

Improving knowledge and perception of HIV/AIDS among English language speaking children in rural areas through educational digital storytelling

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Abstract

Background/Objective: Previous research efforts have shown the need for improvement of knowledge and perception of HIV/AIDS among English Language speaking children in rural areas. Hence, the study at hand was designed to investigate the effect of using educational digital storytelling intervention to satisfy this need of English Language children in rural areas in Nigeria.

Method: The study adopted a randomized control design involving a pretest, post-test, and follow-up measures. Eight-four children (n=84) took part in the study. The HIV Knowledge Questionnaire (HIV-KQ-18) and the Perceived Risk of HIV Scale (PRHS) were used for data collection. Data were analyzed using *t* test statistics.

Result: The educational digital storytelling intervention in appreciably improved knowledge and perception of English language children in rural areas who participated in the intervention concerning HIV/AIDS compared with their peers in the no-intervention control group. The improvement in knowledge and perception gained was also maintained throughout the follow-up evaluation period.

Conclusion: The present study showed that the use of educational digital storytelling could improve knowledge and perception of HIV/AIDS among English Language speaking children in rural areas. Educational digital storytelling intervention effectively improved knowledge and perception of HIV/AIDS among children in rural areas. In return, we recommend that rural sociologists, counselors, language and communication experts, child educators, and other professionals involved in public health especially, as it concerns children be skilled in the use and application of educational digital storytelling intervention procedures to facilitate the move towards adopting the method in their professional practices.

Abbreviations: DQ = Demographic Questionnaire, EDSI = Educational Digital Storytelling Intervention, HIV/AIDS = Human Immunodeficiency Virus/ Acquired Immune Deficiency Syndrome, HIV-KQ-18 = HIV Knowledge Questionnaire, JUNAID = Joint United Nations Program on HIV/AIDS, NACA = National Agency for the Control of AIDS, NFMH = Nigeria Federal Ministry of Health, NPC = National Population Commission, PRHS = Perceived Risk of HIV Scale, UNCRC = United Nations Convention on the Rights of the Child, WHO = World Health Organization, WMA = World Medical Association.

Keywords: child education, English language speaking children, knowledge, perception, rural areas, rural sociology

Editor: Phil Phan.

The authors have no conflicts of interest to disclose.

The datasets generated during and/or analyzed during the current study are not publicly available, but are available from the corresponding author on reasonable request.

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How to cite this article: Dike IC, Ebizie EN, Njoku OC, Oraelosi CA, Egbe CI, Nnamani AP, Ezeaku MN, Ihuoma EC, Otu MS, Okechukwu FO, Anowai CC, Nnodim EJ, Ukwuezeh CP, Onuorah AR, Onwuegbuchulam AC. Improving knowledge and perception of HIV/AIDS among English language speaking children in rural areas through educational digital storytelling. *Medicine* 2021;100:50(e28058).

Received: 19 November 2020 / Received in final form: 6 November 2021 / Accepted: 8 November 2021

<http://dx.doi.org/10.1097/MD.00000000000028058>

1. Introduction

At present, a lot of children in developing countries are at the risk of being infected with human immunodeficiency virus/acquired immune deficiency syndrome (HIV/AIDS) from numerous sources, which are yet unknown to them. The HIV/AIDS infection remains a threat to children as it deprives them of their fundamental human rights. Children are also barred from having their needs met since the disease affects nearly all aspects of their life. A greater brunt of the suffering appears to be borne in rural areas by the poorest and the less privileged persons, including children living in poverty, young girls, and the disabled.^[1] For this study, children have been defined according to the United Nations Convention on the Rights of the Child (UNCRC) as every human being under the age of 18 years.^[2]

Between 2002 and 2003, the joint United Nations Program on HIV/AIDS (UNAID) reported a global decrease in the number of new HIV cases among children. Despite this achievement, the problem still affects millions of children in different ways every year due to its consequences on their families and communities. According to the World Health Organization,^[3] HIV affects children through the loss of a parent, direct infection, early end to childhood, thereby forcing them into undue responsibilities such as becoming family heads, quitting school, working for money, raising younger siblings, and caring for family members with HIV-related sicknesses. For those in rural areas, their experiences become worse as a result of loss of support from adult family members who earn their livelihood from farming. In effect, these children undergo deficiencies in health, education, security, nutrition, affection, and even vulnerabilities to discrimination, loneliness, rejection, fear, depression, and various societal vices.^[4]

In Nigeria, previous studies have reported a high rate of misunderstanding and poor knowledge level among children concerning HIV/AIDS.^[5–11] Several studies^[8,9] have established the media as children's key source of information concerning HIV regardless of its doubtful effectiveness, which, however, is due to erroneous beliefs caused by poor awareness. Some studies^[12–14] have established the clinical efficacy of the media in knowledge-based interventions. The resultant awareness deficits, therefore, suggest that the media has not been widely utilized in promoting comprehensive knowledge of the pandemic irrespective of it being a major source of information concerning the pandemic. Although evidence^[8,9] has it that awareness about the virus is high among children in Nigeria, some studies believe that increasing awareness and knowledge of HIV transmission among children will increase the chances of the children being more tolerant towards others with HIV-related infections. Thus, reducing stigmatization of those living with the virus.^[15,16]

In addition, it has been established^[17,18] that early introduction to sexual behavior, which is widespread in Nigeria is a risk factor, and begins at age 15 or less for about 15% of Nigerian children. Early sexual activity, in conjunction with a very poor rate of HIV testing in Nigeria, is one of the major factors that increase vulnerability to the virus among Nigerian children.^[17,18] Again, it has been reported that more than 400,000 children are living with the virus, with about 2 million being orphaned by AIDS in Nigeria.^[19] To this end, children, especially the girls, have been negatively impacted indirectly, as they have become the caregivers to parents living with the virus.^[18] As a result of this and other cultural factors in Nigeria, there appears to be an imbalance in schooling between the female and male genders. The girls are often absent in classes where they could have been

educated about the virus and how best to guard against infections.

Responding to this terrible situation, there has been a call by the Nigerian National HIV/AIDS Strategic Plan 2010 to 2015 for improved attitudinal change communication for most affected groups. On this note, there are ongoing enhancements in peer education systems, in conjunction with social media messaging, which are targeted at these groups who are less privileged to leverage on HIV services^[1] such as free testing and counseling. An extensive improvement of knowledge and perception concerning HIV/AIDS for children in rural areas might be possible by exposing them to an educational digital storytelling intervention in the English language.

Storytelling has over the years been a source of education for children. In traditional societies, stories were useful in the socialization process. However, with the industrialization and urbanization of societies, face-to-face storytelling, which is encumbered by space and time, is gradually giving way to digital storytelling. Digital storytelling combines digitalized video and photography with storytelling. It combines the gains of multimedia with the art of storytelling in a target language to achieve its effect, thus making it a more potentially useful educational tool than ordinary storytelling.

Storytelling, whether in the oral forms or combination with digitalized video and photography, relies for its success on the communicative competence of the narrator who conveys the message to the audience in the language they understand. In the world of today, the language that cuts through the global village and pulls the divergent chords towards a central point is the English language.^[1] It is also the language of the internet, as it accounts for about 80% of the information on the internet.^[1] In Nigeria, English is the medium of instruction in Nigerian schools and a core subject across all levels of education.^[2]

English was thus chosen as the language for the digital story intervention in this study because it is the language the children are taught with and the major language through which information about HIV/AIDS is spread over the media, social network sites, and the internet. It is also the language that will help them understand the specific register associated with HIV/AIDS.

2. Hypothesis

It is hypothesized in this study that educational digital storytelling intervention will have a significant improvement in knowledge and perception of HIV/AIDS among children in rural areas.

3. Methods

3.1. Ethical considerations

This study was conducted on the approval of the Research Ethics Committee of Agricultural Extension, University of Nigeria, Nsukka. Parents of the participants as well as the community leaders gave their written approval by filling the informed consent form. The researchers also kept to the ethical requirements for researching with human participants as stated in the World Medical Association's Declaration of Helsinki.^[20]

3.2. Study design

This study was designed in a randomized controlled pattern.

3.3. Study setting

The study was carried out in Umueze community in Aguata agricultural zone in Anambra State, Nigeria. The State is made up of 21 Local Government Areas (LGAs) and 4 agricultural zones, including Aguata, Anambra, Awka, and Onitsha. The state is located in the South-East region of Nigeria and is mainly occupied by the Igbo ethnic group who is majorly farmers and traders. Anambra State occupies an area of 4416 sq. km and has a population of 4,177,828 out of which 2,117,984 are males and 2,059,844 are females.^[21] Aguata zone was selected for the study. Aguata zone is made up of 6 extension blocks, comprising 45 circles. The number of areas within the state is about 338,721 with an average size of 6 persons per household.^[22] The climate is typically equatorial with 2 main seasons, the dry and the rainy seasons. The vegetation consists of rainforest. Major crops grown in the state among others include rice, cassava, yam, maize, okra, cocoyam, melon, cowpea, and pigeon pea.

3.4. Participants

The participants in this study were 84 children from Umueze community in Aguata agricultural zone in Anambra State, Nigeria (see Fig. 1). Participants were recruited during the school holiday break between August and September 2019 by the authors. Adequacy of the sample size was determined using the G*Power 3.1 software.^[23] Concerning inclusion criteria, only children who self-reported having access to social media platforms were selected and included in the sample. Note that behavioral intentions, retrospective information, actions, perceptions, and beliefs can be measured through self-reports.^[24] Participants were also selected based on their availability throughout the study. Table 1 describes the characteristics of the participants.

3.5. Intervention procedure

This study adopted a group randomized controlled trial design,^[25] involving pretest, posttest, and follow-up evaluations. First, the researchers embarked on a legitimization process within the study community. During this process, the researchers consulted with the community leaders and opinion leaders within the community and intimated them on the need for such a program, sought their consent, and also appealed to them to inform parents to make their children available for the study. Following the granting of the permission, the researchers embarked on a 1-day mass awareness program within the community using posters, pamphlets, fact sheets, folders, and projected visuals. The intervention type has 2 groups via an experimental group (EDSI group) and a control group (no-intervention control group). Participants were randomly allocated to either experimental group or no-intervention through a random allocation sequence generated using Random Allocation Software.^[26] A total of 41 participants in the EDSI group were exposed to the EDSI intervention. The 43 control group participants used for comparison were not exposed to any intervention. The intervention had 12 sessions and lasted from September 2017 to November 2017 for 6 weeks at 2 sessions per week. The intervention was delivered at the community/town hall where the children were converged for this purpose. Before the first session commenced, baseline data were collected (Time 1). After the last session, post-treatment data were also collected (Time 2). Three months after the intervention was completed, 2

weeks follow-up evaluation which had only 2 sessions were also conducted, after which follow-up data were collected (Time 3). The participants completed and returned the outcome measures at time points 1, 2, and 3.

In writing the story, we used characters that the children can relate to, as well as admire, such as animals and inanimate objects personified. This was done because children learn the content of a story while relating to the characters and events therein. We also used older children as some of the characters bearing in mind that children often emulate and mimic the actions of older children. In order to avoid children becoming so consumed with manipulating objects and being entertained with the visual elements such that the story and message become invisible, we adopted a method whereby elements of the story and interface were tested and well-screened during their development instead of testing the story at its completion. With this method also, less time and money were involved in developing the stories, hence, more economy. The educational digital storytelling intervention EDSI was delivered by therapists who were experts in the use of digital storytelling in English language and HIV interventions and who had qualifications in rural sociology, educational technology, psychology, social work, counseling, and communication in the English language.

3.6. Intervention package

The EDSI is an audio-visual psycho-educational intervention on the perception of HIV/AIDS among children in rural areas. The intervention was delivered twice per week and lasted for 8 weeks. This health promotion model was planned to assist children in rural areas in gaining basic knowledge about HIV/AIDS (mode of transmission, signs and symptoms, stages, and precautionary measures) as well as help them to learn from the lived experiences of others and also improve their perceived risk of HIV through a group psycho-educational process of digital storytelling. During the intervention, videos based on HIV themes were provided for the children who watched them generally during group meetings. The videos could be downloaded from social media sites. At the end of each session, participants were given another take-home video to watch at home individually and write down the central message as well as the moral lessons gained thereof. During the next session, after collectively watching the video of the day, participants were made to narrate the story of the moral lesson they learned from their take-home video to other group members. At the end of the narration, the narrator asked other group members about the moral lesson they gained from the narrated story and also to make their contributions. To ensure that each participant took turns during sessions, a method is known as "pick a card, any card," was initiated through which each of the listeners was given five minutes to respond, answer the question and make a contribution to the HIV video story that was narrated. After this, the children were separated into groups of six members each by the researchers in which they were engaged in small psycho-educational discussions. Each group was directed by one therapist to survey their perceptions and knowledge of HIV/AIDS. The researchers made use of a series of behavioral techniques in the course of delivering the educational digital storytelling intervention, including group discussions, direct teaching; cognitive, emotive, and behavioral homework assignments; and cognitive disputation; to layoff, superstitions concerning HIV/AIDS and encourage basic facts about the virus.

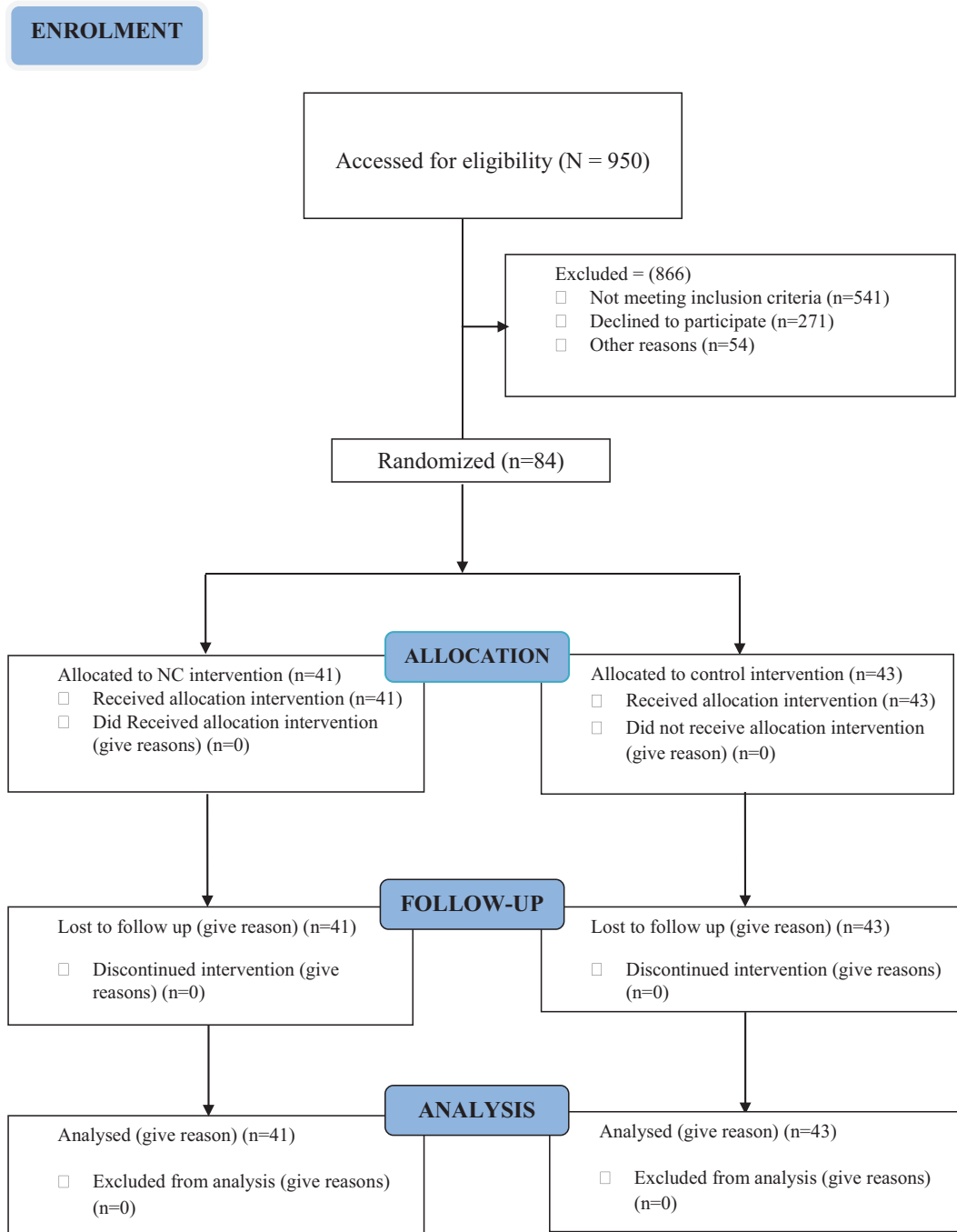


Figure 1. This legend shows the estimated marginal mean of HIVKQ18. Flow diagram: This legend shows the distribution of participants in the treatment and control groups.

3.7. Measures

HIV Knowledge Questionnaire (HIV-KQ-18): The HIVKQ-18 is a self-administered questionnaire that measures the HIV-related knowledge of individuals. The HIVKQ-18 was developed by Carey and Schroder and contains 18-items.^[27] The instrument is scored on 3-choice statements via true, false, or do not know which are summed to yield a single score. Higher scores indicate higher HIV-related knowledge. The HIVKQ-18 is a good, reliable, and valid instrument for assessing HIV-related knowl-

edge.^[27] The HIV-KQ-18 has a reported Cronbach alpha internal reliability coefficient of 0.87.

Perceived Risk of HIV Scale (PRHS): The PRHS is a self-report questionnaire that measures cognitive assessments of risk, intuitive assessments, and salience of risk.^[28] The PRHS was developed by Napper, Fisher, and Reynolds, and contains eight items. The instrument is scored on a 5-point scale of different responses, which are summed up to yield a single overall PRHS score.

Children demographic features	Percentage %	Number
Gender		
Male	53.57%	45
Female	46.43%	39
Ethnicity		
Igbo	80.95%	68
Yoruba	4.76%	4
House	15.38%	12
Mother's level of education		
No formal education	27.38%	23
Certificate of basic education or less	36.90%	31
General/vocational secondary education	23.81%	20
University/Polytechnic degree	11.90%	10
Parents relationship status		
Both parents alive and living together	64.28%	54
Both parents alive but separated	17.86%	15
One of the parents alive	11.90%	10
Neither of the parents alive	5.95%	5

Demographic Questionnaire (DQ): The DQ is a 5-item information instrument that assesses participants' demographic characteristics, including age, household size, gender, and parents' educational level.

3.8. Data analysis

In analyzing data from this study, the independent *t* test statistic was made use of. Some sections of the questionnaire were blurred (i.e., a blinding strategy) to minimize bias on the part of the data analysts. We tested for data normality and assumption violations. Data were normally distributed and statistical assumptions were adhered to. We also screened for missing data and there was no missing data. Statistical analyses were all done using IBM SPSS, version 20. Results were adjudged significant at $P \leq .05$.

4. Results

Table 2 displays the results on children's knowledge as assessed by the HIVKQ-18. There was no significant difference between the intervention and no-intervention control group participants in original knowledge and perception of HIV/AIDS at Time 1, $F(1, 82) = 0.047$, $P = .828$, $\eta_p^2 = 0.001$, $R^2 = -0.012$.

At post-treatment, result disclosed that the educational digital storytelling intervention had a significant improvement on the

knowledge and perception of HIV/AIDS among English Language speaking children in the intervention group as against those in the no-intervention control group as measured at Time 2, $F(1, 82) = 553.93$, $P = .000$, $\eta_p^2 = 0.871$, $R^2 = 0.869$.

Similarly, the follow-up measure further showed that the improvement in knowledge among children in the intervention group gained was maintained all through the follow-up period (Time 3) as against those in the no-treatment control group, $F(1, 82) = 890.01$, $P = .000$, $\eta_p^2 = 0.916$, $R^2 = 0.915$. Thus, educational digital storytelling intervention was therapeutically helpful in raising the level of knowledge among English Language speaking children who benefited from it. This is further illustrated graphically in Figure 1.

Furthermore, Table 3 shows improvement in the HIV risk perception among the children as measured by PRHS. The pre-treatment test (Time 1) shows no significant difference between the treatment and control groups, $F(1, 82) = 0.011$, $P = .917$, $\eta_p^2 = 0.000$, $R^2 = -0.12$. At the post-treatment test (Time 2), there was a significant mean increase in the perception of children in the treatment group when compared with their counterparts in the control group, $F(1, 82) = 1582.17$, $P = .000$, $\eta_p^2 = 0.951$, $R^2 = -0.950$. Also, the significant mean increase was maintained at the follow-up period (Time 3), $F(1, 82) = 3850.29$, $P = .000$, $\eta_p^2 = 0.979$, $R^2 = 0.979$. Therefore, educational digital storytelling intervention helped improve the level of HIV risk perception among English language speaking children who benefited from it. This is further illustrated graphically in Figure 2.

Furthermore, to assess whether the distributions of covariates were similar between the treated and control groups, a balance test was conducted and the results were no significant in gender, age, mother's level of education, and parental status for both HIVKQ-18 and PRHS (See Table 4 and Table 5).

5. Discussion

The present study tried improving knowledge and perception of HIV/AIDS among children in rural areas through educational digital storytelling intervention. The ICT-based interventions demonstrated sufficient treatment reliability and were rated by teachers as highly satisfactory.^[29] An intervention including the digital storytelling component demonstrated positive effects in improving poor knowledge and perception of HIV/AIDS among children in rural areas who benefited from the treatment. Given the significant improvement that was observed in knowledge and perception of participants in the treatment group as measured using the HIVKQ-18 and PSHS, respectively, the result of this study validated our hypothesis that the educational digital storytelling intervention will have a significant improvement effect on the poor knowledge and perception of children in rural areas concerning HIV/AIDS. The findings of this research further

Time	Measures	Group	Mean(SD)	F	Sig.	η_p^2	R^2	95% confidence interval
Pre-Treatment	HIVKQ18	Treatment	20.63 (1.56)	0.047	.828	.001	-.12	20.14–21.12
		Control	20.55 (1.63)					20.05–21.06
Post-treatment	HIVKQ18	Treatment	53.02 (8.92)	553.93	.000	.871	.869	50.20–55.84
		Control	20.48 (1.60)					19.97–20.96
Follow-up	HIVKQ18	Treatment	57.41 (7.9)	890.01	.000	.916	.915	54.89–59.93
		Control	20.38 (1.50)					20.02–20.95

ANOVA = Analysis of Variance; Degree of freedom = 1,83; number for treatment group = 41; number for control group = 43; M = Mean; SD = Standard Deviation; Effect size; R^2 : Adjusted.

Table 3
Mean, standard deviation, ANOVA, and effect size of PRHS among the participants in both treatment and control group.

Time	Measures	Group	Mean(SD)	F	Sig.	η_p^2	R^2	95% confidence interval
Pre-Treatment	PRHS	Treatment	9.09 (1.22)	0.011	.917	.000	-.12	8.71–9.48
		Control	9.06 (1.20)					8.69–9.44
Post-treatment	PRHS	Treatment	24.97 (2.19)	1582.17	.000	.951	.950	24.28–25.66
		Control	9.32 (1.32)					8.91–9.73
Follow-up	PRHS	Treatment	27.97 (1.57)	3850.29	.000	.979	.979	27.47–28.47
		Control	9.06 (1.20)					8.69–9.44

ANOVA = Analysis of Variance; Degree of freedom=1,83; number for treatment group=41; number for control group=43; M = Mean; SD = Standard Deviation; Effect size; R^2 : Adjusted.

reinforce previous claims on the clinical efficacy of digital storytelling intervention in helping people with knowledge and perception deficits.^[30–34] Evidence abounds that educational digital storytelling therapy can be useful in the clinical treatment of a broad range of disorders including autism spectrum disorder in children.^[29,35–37] These indications make evident the vital position of the treatment approach in clinical practice.

6. Implications for practice

Besides adding to knowledge in this field of study, we found some implications from the present results. The results have implications for research cooperation across disciplines. While some researchers believe that the usual knowledge practices of disciplines were the chief obstacle to uniform opinion between academic experts,^[38]

our findings presented evidence of effective cooperation across disciplines in a study. We, therefore, recommend more research collaborations involving academic professionals in rural sociology, child education, counseling, language and communication, psychology, and medical the field. This is necessitated by the fact that studies concerning social issues such as perception and knowledge of people including children require knowledge diffusion across various academic fields for effectiveness. Our findings and the limitations further suggest that professionals in rural sociology, rehabilitation counseling, child education, language and communication, medicine, and other allied fields should embark on major, controlled, and randomized trials aimed at improving knowledge and perception of children in rural areas about HIV/AIDS. The efficacy of such trials will do more in reinforcing and upholding the present study.

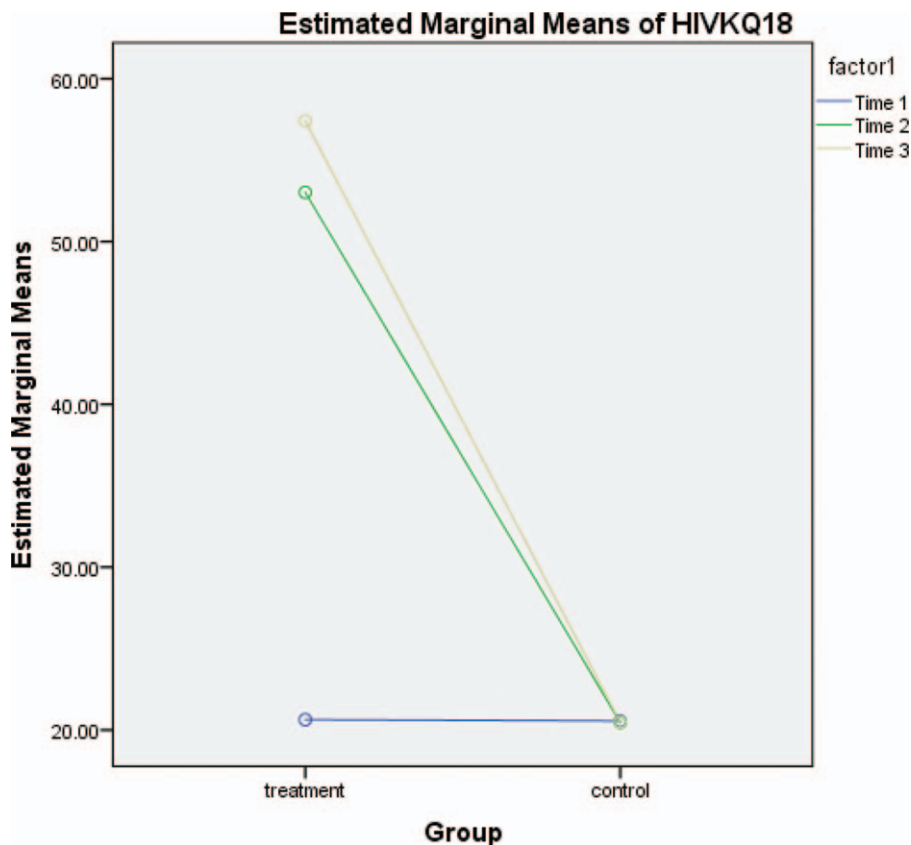


Figure 2. This legend shows the estimated marginal mean of PRHS. Additional Reference (please integrate)

Table 4
Balance test for HIVKQ18.

Group	Gender	Mean	Std. D	F	Sig.	η_p^2
Treatment	male	20.63	1.56	2.77	.100	.034
	Female	20.63	1.56			
Control	male	19.50	1.91			
	female	20.66	1.59			
Group Age						
Treatment	9–11 yr	20.63	1.56	1.58	.212	.020
	12–14 yr	20.09	1.56			
Control	9–11 yr	20.51	1.67			
	12–14 yr	20.33	1.72			
	14 yr and above	21.50	1.00			
GROUP MOTHER'S LEVEL OF EDUCATION						
Treatment	No-formal Education	20.69	1.60	.040	.842	.001
	Certificate of basic education or less	20.55	1.54			
	University/Polytechnic degree	20.63	1.56			
Control	Certificate of basic education or less	20.61	1.75			
	General/vocational secondary education	20.40	1.56			
	University/Polytechnic degree	20.80	1.75			
GROUP PARENTS RELATIONSHIP STATUS						
Treatment	Both parents alive and living together	20.63	1.56	.902	.345	.011
	Both parents alive but separated	20.63	1.56			
Control	Both parents alive and living together	20.61	1.75			
	Both parents alive but separated	20.53	1.64			
	One of the parents alive	20.10	1.79			
	Neither of the parents alive	21.40	.89			

It will be of benefit in no small measure if potential studies investigate whether educational digital storytelling intervention can be effective using other languages, other than English, and also how it can be applied in improving public knowledge and

perception of other diseases threatening human existence including the current COVID-19 pandemic. It appears that an educational digital storytelling intervention might be helpful in the improvement of other aspects of public knowledge and

Table 5
Balance test for PRHS.

Group	Gender	Mean	Std. D	F	Sig.	η_p^2
Treatment	Male	9.12	1.22	.386	.536	.005
	Female	9.09	1.90			
Control	Male	8.75	.95			
	Female	9.10	1.23			
Group Age						
Treatment	9–11 yr	9.09	1.22	.009	.923	.000
	12–14 yr	9.09	1.34			
Control	9–11 yr	9.11	1.21			
	12–14 yr	8.91	1.31			
	14 yr and above	9.25	.95			
GROUP MOTHER'S LEVEL OF EDUCATION						
Treatment	No-formal Education	9.17	1.26	.007	.936	.000
	Certificate of basic education or less	9.00	1.18			
	University/Polytechnic degree	9.09	1.22			
Control	Certificate of basic education or less	9.07	1.25			
	General/vocational secondary education	9.00	1.16			
	University/Polytechnic degree	9.20	1.31			
GROUP PARENTS RELATIONSHIP STATUS						
Treatment	Both parents alive and living together	9.09	1.22	.022	.882	.000
	Both parents alive but separated	9.23	1.43			
Control	Both parents alive and living together	9.07	1.25			
	Both parents alive but separated	9.06	1.22			
	One of the parents alive	9.10	1.37			
	Neither of the parents alive	9.00	1.00			

perception deficits, however, potential research efforts should test this view. Again, our findings imply that researchers globally should aim to use educational digital storytelling for different low public awareness-related problems and the need to produce many digital stories in English and other languages that will create more awareness for children.

7. Conclusion

The present study showed that the use of educational digital storytelling could improve knowledge and perception of HIV/AIDS among English language speaking children in rural areas. Educational digital storytelling intervention effectively improved knowledge and perception of HIV/AIDS among English language speaking children in rural areas. In return, we recommend that rural sociologists, counselors, language and communication experts, child educators, and other professionals involved in public health especially, as it concerns children be skilled in the use and application of educational digital storytelling intervention procedures in order to facilitate the move towards adopting the method in their professional practices.

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