**Table 1:** Characteristics of the study Pupils'

Variables	Control School Ebedebiri (n=103)	Primary CPS	Intervention Primary School CPS Bolou-Orua (n=103)
<b>Age Group</b>			
6 – 8	43(41.7)		45 (43.7)
9 – 11	60 (58.3)		58 (56.3)
Total	103 (100)		103 (100)
<b>Gender</b>			
Male	36 (34.9)		39 (37.9)
Female	67 (65.1)		64 (62.1)
Total	103 (100)		103 (100)
<b>Class</b>			
Primary 4	48 (46.6)		46 (44.7)
Primary 5	55 (53.4)		57 (55.3)
Total	103 (100)		103 (100)
<b>Caregiver type</b>			
Parents	57 (55.3)		58 (56.3)
Guardian	46 (44.7)		45 (43.7)
Total	103 (100)		103 (100)
<b>Religion of family</b>			
Christianity	92 (89.3)		93 (90.3)
Muslim	11 (10.7)		10 (9.7)
<b>Total</b>	<b>103 (100)</b>		<b>103 (100)</b>

Source: Authors Survey Data 2024, SPSS output version 23.0

A total of 206 pupils were included in the study with 103 each for the Diarrhoea discuss corner intervention school (Community Primary School, Bolou-Orua) and the control school (Community Primary School, Ebedebiri) where health talk on diarrhoea was offered. The basic characteristics of the pupils (Table 1) were such that 43 (41.7%) were 6–8 years, [43 (41.7%) in the control primary school and 45 (38.8%) in the intervention primary school]; 118 (57.3) were between 9 and 11 years with 60 (58.3%) in the control and 58 (56.3%) in the intervention school. The females were altogether 131 (63.6%), comprising 67 (65.1%) from Community Primary School, Ebedebiri and 64 (62.1%) from Community Primary School, Bolou-Orua. The pupils in primary 4 in the control and intervention primary schools were 46.6 and 44.7%, respectively. The primary 5 class pupils were 53.4% in Community Primary School, Ebedebiri and 55.3% in Community Primary School, Bolou-Orua.

About 55.8% of the study pupils resided with their parents, comprising 55.3% at Community Primary School, Ebedebiri and 56.3% at Community Primary School, Bolou-Orua. The pupils were predominantly from Christian families (89.8%), with 89.3% at Community Primary School, Ebedebiri and 90.3% at Community Primary School, Bolou-Orua.

**Table 2:** Awareness about baseline knowledge of Diarrhoea

Variables	Control		Intervention	
	Primary School Ebedebiri (n=103)	CPS (n=103)	Primary School Bolou-Orua (n=103)	CPS (n=103)
<b>Knowledge about diarrhoea</b>				
Yes	45 (43.7)		47 (45.6)	
No	58 (56.3)		56 (54.4)	
Total	103 (100)		103 (100)	
<b>Source of information about diarrhoea</b>				
Parents/Guardians	36 (34.9)		43 (41.8)	
School	41 (39.8)		39 (37.9)	
Friends	12 (11.7)		7 (6.8)	
Radio/Television	9 (8.7)		11 (10.7)	
Others (e.g. health centre, hospitals, etc)	5 (4.9)		3 (2.9)	
<b>Previous experience of diarrhoea</b>				
Yes	79 (76.7)		81 (73.8)	
No	13 (12.6)		11 (10.7)	
Not Sure	11 (10.7)		11 (10.7)	

Source: Authors Survey Data 2024, SPSS output version 23.0

Diarrhoea awareness was low among the pupils. Table 2 shows that 43.7% of the pupils in the control primary schools and 45.6% of the pupils in the intervention primary schools knew about diarrhoea and the major sources of information included parents and guardians at home (38.3%) and school (38.8%). About 73.8 and 76.7% of the pupils from the intervention and control primary schools, respectively, had also experienced diarrhoea in the past.

**Table 3:** Awareness about the symptoms and microorganisms causing diarrhoea

Variables	Control School Ebedebiri n = 103		Primary Intervention CPS Primary School Bolou-Orua (n = 103)	
	Pre-test	Post-test	Pre-test	Post-test
<b>Causes of Diarrhoea</b>				
Drinking dirty water	28(27.2)	23 (22.3)	34 (33.0)	4 (3.9)
Eating spoilt food	11(10.7)	5 (4.9)	9 (8.8)	2 (1.0)
Not washing your hands	20(19.4)	9 (8.7)	13 (12.6)	3 (2.9)
Germ/bacterial/virus es/parasites	44(42.7)	66 (64.1)	47 (45.6)	94 (92.2)
<b>Do Microorganisms cause diarrhoea?</b>				
Yes	61(59.2)	68 (66.0)	57 (55.3)	98 (95.1)
No	42(40.8)	35 (34.0)	46 (44.7)	5 (4.9)
<b>Do you know the name of the microorganism that causes diarrhoea?</b>				
Yes	10 (9.7)	17 (16.5)	12 (11.7)	48 (46.6)
No	93 (90.3)	86 (83.5)	91 (88.3)	55 (53.4)
<b>What are some of the symptoms of diarrhoea caused by microorganisms?</b>				
Frequent loose stools	38 (36.9)	26 (25.2)	36 (35.0)	24 (23.3)
Stomach cramps	43 (41.8)	62 (60.2)	50 (48.5)	70 (68.0)
Dehydration	9 (8.7)	7 (6.9)	8 (7.8)	6 (5.8)
Fever	13 (12.6)	8 (7.7)	9 (8.7)	3 (2.9)

Source: Authors Survey Data 2024, SPSS output version 23.0

Table 3 indicates the pre- and post-intervention awareness about the symptoms and microorganisms responsible for causing diarrhoea among the study school children. At baseline, only 42.7% of the pupils at the control school were able to identify germs/bacteria/viruses and parasites as the cause of diarrhoea but that increased to 64.1% at post-intervention. At the intervention school, however, the results were 45.6% at pre-intervention and 92.2% at post-intervention, respectively. In terms of the symptoms of diarrhoea that was identified, at pre-intervention (41.8% at control school and 48.5% at intervention school) and post-intervention (60.2% at control school and 81.6% at intervention school) reported that one of the symptom of diarrhoea is stomach cramp while at pre-intervention (36.9% at control school and 35% at intervention school) and post-intervention (25.2% at control school and 23.3% at



intervention school) also reported that one of the symptom of diarrhoea is frequent loose stools.

**Table 4:** Hygiene Practices to Prevent Microorganisms

Variables	Control Primary School CPS Ebedebiri (n = 103)		Intervention Primary School CPS Bolou – Orua (n = 103)		Effect Size (Cohen's H)
	Pre - test	Post - test	Pre - test	Post - test	
How often do you wash your hands with soap?					
Always	34 (33.0)	40 (38.8)	37 (35.9)	56 (54.4)	- 0.374
Sometimes	26 (25.2)	32 (31.1)	25 (24.3)	42 (40.8)	- 0.355
Rarely	35 (34.0)	25 (24.3)	33 (32.0)	3 (2.9)	0.860
Never	8 (7.8)	6 (5.8)	8 (7.8)	2 (1.9)	0.290
When do you usually wash your hands?					
Before eating	37 (36.0)	40 (38.8)	36 (35.0)	60 (58.3)	- 0.471
After using the toilet	43 (41.7)	45 (43.7)	40 (38.8)	43 (41.7)	- 0.059
After playing outside	23 (22.3)	18 (17.5)	27 (26.2)	0 (0.0)	1.075
How long should you wash your hands with soap and water to remove microorganisms?					
5 Seconds	11 (10.7)	9 (8.7)	12 (11.6)	0 (0.0)	0.695
10 Seconds	45 (43.5)	25 (24.3)	46 (44.7)	2 (1.9)	1.188
20 Seconds	37 (35.9)	58 (57.3)	36 (35.0)	101 (98.1)	- 1.599
1 Minute	10 (9.7)	10 (9.7)	9 (8.7)	0 (0.0)	0.599

**Table 5:** Effect of Diarrhoea discuss corner (DDC) on basic diarrhoea awareness among study school children

Description	Mean Score (SD)	Rank Sum	P-Value
<b>Control</b>			
<b>CPS Ebedebiri</b>			
Pre-intervention	39.789 (6.397)		
Post-intervention	60.967 (6.219)		
Wilcoxon Signed-Rank Test		45	0.0071
<b>Intervention</b>			
<b>CPS Bolou-Orua</b>			
Pre-intervention	4.011 (10.079)		
Post-intervention	91.911 (5.361)		
Wilcoxon Signed-Rank Test		45	0.0071
Control versus Intervention (At post intervention)			
Wilcoxon Signed-Rank Test		171	0.0003

Notes: SD= Standard Deviation



The pre- and post-intervention awareness about the prevention and management of diarrhoea is shown in Table 4. The pre- and post-intervention responses on diarrhoea prevention awareness by pupils in the control school were as follows: “Always washing hands with soap and water” (33% pre-intervention vs 38.8% post-intervention) and “sometimes do wash their hands with soap and water” (25.2% pre-intervention vs 31.1% post-intervention). Whereas at the intervention school, the responses were as follows: “Always washing hands with soap and water” (35.9% pre-intervention vs 54.4% post-intervention) and “sometimes do wash their hands with soap and water” (24.3% pre-intervention vs 40.8% post-intervention). Furthermore, the responses on when they washed their hands were 36% (pre-intervention) versus 38% (post-intervention) at the control school reported to wash their hands before eating and 35% (pre-intervention) versus 58.3% (post-intervention) at the intervention school also reported to wash their hands before eating. The awareness about how long should the hands be washed with soap and water in order to kill off the microorganisms causing diarrhoea was 35.9% (pre-intervention) versus 57.3% (post-intervention) among the pupils’ that reported that hand washing should be at least 20 seconds at the control school and 35% (pre-intervention) versus 98.1% (post-intervention) among the pupils’ that reported that hand washing should be at least 20 seconds at intervention school.

Also, the positive Cohen's *h* values indicate a decrease in the behavior like hand washing duration. Negative Cohen's *h* values indicate an increase in the behavior. The largest effect sizes were observed for hand washing duration (20 sec, 10 sec, and 5 sec) and washing hands after playing outside, which indicates that the intervention had a strong impact in improving the knowledge, awareness and practice of proper WASH among the pupils.

Table 5 depicts the effect of DDC on overall basic diarrhoea awareness among the study school children. At the control school, overall basic knowledge about diarrhoea increased from 39.8% at pre-intervention to 61% at post-intervention while at the intervention school, it increased from 44% at pre-intervention to 91.9% at post-intervention. Significant difference ( $p = 0.0077$ ) was obtained between scores at pre- and post-intervention in both schools. Significant difference ( $p = 0.0003$ ) was obtained for post-intervention scores

between the two primary schools studied, indicating the positive effect of the intervention (Table 5).

## Discussion

Children of primary school age learn better from what they observe and participate in, compared with usual classroom teaching involving lectures, recitations or seatwork activities.<sup>3</sup> Knowledge and awareness at that age can translate to character/attitude/behaviour formation. This phenomenon could be applied to the control of infectious diseases such as diarrhoea when children are empowered with the necessary basic awareness and knowledge about the disease and common ways to prevent and manage it. This could in turn translate to their participation in disease prevention and control in their households and communities through driving of conversations and influencing activities by applying or practicing what they learnt in school.

The DDC aims to use this approach in promoting basic diarrhoea awareness and common preventive and management practices among children of primary school age and subsequently make them contributors in the malaria control/elimination efforts in their homes and communities.

In this study, the awareness level of diarrhoea among the pupils at both intervention and control primary schools was quite low. This was not surprising, as even though majority of them had experienced diarrhoea in the past they did not actually know much about the illness. Low awareness about diarrhoea has similarly been reported among children of this age category in a previous Nigerian study (8). Also, knowledge about specific diarrhoea issues and concepts was quite low among the pupils at baseline in both our intervention and control schools. For instance, many of the children could not properly identify the cause of diarrhoea and the causative agent and so on. It was, however, observed that there was an enhancement of knowledge about these specific concepts regarding diarrhoea at post-intervention. Significant knowledge increase was found for both the intervention and control groups. This is not unexpected, since it is believed that school-based approaches such as health education are effective in instilling knowledge about diseases.

Some of the pupils could not identify germs/bacteria as the cause of diarrhoea prior to the intervention. Some of



them thought that dirty environment and drinking contaminated water, eating dirty food are some of the ways diarrhoea could be transmitted but they had no idea that it was the microorganisms in the contaminated water and dirty food that actually cause the diarrhea. It has been reported that frequent experience with diarrhoea could elicit different wrong perceptions about the disease, particularly among people that are not informed (8). This could likely be the case for these children who may not have thought that a sickness like diarrhoea could be severe. Similarly, despite the fact that majority of the pupils had suffered from diarrhoea, a significant number still could not match the correct symptoms to diarrhoea as well as its ability to lead to fatal situations, prior to the intervention. The same pattern was also observed regarding the low awareness of the children on the ways to prevent and manage the disease including awareness about its prevention and frequent hand washing practices as been recommended for prevention. Poor perception and misconception about diarrhoea symptoms, prevention and management hinder efforts towards effective control and have been found to be influenced by the level of knowledge and awareness about the disease.<sup>1</sup> Knowledge and awareness translate to correct perceptions and elimination of misconceptions and encourage behaviour change necessary for effective control of the disease.<sup>6</sup> Our study found that after the introduction of the intervention, the general knowledge about diarrhoea as well as awareness about the microorganisms responsible for causing the disease increased for both study groups. However, the children exposed to the DDC had a more significant increase in their basic awareness about diarrhoea compared to those that just received health talk. This possibly implies that the DDC approach had more effect in instilling awareness about diarrhoea in the children in the intervention group than the health talk did for those in the control group. The use of visual aids (drawings and posters), the participatory and interactive nature as well as the strategic classroom location of the intervention are likely contributors to this effect. Visual aids and participatory learning have been observed to be better ways of imbibing knowledge in children compared to lectures.<sup>3</sup>

There are common practices at home to at least reduce the rate of diarrhoea occurrence and which children can engage in. These include frequent hand washing with soap and under running water, washing of hands after

using the toilet. Others are immediate self-report to parents when the child feels ill and not hesitating to adhere to instructions concerning medications including completing their dosages and so on. A very significant number of our study children did not adhere to these common practices prior to the intervention. Specifically, many of the children did not wash their hands before eating and many did not also self-report to their parents immediately when they felt sick, they would rather wait till it was serious while some would not report at all until their parents noticed the illness. Previous studies observed similar attitudes, particularly lack of interest in hand washing practices among children. While it may be considered the responsibility of parents/guardians to make their children maintain good hygiene, sanitation and be conscious enough to recognize when their children are ill to take prompt action, it is equally important to instill in the children the consciousness to do what they can at their age to protect themselves as well as to report to someone once they feel ill. These will help in the timelier management and effective control of diarrhoea and other diseases in children. The consciousness to do these can be instilled through deliberate methods targeted at inculcating the awareness in the child that could encourage positive perceptions, behaviours and practices. In this study, the proportion of the study children who would wash their hands before and after eating, wash their hands after using the toilet and wash their hands after playing outside increased significantly at post-intervention. These improvements were more prominent among the children exposed to the DDC than those who received the health talk alone. This outcome aligns with studies such as Chard et al. (2020), who found that visual and storytelling aids have a profound impact on children's learning and behaviour, especially in health-related areas.<sup>4</sup>

### **Implications of the findings**

The results of this study have very useful implications for the primary healthcare and development of school children and the society at large particularly in poor endemic areas. This is because children empowered in this way could become very much aware and proactive about malaria prevention and control. Such children could also become diarrhea conversation drivers and behavior change agents in their families and communities, thereby contributing to efforts towards malaria elimination. Furthermore, this approach could help instill inquisitiveness and health consciousness



among school children not just for malaria but also for other common childhood diseases and also motivate them to adopt positive practices to prevent disease and maintain good health. This will ensure the maintenance of a healthy population of school children, which will in turn positively affect their overall performance in school. Other important attributes of this approach are that it is simple, inexpensive and does not interfere with normal classroom learning. It also has the potential for drawing the needed attention towards support and implementation of school health programs that are currently neglected in Nigeria and other developing/underdeveloped countries.

### **Strengths and limitations of the study**

#### **Strength**

This study has several strengths that contribute to its validity and impact. First, it employed a quasi-experimental design with pre- and post-intervention assessments, allowing for a clear evaluation of the Diarrhoea Discuss Corner (DDC) intervention's effectiveness in promoting awareness and behavioral change. By using a structured and pre-tested questionnaire, the study ensured the reliability of the data collected.

Another key strength of the study is its participatory and interactive approach. Unlike traditional health talks, which are often passive, the DDC intervention actively engaged children through visual materials, drawings, and interactive discussions. This hands-on learning method has been shown to be more effective in knowledge retention and behavior change, particularly among young learners.

Furthermore, the study achieved a 100% response rate, indicating strong participation and commitment from both pupils and teachers. This high level of engagement enhances the reliability of the study's findings. Additionally, the use of Wilcoxon signed-rank test and Mann-Whitney U test for statistical analysis ensured robust and non-parametric validation of the intervention's impact, making the results statistically sound.

Lastly, the cost-effectiveness and scalability of the intervention make it a promising model for school-based health education in other resource-limited settings. Since the DDC requires minimal resources and can be

integrated into existing school curricula, it has the potential to be widely implemented to improve hygiene practices and reduce diarrhoea incidence among schoolchildren.

#### **Limitations of the Study**

Despite its strengths, the study has some limitations. One major limitation is its short duration. The intervention was implemented over a two-month period, making it difficult to assess long-term retention of knowledge and sustained behavioral changes. Future studies should consider a longer follow-up period to evaluate the lasting impact of the DDC on children's hygiene practices.

Additionally, the study relied on self-reported data, which may have been influenced by social desirability bias. Pupils might have provided responses that they believed were expected rather than their actual behaviors, leading to a possible overestimation of the intervention's effectiveness. Observational methods or objective hygiene assessments could help address this limitation in future research.

Another limitation is the lack of generalizability beyond the study population. The study was conducted in two primary schools in Sagbama, Bayelsa State, Nigeria, and while the findings are valuable, they may not be fully applicable to other regions with different cultural, environmental, or socioeconomic conditions. A larger, multi-location study would help determine the broader applicability of the DDC intervention.

Finally, while the study effectively measured knowledge improvement and hygiene behavior changes, it did not directly assess the impact on diarrhoea incidence among pupils. Future research could incorporate health outcome tracking to determine whether increased awareness and improved hygiene practices translate into a measurable reduction in diarrhoea cases.

#### **Conclusion**

This study has demonstrated the potential of the DDC as a school-based intervention that could promote basic diarrhea awareness and common preventive/management practices among school-age children in diarrhea endemic areas. The participatory, self-educative and interactive nature of this approach makes this possible. Learning methods with similar



characteristics have been proven to improve cognition, which in turn leads to attitude and behaviour formation in children.<sup>3</sup>

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