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Sanjo-Odutayo Aromoke
Babcock University, Ilishan-Remo, Ogun State, Nigeria

Prof. Ajao E.O
Babcock University, Ilishan-Remo, Ogun State, Nigeria

B Dr. Ojewole F.O
Babcock University, Ilishan-Remo, Ogun State, Nigeria

Correspondence
Sanjo-Odutayo Aromoke
Babcock University, Ilishan-Remo, Ogun State

Influence of nurse-led educational intervention on mothers' knowledge and readiness for rotavirus vaccine in Ikenne local government, Ogun State

Sanjo-Odutayo Aromoke, Prof. Ajao E.O and Dr. Ojewole F.O

Abstract

Objective

Rotavirus gastroenteritis is rated 2nd among the most frequent causes of mortality and an important agent responsible for diarrhea infection in children <5years with occurrence as high as 25% in Nigeria. One important path to prevent and reduce its infection and offer the reliance for control is vaccination. Rotavirus vaccine has been included in the routine immunization program of many countries while Nigeria still awaits its 2017 proposed inclusion into national immunization scheme. This study assessed the influence of nurse-led educational intervention on mothers' knowledge and readiness for rotavirus vaccine in Ikenne Local Government, Ogun State. Nigeria.

Method

A quasi-experimental study with a pre-test and a post-test of knowledge and readiness for use of rotavirus vaccine among mothers (n=30) of 0-8weeks infants. It explored the baseline knowledge and readiness using a self-developed questionnaire. The intervention consisted of pictorial illustrations of rotavirus disease management and prevention using in-depth and understandable teaching language. Differences in knowledge and readiness before and after a nurse-led educational intervention was analyzed using descriptive and paired t-analyses with the level of consistency was 0.8.

Results

70% of mothers had poor knowledge of rotavirus vaccine as well as readiness to use. Nurse-led educational intervention significantly influenced mothers' knowledge and readiness to use rotavirus vaccine with mean differences of 4.8 and 3.27 respectively. However, readiness appeared to be lower than acquired knowledge; this may be due to the present cost of rotavirus vaccine and non-availability at Primary Health Care centres. The outcome of this study revealed that majority of mothers would have shown readiness to use rotavirus vaccine if available in the NPI as recommended by W.H.O since 2009. Mothers recognized diarrhea as a deadly disease common among children and admitted that immunization would be the most cost-effective method of prevention.

Conclusion

This study concluded that improving mothers' knowledge and readiness to use a new vaccine such as rotavirus is essential to achieve a successful decline in rotavirus-gastroenteritis among children in Nigeria. The study therefore recommends that the government of Nigeria timely includes rotavirus vaccine in the NPI as proposed.

Keywords: Rotavirus vaccine, Nurse-led educational intervention, Knowledge, Mothers, readiness

Introduction

Most times, nurses are first time health informants of mothers; providing current information about vaccine-preventable diseases such as rotavirus and promoting activities for use of existing and new vaccines. The burden of disease is generally considered to be an important drive to deciding whether to use new vaccine or not. A few of the barriers impacting the use of new vaccines are the cost and availability, yet, vaccination over the years has provided positive impact in reducing the spread of infectious diseases. The primary aim of immunization is to provide immunity against diseases which is a key fact by the WHO facilitating prevention of illnesses, disability and death through immunization [12]. Rotavirus vaccine is administered orally to protect against rotavirus infection, a common cause of childhood diarrhea.

Rotavirus infections commonly cause severe diarrheal disease worldwide ^[13] with occurrence as high as 25% in Nigeria ^[14]. Rotavirus is recognized to be the most common pathogen related with severe diarrhea among children. Rotavirus gastroenteritis is described as a vaccine-preventable disease that causes hospitalization and deaths due to severe gastroenteritis majority of which are in developing countries ^[18]. The World Health Organization report rates rotavirus gastroenteritis second among the most frequent causes mortality and an important agent responsible for diarrhea infection in children under five ^[6]. 10% of mortality in children under five is caused by diarrheal diseases and that 801, 000 children die annually due to gastroenteritis ^[15].

A number of studies in Nigeria and most parts of the world have reported higher infection rate in children less than two years of age, furthermore, some studies have found the peak incidence at 6-12 and 9-14 months ^[2, 3]. In a study in Lagos reported that prevalence rate of rotavirus infection is higher in children less than twenty four months ^[3]. In Jos, 90.9% of children with rotavirus gastroenteritis infection were at peak among twelve months and below as well as among two years old ^[6]. However, it has been noted that children are not fully immunized in Nigeria due to lack of awareness about the need for immunization, fear of side effects, mother being too busy, non-availability of vaccines and place of immunization being too far ^[1, 4]. Some of these reasons point to the competing priorities by health workers and mothers which could be attributed to health information gap, mothers' perception, and low value attached to immunization or readiness to use new vaccines.

Nightingale, the mother of modern nursing wrote in 1894 that spending money to maintain health in infancy and childhood is better than using money to build hospitals to cure several diseases ^[8]. This idea is true as the primary maintenance of children's health through the use of vaccines has farther-reaching implications than that of other population groups; it is a predictor of the health of a country. Generally, vaccines whether routine or newly introduced often encounter problems of awareness and acceptability, the idea of unwillingness has to do with informed decision-making and what determines the acceptance of vaccines in its entirety. According to the model for assessment of vaccine hesitancy: assurance (confidence in vaccines and the vaccinator), uninformed self-satisfaction (unawareness and misperception towards the need and importance of vaccine), and appropriateness (the issue of reaching the place of vaccine delivery) are main domains of vaccine acceptance and refusal ^[6].

Furthermore, health behavior determines personal beliefs or perception about a disease and the strategies obtainable to reduce its rate ^[7], individual perception is influenced by series of intrapersonal factors influencing health choices of whether or not to use new vaccines. The intention of introducing new vaccines is to address childhood diseases of special concern, yet, vaccine-preventable diseases still account for not less than 25% of the deaths that occurred every year among under five year old children according to 2006-2015 report of Global Immunization Vision Strategy. This can be related to the fact that more infectious diseases are now grouped as vaccine-preventable. Children can now be protected with the availability of new vaccines, such as vaccine against rotavirus disease. Therefore, vaccines have the possibility to influence the achievement of the United

Nations Sustainable Development Goal (SDG) three that calls for good health and well-being.

A number of studies in Nigeria and most parts of the world have reported higher infection rate in children less than two years of age, furthermore, some studies have found the peak incidence at 6-12 and 9-14 months ^[2, 3]. In a study in Lagos reported that prevalence rate of rotavirus infection is higher in children less than twenty four months. In Jos, 90.9% of children with rotavirus gastroenteritis infection were at peak among twelve months and below as well as among two years old ^[8]. However, it has been noted that children are not fully immunized in Nigeria due to lack of awareness about the need for immunization, fear of side effects, mother being too busy, non-availability of vaccines and place of immunization being too far ^[1, 5]. Some of these reasons point to the competing priorities by health workers and mothers which could be attributed to health information gap, mothers' perception, and low value attached to immunization or readiness to use new vaccines.

Nurse-led educational intervention can deal with some of these issues by creating awareness on the benefits of immunization; correcting false reports and the things that hinder mothers from immunizing their children thereby potentially increasing readiness for vaccine use ^[15]. Utilizing immunization services depends on many things such as knowledge and attitude of mothers not only on provision of immunization services ^[9, 12]. Nurses' proficiency, knowledge and guidance are very important in creating confidence and safe environment for childhood immunizations ^[10]. How nurses communicate with mothers on routine immunizations fosters self-assurance in the decision to vaccinate their children and can boost their readiness to use new vaccines. It is important to assess the influence of a nurse-led educational intervention in improving knowledge and readiness of mothers for rotavirus vaccine as a way to increase children's survival while timely inclusion of rotavirus vaccine into the routine immunization schedule becomes also very crucial. Thus, this study is set to prepare mothers for the use of rotavirus vaccine in Ikenne Local Government, Ogun State.

Methods

Study design

The study adopted a quasi-experimental design and was conducted among mothers of infants 0-8weeks recruited from two Primary Health Care centres in Ikenne Local Government Area between January and February 2017.

Ethical Consideration

Ethical clearance was obtained from Babcock University Health Research Ethics Committee (BUHREC). All the participants were well informed about the study, they reserved the right to withdraw from the study at any time without penalty and the confidentiality of the participants was guaranteed.

Sampling technique

The two PHCs selected stand as the two mostly populated PHC in Ikenne Local Government and all consenting mothers made up the sample size. All nursing mothers with infants who attended the immunization/infant welfare clinic for the first time during the period of study and consented to participate were recruited until the required sample size of 30 was obtained.

Sample size determination

Sample size was determined using Leslie Kish formula.

$$N = \frac{Za^2P(1-P)}{\delta^2}$$

N is sample size estimate

Za² is standard normal deviate at 95% confidence interval corresponding to 1.96

P is assumed baseline level of knowledge, put at 50%, i.e. 0.5

δ is precision (difference between baseline knowledge and effect of a Nurse-led educational intervention) put at 30%, i.e. 0.3

$$N = \frac{1.96^2(0.5)(1-0.5)}{0.3^2} = 10.7 \approx 15$$

(15 respondents each were used so that the difference of 4 will take care of attrition effect).

Instrument and procedure

The tool for data collection was a 44-item self-developed questionnaire consisting of socio-demographic characteristics of mothers, knowledge, perception and an assessment of readiness to use rotavirus vaccine.

Pre-intervention, a baseline-mean score was assessed using the developed questionnaire; questions were directed towards knowledge, perception and readiness to use rotavirus vaccine.

Intervention:

This consisted of pictorial illustrations of rotavirus disease management and prevention using understandable teaching language that included description of rotavirus vaccine, access, cost, frequency of use, questions and answers. The researchers' teaching package was used to promote knowledge of rotavirus vaccine among respondents after which a post-assessment of knowledge and readiness of rotavirus vaccine was done. Researcher had a 45 minute session with participants.

Post intervention, knowledge and readiness for use of rotavirus was assessed using self-developed questionnaire designed for the pre-test.

Results

Table 1 shows the demographic characteristics of participants with mean age of 26.43 years and standard deviation 8.77. 93.3% of participants were married and averagely educated with 53.3% of participants having attained secondary school education. 73.3% participants were self-employed as traders and apprentices. However,

majority (93.3%) were on monthly income that is less than 20, 000, while only two participants were on income scale of 21,000- 60,000. 63.3% had a maximum of two children at the time of study, with a household number of maximum of 4, while only 3 had up to 6 children already. However, 5 participants had a household of 8-10 living together. Infants of participants that took part in the study reported to the infant welfare/immunization clinic at age six and seven weeks at 43.3% respectively, only 13.3% reported at eight weeks after birth.

Table 1: Frequencies and Percentages Showing Demographic Data of Participants.

Variables	Mothers (n= 30)	Frequency	Percent (%)
Age in years	20-24	12	40
	25-29	7	23.3
	30-34	9	30
	35-37	2	6.7
Marital status	Married	28	93.3
	Unmarried	2	6.7
Level of education	Uneducated	7	23.3
	Primary	3	10
	Secondary	16	53.3
	Tertiary	4	13.3
Employment status	Employed on salary	1	3.3
	Self employed	22	73.3
	Unemployed	2	6.7
Monthly income	Full housewife	5	16.7
	20,000 or less	28	93.3
	21-40,000	1	3.3
	41-60, 000	1	3.3
No of children	1-2	19	63.3
	3-4	8	26.7
	5-6	3	10
No of household	2-4	13	43.3
	5-7	12	40
	8-10	5	16.7
Birth in weeks	6	13	43.3
	7	13	43.3
	8	4	13.3

Table 2: Descriptive Statistics of Data for the Pre-test Assessment of knowledge of rotavirus vaccine.

Criteria	Frequency	Percent (%)
Good	02	6.7
Fair	07	23.3
Poor	21	70.0

Table 2 shows the descriptive statistics of knowledge deficit of rotavirus vaccine among mothers. More than half of the participants (70%) had poor knowledge of the rotavirus vaccine

Table 3: One-sample t-test analysis of difference between mothers' baseline knowledge and newly acquired knowledge of rotavirus vaccine following a Nurse-led educational intervention.

Group	N	Mean	Std. Deviation	Std. Error Mean	t-value	DF	p-value
Pre-test Knowledge	30	9.367	2.526	.461	20.314	29	.000
Post-test Knowledge	30	14.167	3.752	.685		29	.000

Table 3 describes the outcome of the analysis that nurse-led educational intervention improved mothers' level of knowledge to use rotavirus vaccine with a mean difference of 4.8.

This further confirms the test of hypothesis that "there will

be a significant difference between mothers' baseline knowledge and the newly acquired knowledge of rotavirus vaccine following a nurse-led educational intervention". It implies that the treatment significantly affected participants' acquired knowledge of rotavirus vaccine with

Table 4: Descriptive Statistics of Data for the Pre-test Assessment of perception of rotavirus vaccine.

Criteria	Frequency	Percent (%)
Poor	25	83.3
Fair	02	6.7
Good	03	10

This table shows descriptive statistics of perception deficit with 83.3% of participants with poor perception of rotavirus vaccine

Table 5: Descriptive Statistics for the pos-test assessment of mothers' level of readiness to use rotavirus vaccine.

Group	N	Minimum	Maximum	Mean		Std. Deviation	Variance
	Statistics	Statistics	Statistics	Statistics	Std. Error	Statistics	Statistics
Pre-test Readiness	30	7.00	13.00	10.7333	.27515	1.50707	2.271
Post-test Readiness	30	30	7.00	14.00	10.2000	.30475	1.66919

Table 5 shows that the nurse-led educational intervention influenced mothers' level of readiness to use rotavirus vaccine to an extent as mothers' responses may have been hindered by non-availability, cost of vaccine or cultural values.

Test of Hypotheses

Hypothesis One

There will be a significant difference between mothers' baseline knowledge and the newly acquired knowledge of rotavirus vaccine following a nurse-led educational intervention.

Table 6: One-sample t-test analysis of difference between mothers' baseline knowledge and newly acquired knowledge of rotavirus vaccine following a nurse-led educational intervention.

Group	N	Mean	Std. Deviation	Std. Error Mean	t-value	Df	p-value
Pre-test Knowledge	30	9.367	2.526	.461	20.314	29	.000
Post-test Knowledge	30	14.167	3.752	.685		29	.000

This table indicates a significant difference between mothers' baseline knowledge of rotavirus vaccine following a nurse-led educational intervention. This implies that the treatment significantly affected participants' acquired knowledge of rotavirus vaccine.

Hypothesis Two

There will be a significant difference between the mean score of mothers' baseline readiness and acquired readiness to use rotavirus vaccine following a nurse-led educational intervention.

Table 7: Paired t-test analysis of difference between mothers' baseline and acquired readiness to use rotavirus vaccine

Group	N	Mean	Std. Deviation	Std. Error Mean	t-value	Df	Sig. (2-tailed)
Pre-test Readiness	29	10.733	2.525	.461	3.280	29	.003
Post-test Readiness		14.00	1.669	.305			

This implies that following a nurse-led educational intervention, mothers' readiness to use rotavirus vaccine was influenced and this shows that the treatment significantly affected participants' readiness to use rotavirus vaccine.

Discussion of Findings

Scores of 7-10, 11-14 and 15-18 were graded poor, fair and good respectively for knowledge while 30-36, 37-43 and 44-52 were graded poor, fair and good for perception. Differences in knowledge, perception and readiness before and after a Nurse-led educational intervention were analyzed using descriptive and paired t-analyses.

30 mothers with infants aged 0-8weeks were studied, majority (40%) of which were within the age range of 20-24 years. 93.3% were married and more than half (53.3%) had secondary education. They were mostly self-employed (73.3%) with majority (93.3%) of them on income scale of less than 20,000. 63.3% had between one and two children and less than half (43.3%) of the mothers had number of household range of 2-4 members. 86.6% of mothers brought their infants for the first immunization outing at age 6-7 weeks while only 13.3% reported at 8 weeks.

The description of the pre-assessment of mother's knowledge of rotavirus vaccine shows that there is knowledge deficit which is concomitant with [7, 10] that use

of immunization services depends on many things such as knowledge and attitude of mothers and not only on the provision of immunization services.

Summary

This study assessed the influence of Nurse-led educational intervention on mothers' knowledge and readiness for use of rotavirus vaccine in Ikenne Local Government. Generally, the baseline knowledge of rotavirus vaccine among mothers was low on the knowledge scale as well as baseline perception. The outcome of this study revealed that a Nurse-led educational intervention improved mothers' level of knowledge and readiness to use rotavirus vaccine. The findings from this study showed a significant difference between mothers' baseline knowledge and the newly acquired knowledge of rotavirus vaccine following a Nurse-led educational intervention. Also, a significant difference was found between the mean score of mothers' acquired knowledge and readiness to use rotavirus vaccine.

Conclusion

This study is of significance to mothers as it brought awareness to the health issues that some mothers were not aware of. A significant difference was observed between mothers' baseline knowledge and the newly acquired knowledge of rotavirus vaccine. Also, a significant

difference was found between the mean score of mothers' acquired knowledge and readiness to use rotavirus vaccine. However, their level of readiness to use rotavirus vaccine was lower than acquired knowledge. As such, nurses and other healthcare providers need to improve efforts in promoting the importance of rotavirus vaccine, while government on their own part make timely inclusion of the rotavirus vaccine on the National Program for Immunization (NPI) schedule for children.

Recommendations

In view of the findings stated earlier, there is an urgent need to pay more attention to creating awareness and improve knowledge of rotavirus-related diarrhea among children in Nigeria. Nurses and other healthcare providers are challenged as client's advocates. The following recommendations are made:

- Stimulate and intensify health teaching among nursing mothers as this may influence health choices they make on behalf of their children as well as keep mothers informed of new vaccines.
- Mobilize community to embrace immunization and other immunization services through community involvement and participation.
- Timely addition of rotavirus vaccine on NPI scheme as a routine hence, affordable by the general public.

Limitations of the Study

Selection of Primary Health Care centers as study sites is a classic representation of possible barriers such as information and knowledge of vaccines that mothers encounter, and this as such can be generalized to the national population where a high percentage live below average. However, the scope of the generality was excluded by the sample size. Further studies may be carried out with much larger sample sizes. Moreover, since the present study is a quasi-experimental study and the sampling was performed by purposive sampling, cause-effect conclusions may be drawn from a larger sample. Future studies may also design a longitudinal research evaluating the impact and effectiveness of rotavirus vaccine in the nearest future.

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