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EVALUATING THE KNOWLEDGE OF DIARRHOEA DISEASE PREVENTION MEASURES AMONG CAREGIVERS IN NYALENDA, KISUMU COUNTY

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Abstract

This study sought to evaluate knowledge of diarrhoea disease prevention measures among caregivers. Diarrhoea disease is a prominent public health concern, with children aged 6-24 months more at risk. Caregiver education is crucial for eliminating child diarrhoea. The study employed a quasi-experimental design using mixed-method analysis. The study included a sample size of 302 households of caregivers of children aged 6-24 months living in Nyalenda informal settlements. The study used an open-source web-based statistical tool. Data was collected, entered into SPSS, and analysed. Descriptive analysis determined the mean and proportions. Multivariate logistic regression analysis assessed the connection between independent and dependent variables. This study found that the mean knowledge score for diarrhoea disease prevention from the 12 items calculated was 6.3 ± 2.6 at baseline for all the recruited caregivers. It was also established that the caregivers from Nyalenda A (intervention group) had a higher mean knowledge score of 7.9 ± 2.7 than those from Nyalenda B (control group), which had a mean knowledge score of 6.4 ± 2.6. In conclusion, the study proved that training caregivers using visual charts played a role in enhancing the knowledge of the caregivers. This study recommends focusing on implementing visual charts to increase caregivers' knowledge of diarrhoea prevention measures.

Key terms: Caregivers, diarrhoea disease, health status, informal settlement, prevention measures.

1.0 INTRODUCTION

Diarrhoea poses a major public health concern as it stands as a leading cause of child mortality. It is estimated that around 1.7 billion childhood diarrheal diseases occur annually (WHO, 2019). Health-targeting diarrhoea prevention in children cannot be met without focusing on the mothers/ caregivers (Winter et al., 2019). Mothers education has proved to be an important determinant of health status of children under five years old (Adeyimika et al., 2017; Demissie et al., 2021; Kaçan et al., 2022a; Ugboko et al., 2021). Lack of knowledge of diarrhoea increases the disease burden in children (Desmennu et al., 2017). Increasing mothers' knowledge has been proven to reduce child morbidity and mortality from infectious diseases (Wabwile, 2019).

Interventions towards diarrhoea prevention, such as improving water sources, creating hand-washing facilities, providing clean water and sanitation, and improving food hygiene (Joshi et al., 2020a; Mulatya & Ochieng, 2020b; Mumma et al., 2019b; Simiyu et al., 2019), and rotavirus vaccination campaigns (Burnett et al., 2020; Vos et al., 2020), have been implemented in Nyalenda. However, diarrhoea remained the number one disease in this informal settlement.

Previous studies in Nyalenda reveal that a good number of caregivers, (4.2%), are illiterate, while (46.0%), have only attained a primary level of education (Gutema et al., 2024; Oyando et al., 2021). Illiteracy may increase the chances of a language barrier among mothers and healthcare providers. The language barrier has also been seen to compromise knowledge and understanding, resulting in a high prevalence of diarrhoea (Emmanuel & Ekoja, 2020; Eruyar et al., 2021; EZE, 2018).

The Kenya demographic survey (2022) and other studies show that childhood diarrhoea mainly affects rural and informal settlement centres (Habitat, 2005; KDHS, 2014; Troeger et al., 2018a; Vos et al., 2020). The diarrhoea disease in these regions is reported to have developed multi-drug resistance (Akullian et al., 2018; Simiyu et al., 2020; Utami et al., 2020), Thus calling for more effective intervention measures to reduce the incidences. Nyalenda is the largest informal settlement in the Western region (Guillaume et al., 2020a; Musyoki et al., 2021).

Children require a clean, friendly environment where they cannot contact germs while crawling or playing. They also need good hygiene and sanitation conditions to prevent diarrhoea diseases and other infections (Mulatya & Ochieng, 2020a; Mumma et al., 2019b). This study introduces a communication model that visually illustrates health information to increase caregivers' knowledge and practice of diarrhoea disease prevention (Raiyn, 2016). Using visual content to educate mothers was meant to increase their understanding and enhance their knowledge capacity in reducing diarrhoea episodes. Children are in good health when they present with complete physical, mental, intellectual, and emotional well-being (Sharp, 1947). A healthy child enjoys good growth and development, increasing skills and functions' complexity in children (Watson & Lowrey, 1951).

The World Health Organization (WHO) prioritises the education of caregivers as a step towards eliminating diarrhoea diseases in infants and children. The traditional methods of imparting knowledge through lecture formats have yet to be successful, given persistent diarrhoea episodes even after the education

approach. Visual charts have been proven effective in food restaurants to increase performance for those with language barriers (Madera et al., 2013; Patinella et al., 2021; Rajagopal, 2012). Studies also reveal that visual chats improve learning (Lee et al., 2014; Mayer, 2017; Páez Molina, 2020).

Visual charts make it visible and clear for people, thus increasing knowledge and experience (Ahmed et al., 2019). Applying various methods and techniques in training and communication enhances knowledge (Bermudez-Millan et al., 2004). Despite this evidence, no studies have used visual charts in diarrhoea disease prevention at the household level. This study aims to determine the effect of the use of visual charts in augmenting knowledge and practices of diarrhoea prevention measures among caregivers in order to reduce the prevalence of diarrhoea in children aged 6-24 months.

2.0 LITERATURE REVIEW

Caregivers of children below five years old may have good knowledge of diarrhoea but poor diarrhoea preventive scores. There is a variance in the knowledge of prevention measures such as water treatment before consumption, boiling water, and hand washing (Merali et al., 2018). The level of preventive lag behind diarrhoea practices indicates that caregivers may not consistently implement their knowledge even though they agree that practices such as hand washing can prevent diarrhoea (Khaliq et al., 2022). Caregivers' practices and adequate knowledge are essential (Aftab et al., 2018).

Caregivers' knowledge is directly affected by their levels of education (Kaçan et al., 2022b). Caregivers exposed to media have suitable hygiene measures of hand-washing with water and soap before eating, eating, feeding children, and preparing food (Bedada et al., 2021). Adequate knowledge promotes good food hygiene practices (Teshome et al., 2021); Begum et al., 2020). Poor hygiene and sanitation have been reported among mothers/caregivers with a low level of education. Knowledge of hygienic food practices during child weaning is associated with diarrhoea disease (Tadege, 2021; Teshome et al., 2021). Mothers with a poor understanding of diarrhoea are twice as likely to suffer from diarrhoea than mothers with good knowledge (Alemayehu et al., 2021b).

Knowledge of proper management of child defecation and faeces (Islam et al., 2020), sanitation, and hygiene practices (Derseh et al., 2021; Kalumbi et al., 2020) reduces diarrhoea episodes in children. Increased knowledge and education status of mothers and caregivers enhance the capacity to adopt prevention strategies to reduce child infection with diarrhoea (Dagne et al., 2019). Literature proves there is still a gap in caregivers' knowledge of water, hygiene, and sanitation measures, calling for new interventions to impart knowledge to caregivers.

3.0 METHODOLOGY

The study employed a quasi experimental design using both qualitative and quantitative methods of analysis. Structured questionnaires were developed after reviewing relevant literature to include all the possible variables that address the study's objectives. The questionnaire contained independent, intervening, and dependent variables questions. Mothers of children 6-24 months old were interviewed. The data was collected using structured and in-depth questionnaire tools. The knowledge of diarrhoea disease prevention was assessed using 12 items, scored as either 0 or 1. The aggregate scores were determined for each caregiver, and the mean knowledge scores were used to compare the study groups at

baseline and endline. The knowledge score was further categorised into above-average (Good) knowledge for those who scored greater than 6/12 versus average (Poor) knowledge for those who had less than 6/12. The items in the knowledge questionnaire were each summarised by cross-tabulation to determine the frequencies and percentages. The knowledge scores were compared between the control and interventional groups using an independent samples t-test. A p-value of ≤ 0.05 was considered statistically significant.

4.0 RESULTS AND DISCUSSION

Baseline Results

The mean knowledge score for diarrhoea disease prevention from the 12 items calculated was 6.3 ± 2.6 at baseline for all the recruited caregivers [Table 1]. When categorised by division, the Caregivers from Nyalenda A had a mean knowledge score of 6.4 ± 2.9, while those from Nyalenda B had a mean knowledge score of 6.1 ± 2.3. There was no statistically significant difference in knowledge scores between the two groups at baseline when using an independent samples t-test (p=0.291).

Table 1: The Mean Knowledge Scores at Baseline for Caregivers in the Study

Outcome		n	Mean	SD	p-value
Baseline mean knowledge score overall		302	6.3	2.6	-
Baseline mean knowledge score by division	Nyalenda A	151	6.4	2.9	0.291
	Nyalenda B	151	6.1	2.3	

The number of participants (n), average knowledge score (Mean), and standard deviation of knowledge scores (SD) are as shown. The p-value is for the independent samples t-test performed for the difference in mean scores between the two study divisions.

When the knowledge scores were categorised into binary as above average (score>6) or below average (score<6) scores, 65.9 per cent (n=199) of the caregivers at baseline had above average knowledge, with 62.9 per cent (n=95) in Nyalenda A and 68.9 per cent (n=104) in Nyalenda B having above average knowledge [Table 2]. There was no significant difference in the proportion of caregivers having above-average knowledge between the two groups (p=0.275) at baseline. In the qualitative analysis of the knowledge of diarrhoea, the vast majority of mothers' caregivers' views were that when their children had a watery stool, they were suffering from diarrhoea. Nonetheless, most of the caregivers (64 %; n = 9) had no clear cut of the number of diarrhoea episodes that would result in a child suffering from diarrhoea. However, a few mothers (20%; n =4) said that they could tell their children had diarrhoea if they experienced more than three diarrhoea episodes.

"I would tell my child has diarrhoea when my child has frequent bowel movements with watery loose stool".

"When my child has frequent episodes of watery and green loose stools, I get worried because I know that my child is suffering from diarrhoea" are some of the responses.

Table 2: Proportions of Caregivers with below and above Average Knowledge of Diarrhea Prevention at Baseline

Outcome		Total n	Below average knowledge n (%)	Above average knowledge n (%)	p-value
Baseline knowledge by division	Nyalenda A	151	56 (37.1%)	95 (62.9%)	0.275
	Nyalenda B	151	47 (31.1%)	104 (68.9%)	

The number of participants (Total n) and the frequency and percentage of participants with knowledge scores below average and above average [n (%)] are shown. The p-value is for the Chi-square test for association between the knowledge category and the study division.

Endline Results

At the end of the study, the caregivers from Nyalenda A (intervention group) had a higher mean knowledge score of 7.9 ± 2.7 than those from Nyalenda B (control group), with a mean knowledge score of 6.4 ± 2.6. A two-tailed t-test for independent samples (equal variances assumed) showed that the difference between Nyalenda A and Nyalenda B with respect to the endline knowledge score was statistically significant (p = <.001). The Cohen's d value was 0.6, representing a medium effect size. The mean difference in difference calculated between endline and baseline mean knowledge scores for individual caregivers was positive for both groups but was significantly larger in Nyalenda A (Mean difference in difference= 1.6, SD = 3.8) than in Nyalenda B (Mean difference in difference = 0.4, SD = 3.4). The p-value was 0.003, while Cohen's d was 0.4, indicating a small effect size. Table [Table 3] and boxplots (Figure 1) show the difference in mean knowledge score between the study groups at baseline and at the endline.

Table 3: The Mean Knowledge Scores and Difference in Difference at Endline for Caregivers in the Study

Outcome		n	Mean	SD	p-value
Endline mean knowledge score by division	Nyalenda A	145	7.9	2.7	**<0.001***
	Nyalenda B	141	6.4	2.6	
Difference in difference (Endline - Baseline)	Nyalenda A	145	1.6	3.8	**0.003***
	Nyalenda B	141	0.4	3.4	

*Statistically significant p<0.05

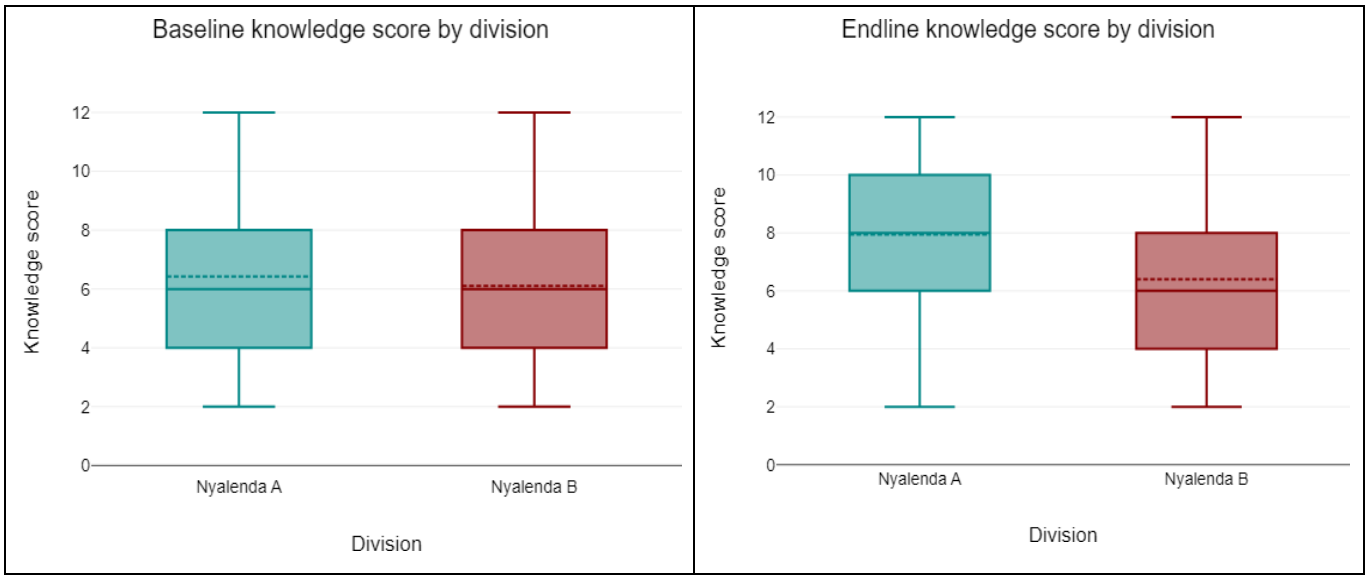

Figure 1: Boxplots Showing the Baseline and Endline Knowledge Scores for Caregivers in the Study by Division

At the end of the study, a significantly higher proportion of caregivers in Nyalenda A (n=109, 75%) had above-average knowledge, compared to Nyalenda B (n=83, 78.9%) with $\chi^2 = 8.6$, $p = 0.003$. The results are summarised in Table 4, and the representative bar charts are shown in Figure 2.

Table 4: Proportions of Caregivers with below and Above-Average Knowledge of Diarrhea Prevention in the Study at the End of the Study

Outcome		**Total n**	**Below average knowledge n (%)**	**Above average knowledge n (%)**	**p-value**
Endline knowledge by division	Nyalenda A	145	36 (24.8%)	109 (75.2%)	**0.003***
	Nyalenda B	141	58 (41.1%)	83 (58.9%)	

*statistically significant p<0.05

The number of participants (Total n) and the frequency and percentage of participants with knowledge scores below average and above average [n (%)] are shown. The p-value is for the Chi-square test for association between the knowledge category and the study division. * indicates statistically significant p<0.05

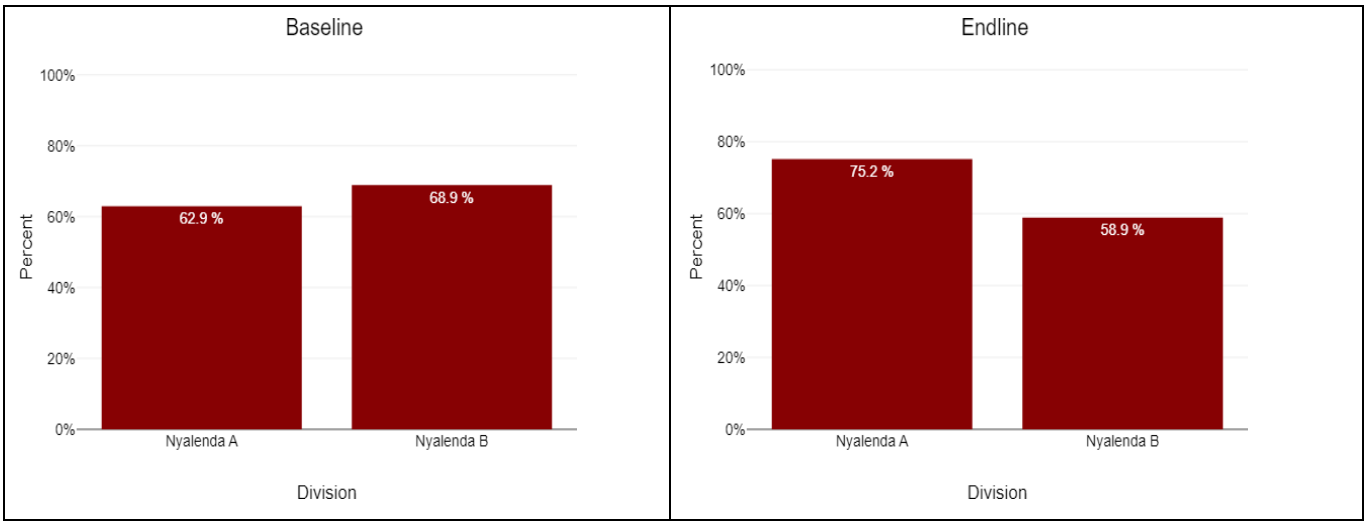

Figure 2: Bar Graphs showing the Proportion of Caregivers having Above-Average Knowledge Scores by Division at the Start and End of the Study

Discussion

This study's findings show that knowledge scores at baseline were comparable between the two groups, with most caregivers having slightly above-average knowledge. At the end of the intervention period, the results indicate a significant improvement in the knowledge of diarrhoea prevention among caregivers in the intervention group (Nyalenda A) compared to the control group (Nyalenda B). This showed that intervention involving visual charts positively impacted the caregivers' knowledge of diarrhoea prevention measures. This improvement was statistically significant, with a medium effect size.

These findings align with previous research studies that highlighted the effectiveness of visual aids in health education. For instance, a study investigating using an educational primer to promote maternal self-efficacy in preventing childhood diarrhoea found that visual aids improve comprehension, recall, and adherence to medical instructions (Sabino et al., 2018). Similarly, a review by Mbanda et al. (2021) concluded that visual aids can significantly enhance risk communication and decision-making in health contexts (Mbanda et al., 2021).

The implications of these findings are profound, particularly for public health interventions in low-resource settings like Kisumu. Diarrhoea diseases are a leading cause of morbidity and mortality among children under five in these settings, and caregiver education is a crucial strategy for prevention (He et al., 2023; Mulatya & Ochieng, 2020c). The use of visual aids, as demonstrated by this study, can significantly enhance the effectiveness of such educational interventions. Moreover, the study underscores the importance of tailoring health communication to the audience's needs and preferences. Like others in similar settings, the caregivers in this study have low literacy levels and limited access to health information. Visual aids can bridge these gaps by presenting information in an accessible and engaging manner (Mbanda et al., 2021).

However, it is essential to note that the effectiveness of visual aids can vary depending on their design and the context in which they are used (Garcia-Retamero & Cokely, 2017). This study adds to the growing body

of evidence supporting the use of visual aids in health education. It also reveals the potential of such aids to enhance caregivers' knowledge of diarrhoea disease prevention.

5.0 CONCLUSION AND RECOMMENDATION

Conclusion: There was no significance in knowledge scores at baseline between the intervention and control groups; however, at the end of the study, the intervention group scored higher in knowledge compared to the control group (p=<0.001). This proved that training caregivers using visual charts played a role in enhancing the knowledge of the caregivers. The study, therefore, rejected the null hypothesis that "There is no statistically significant difference in knowledge of diarrhoea disease prevention between caregivers in the intervention and control groups after the intervention period".

Recommendation: This study has proved that augmenting knowledge of diarrhoea disease prevention practices using visual charts is effective. Therefore, it is viable to focus on implementing visual charts to increase caregivers' knowledge of diarrhoea prevention measures.

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