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Effect of Hand Washing Education on Primary School Pupils in Nkanu West Local Government Area (Lga) of Enugu State, Nigeria

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ABSTRACT

The study explored the effectiveness of hand washing (hw) education on primary school pupils in Nkanu West LGA of Enugu state. Comparison group pretest-posttestdesign was utilized to execute the study. The population for the study was 9746 pupils. The samplefor the study was 48 pupils made up of 23 and 25 intact primary 5 classes from two separate schools. The instrument utilized for data collection was a 10-item hw achievement multiple-choice test (HaWaT) adapted from hw testdeveloped by Massachusetts Department of Public Health Division of Epidemiology and Immunization-MDPHDEI (2000). The HaWaT had sections A and B that sought data on knowledge and skills of hw respectively. The face and content validity of the instrument was established through the judgment of three expertsin health education, psychology and measurement/evaluation. The instrument was pilot tested in a school in the LGA that was different from the schools selected for this study using a test-retest method. The resultant data were correlated using Pearson Product Moment Correlation Coefficient and it yielded a reliability coefficient of .78. Kuder-Richardson formula 20 was utilized to determine its internal consistency and it yielded a reliability index of .71. Data that were generated from the pre and posttest were analyzed using SPSS version 21. Descriptive statistics of mean ($\bar{x}$) and standard deviation (SD) were used to answer the research questions while ANOVA was used to verify the

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hypotheses at .05 level of significance. The majorfindingsfrom the study showed that the mean achievement gain on: knowledge of hw of the intervention group ($\bar{x}$=10.87%) was higher than the comparison group ($\bar{x}$=.08%); skills of hw of the intervention group ($\bar{x}$=12.81%) was greater than the comparison group ($\bar{x}$=4.40%). Additionally, the ANOVA test showed that null hypothesis one which stated that there was no significance difference between experimental and comparison group on knowledge of hw was rejected (p value=.001<.05 alpha level).Similarly,null hypothesis two which stated that there was no significance difference between both groups on skills of hw was rejected(p=.001< .05 alpha level). Based on these findings, it was concluded that the hw education was effective. Following from the conclusions a recommendation for the adoption of the health education in primary schools in Nkanu West LGA was made.

Keywords: hand washing, health promotion, health education, teaching

Hand washing (hw) is a positive health practice. This is becausecontaminated fingers areassociated with the transmission of faeco-oral infections like enteric fevers, dysentery, cholera and many intestinal parasitic worms (Nwokike, 2015). Efe-Aigbovo and Okafor (2016) showed that the dreaded Ebola virus disease (EVD) which is a respiratory infectionis alsomainly transmitted through unwashed hands.The infections that are transmitted through unwashed hands have high mortality rates(Agboola&Rosiji, 2016). Nwokike revealed that about 5 million under five children dieevery year in the developing countries from acute diarrhoea. In Nigeria alone,diarrhoea killed 150,000 children annually (UNICEF/Water Aid Nigeria, 2008).Diarrhoea, according to Eseoghene and Ujiro (2013), also contributedto loss of 22 million school days each year in Nigeria.

Deaths and man-hour losses resulting from diseases associated with unwashed hands are avoidable.According to Igbokwe, Dibia and Igbokwe (2015),hw could drastically reduce faeco-oral diseases.The Global Public-Private Partnership for Handwashing (2016) stated that hand washing with soap also reduces stunting, undernutrition, maternal mortality, water supply contamination and a host of others. In statistical terms, Agberemi, Ofem and Saidu (2009) reported that diarrhoea episodes could be reduced by 30 to 40 per cent with hw alone. Hw is not only effective in disease prevention; it is also cheap and safe.

Hw as used in this study simply means cleaning ones hands with water and soap. Hwas a practice is associated with its knowledge. Put in another way, for an individual to imbibe the practice of hw, he is likely to have the knowledge of the importance of the act. Knowledge which was defined by Landy and Conte (2010) as a collection of discrete but related facts and information about a particular domain was adopted in this study. Nigeria parents and older siblings frequently instruct small children to wash hands, particularly, before eating (Adegbite, 2005).Some of the health knowledge might require unlearning, modifying or strengtheningat the primary school.Primary education in Nigeria is for those aged 6-11 years.Although hw is thought at that level of education, observation has shown that little attention is paid to the skills of hw among pupils in Nkanu West.The skill of hw is vital at critical periods. According to Garg, Taneje, Badhan and Igle (2013), the most critical times

for hw included after going to toilet, before cooking or handling food, before eating and after handling dirty things.

Hw skill is concerned with the techniques of washing hands to get rid of germs that could lead to infections. Skill is an action with a specific goal that can be learnt, that involves actions performed in sequence (Trevithick, 2012). Hw skill is skill-based health education. This is because Iwuagwu (2016)reported that skill-based health education is aimed at providing a sequence of planned experiences capable of equipping learners with adequate abilities to take action to promote their health. Correct hw, as indicated by Eseoghene and Ujiro (2013) is done in a stepwise manner. Nonetheless,hw, even among educated adults, in the area of this study is often done perfunctorily. Inadequate skill of hand washing also occurred among girls students in middle schools in Delhi, India. Inappropriate hw among primary school pupils could be serious inNkanu West LGA since the area is not yet open-defeacation free(Ani&Ugwuoke, 2015).Fresh faeces could easilybe handled by the primary school pupils while playing or working in the fields. Additionally, since the authors reported that only a small proportion of households in the LGA provided wash hand basins close to their toilets, it suggests an absence of the culture of hw at such critical moment in many homes where the pupils came from.Eseoghene and Ujiro also found low utilization of hw facilities in primary schools in Ughelli North LGA of Delta state, Nigeria which is not likely to be different in some primary schools inNkanu West LGA.

Hwamong primary school children is extremely beneficial because they often cared for their younger siblings.Since they often fed and cleaned up their little ones when their mothers were in the farm, market or busy with home chores, regular hw would protect their health and that of their younger ones. Hand washing among them is also significant to the whole community because UNICEF (no date) indicated that 80 percent of children in developing countries enrolled in primary schools.

Although primary schoolpupilsin Nkanu West LGA could have been thought how to keep their bodies clean as part of the curriculum or they might have acquired knowledge and skills of hwthrough campaigns carried out in Nigerian schools as indicated by Agberemi, Ofem and Saidu(2009), the effect of such educations in Nkanu Westis not clear, hence this study. As pointed out earlier, ifknowledge and skills of hw is put into practiceby the pupils,it would lead to health promotion in their communities generally.This is because Xie, Chongsuvivatwong, Tan, Tang, Sornsrivichai, McNiel, (2015)indicated that hw with soap after playing in the playgrounds led to reduction of hand, foot and mouth disease among a study group in China.

Health promotion means empowering people to take responsibility for their health. According to Egba and Omaka-Amari(2016), health promotion enablesan individual to have optimal health and promote personal empowerment. Ekenedo and Iwuagwu (2015) stated that health promotion relies on health educationto help change negative health behaviours or environment. Health promotion and health education are interwoven. This is because,just as health promotion, Adegbite (2005) stated that health education sharpens an individual's decision-making power in matters of health.Its goal is to enable the target audience to take informed action in order to improve their health. According to Ekenedo (2005), health education is a means of changing existing negative behaviour, attitude and belief and reinforcing positive ones. Bassey and Ikorok (2016) showed that health education, lifestyle and behaviour changes are the core health promotion activities.

Health educationcould beeffected byusing mass media or person-to -personmethods. According to Aggarwal (2011), with the advancement of technology the mass media

have become vital avenues for education since they can reach a large audience at the same time. Mass media like the radio, television, print media, computer and the internet have strong influence on children.Thisis because they have the capacity to integrate text, pictures, audio and animation(Madu&Nwangwu, 2014).Despite the strong appeal of the new high-tech mass media on the school children, Aggarwal reiterated the relevance of person-to-person teaching. West and Turner(2011) also advocated interpersonal method in small groups like classrooms. Since the high-tech media are rarely used in primary schools in Nkanu West LGA, they might not be relied upon forimparting hw messages to the pupils. Consequently, teaching hwusing person-to-person method was adopted in this study.

Teaching involves making an individual to learn something meaningful. It is a behaviour change communication process. In this study,it involvesthe teacher sharinghw knowledge and skills with the subjects. Siddiqui and Khan (2011) stated that teaching is the process by which the teacher andthe child share their values and beliefs. The expertsindicated that the most important aim of any teaching was to improve the instructional effectiveness. Different teaching methods might have been utilized singly or in combinationin impartingpersonal hygieneto pupils in the area of this study. However,Ene (2000);Idoko (2010) stressed the need to selecteffective teaching method/s in order to achieve the intended results of teaching and learning.Hassan and Usman (2015) also recommended the use of teaching methodthat has the potential to empower the targeted audience to work for change.Therefore, the present research focused on finding out the effectiveness of teachinghwamong pupils in Nkanu West LGA of Enugu state.

Researches have been conducted on hand washing in other areas. For instance, in a hand hygiene programme by WHO (2009) conducted for health workers in Bamako, Mali, hygiene compliance rose significantly among the subjects after treatment.WaterAid and The Soap Box (2015) indicated that hand-hygiene compliance among Nigerian nurses was higher than that of doctors after a hand washingintervention.Omuewu, Ogboghodo, Opene, Oriarewo and Onibere(2013) had earlier identified lack of soap and water amongst others as thereasons for non-compliance among doctors in southern Nigeria. In Angolela, Ethiopia, primary school pupils in grades 1-6 had adequate knowledge of hand hygiene but only a small proportion of them used soap for hand washing (Vavis, Gelaye, Aboset, Kumie, Berhane& Williams, 2010). The authors showed that far less percentage of the pupils washed hands after defeacating. Similarly, Lopez-Quintero, Freeman and Neumark (2009) reported that insignificant proportion of school children investigated inBogota, Colombia had regular access to soap and water for hw. Xuan and Hoat (2013) revealed that none of the schools studied in minority area of Vietnam had soap and very small percentage of the entire school children performed hand washing satisfactorily.Garg, Taneja, Badhan and Igle (2013) found that a high proportion of students in grades 6^{th}-8^{th} in Delhi, India acquired the correct technique of hw following an intervention. Shrestha and Angolkar (2015) showed that primary schools pupils in South India acquired adequate hw knowledge following a hw education. Since there has not been any study on hw among primary school pupils in Nkanu West to the best of the knowledge of the researcher, this research was conducted to fill in the gap.

Research Questions

1. What is the mean achievement score of hw knowledge of pupils that received hand washing education in Nkanu West LGA?
2. What is the mean achievement score of hw skills of pupils that received hand washing education in Nkanu West LGA?

Hypotheses

Two null hypotheses formulated to guide the study were tested at .05 level of significance.

1. There is no significant difference betweenthe mean achievement score of knowledge of pupils that received hw education and the comparison group.
2. There is no significant difference betweenthe mean achievement score of skills of pupils that received hw education and the comparison group.

Method

Comparison group pretest-posttestdesign was utilized to execute the study. Thedesign permits assignment of subjects not randomly selected into treatment and comparison groups (Grinnell, Jr., Unrau& Williams, 2005). The population for the study was 9746pupils in the 51 public primary schools in Nkanu West LGA (Nkanu West Local Education Authority-NKWLEA, 2017). A two stage sampling procedure was used to draw a sample of 48 pupils involved in the study. Stage one involved the selection of two schools that had water, sanitation and hygiene (WASH) facilities through purposive sampling technique. Stage two involved the selection of twointact primary 5 classesthat were made up of 23 and 25 pupils from each of the schools through cluster sampling technique. Different schools were deliberately drawn to guard against diffusion or compensatory rivalry effects which, according to Grinnell, Jr., Unrau and Williams, could occur when experimental and control group were closely situated.

The instrument utilized for data collection was a 10-itemhw achievementmultiple-choice test (HaWaT).It was adapted from Massachusetts Department of Public Health Division of Epidemiology and Immunization-MDPHDEI (2000)hw test for grade 5. The HaWaThad sections A and B. Sections A and B sought data on knowledge and skills ofhw respectively.Theface and content validity of the instrument was established through thejudgment of threeexpertsin health education, psychology and measurement/evaluation. According to Okwo (2001), content validity is vital for achievement tests like the present one. The instrument was pilot tested in aschool inthe LGA that was different from the ones selected for this study using a 2-week interval test-retest.The resultant data were correlated using Pearson Product Moment Correlation Coefficient and it yielded a reliability coefficient of .78. Kuder-Richardson formula20 (KR-20) was utilized to determine its internal consistency and it yielded a reliability index of .71. KR-20 is suitable for right and wrong answers and for an instrument that is relatively easy. Ebuoh (2004) recommended its use to avoid the problem associated with split-half method.

The researchers engaged anexperienced public health officer toconduct the teaching.The hygiene officerwas versatile with working with pupils butshe was trained on the need for:coverage of the lesson plan that was adapted from MDPHDEI (2000);sticking to time; effective use of teaching aids and so on.The research team and the authorities of the sampled schools agreed onthe modalities for the intervention. Each participant was given a note bookafter the programme.

Before the intervention, a pretest was administered on the sampled classes while a posttest was administered on them after the intervention.Data that were generated were scored on a maximum of 100 and a minimum of zero percent. The datawere analyzed using SPSS version 21. Descriptive statistics ofmean ($\bar{x}$) and standard deviation (SD) were used to answer the research questions posed to guide the study while a one-way analysis of variance (ANOVA) was used to verify the hypotheses postulated to guide the study at .05 level of significance. ANOVA was utilized instead of independent t-Test because of the pretest and posttest on two independent groups (Williams, Tutty& Grinnell, Jr, 2005). However, since there were only two groups involved *post hoc* test was not necessary after finding significant F values in this study.

Results

Table 1:Mean Achievement Scores ofKnowledge of Pupils that received Hand Washing Education in Nkanu West LGA (n=48)

Hand washing knowledge		Pretest		Posttest		
Group	N	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$ Gain
Intervention	23	23.04	13.29	33.91	12.34	10.87%
Comparison	25	21.60	11.79	22.40	13.00	.08%

Table 1 shows that the intervention and the comparison groups mean achievement scores in the pretest were $\bar{x}$=23.04% with SD=13.29 and $\bar{x}$=21.60% with SD=11.79 respectively. From the same Table, the intervention group had a mean achievement score ($\bar{x}$=33.91%; SD=12.34) which was greater than that of the comparison group ($\bar{x}$=22.40: SD=13.00) in the posttest. Since the mean achievement gain ($\bar{x}$ gain=10.87%) of the intervention group was well above that of the comparison group ($\bar{x}$ gain=.08%), the hw education was effective.

Table 2: Mean Achievement Scores of Skills of Pupils that received Hand Washing Education in Nkanu West LGA (n=48)

Hand washing skill		Pretest		Posttest		
Group	N	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$ Gain
Intervention	23	15.65	12.37	27.83	10.43	12.81
Comparison	25	12.80	8.91	17.20	9.36	4.40

Table 2 shows that the intervention group had a mean achievement score of 15.65 per cent with SD of 12.37 in the pretest and a mean achievement score of 27.83 per cent with SD of 10.43 in the posttest. Additionally, the Table indicates that the comparison group had a mean achievement score of 12.80 per cent with SD of 8.91 per cent in the pretest and a mean achievement score of 17.20 per cent and SD of 9.36 in the posttest. The mean achievement gain of the intervention group (12.81%) was higher than that of the comparison group (4.40%), indicating that the programme was effective on skills hw among the pupils.

Table 3: Summary of ANOVA Test Verifying the null Hypothesis of no Significant Difference between the Knowledge Achievement Scoreof Pupils that received Hand Washing Education and the Comparison Group

Source	Type III Sum of Squaresdf	Mean square	F	Sig.
Corrected model	3618.805[a]	2	1809.402	15.155 .000
Intercept	2964.245	1	2964.245	24.827 .000
PreKnowledge	2030.964	1	2030.964	17.010 .000

Group	1378.963	1	1378.963	11.549	.001
Error	5372.862	45	119.397		
Total	46400.000	48			
Corrected Total	8991.667	47			

a. R Squared=.402 (Adjusted R Squared= .376)

*Significant p.05

Table 3 indicates that at the F-ratio value of 11.549 and df of 1 and 48 the probability value was .001. Since the probability value was lower than the .05 alpha level, null hypothesis one which stated that there was no significance difference between experimental and comparison group on knowledge of hw was rejected.

Table 4: Summary of ANOVA Test Verifying the null Hypothesis of no Significant Difference between the Skills Achievement Scoreof Pupils that received Hand Washing Education and the Comparison Group

Source	Type III Sum of Squares	df	mean square	F	Sig.
Corrected model	1573.403[a]	2	786.702	8.282	.001
Intercept	6481.305	1	6481.305	68.232	.000
Preskill	220.791	1	220.791	2.324	.134
Group	1186.123	1	1186.123	12.487	.001
Error	4274.513	45	94.989		
Total	29700.000	48			
Corrected Total	5847.917	47			

a. R Squared=.269 (Adjusted R Squared=.237)

*Significant p.05

Table 4 indicates that at the F-ration value of 12.49 withdf of 1 and 48 the probability value was .001. Since the probability value was lower than the .05 alpha level, null hypothesis two which stated that there was no significance difference between experimental and comparison group on skills of hw was rejected.

Discussions

Table 1showed that the intervention group had a higher mean achievement gain on hand washing knowledgeafter the health educationthan the comparison group. This finding was not strange since the hweducation in the present study was painstakingly designed with the view of increasing the hw knowledge of the pupils. The rich content of the hw lessons and its specific objectives which were adapted from MDPHDEI (2000); theample use of locally devised instructional materials and the use of a teacher with high level of health education competency might have contributed to the effectiveness of the programme. The researchers' position is informed by Siddiqui and Khan's (2011) view that a well-designed educational programme usually improves the instructional effectiveness. The finding also agreed with Vavis,Gelaye, Aboset, Kumie, Berhane and Williams (2010);Shrestha and Angolkar (2015). The present result also lent credence to findings by WHO (2009); WaterAid

and Soap Box (2015) which revealed that hand hygiene compliance among health workers in Bamako and Nigeria respectively rose significantly after intervention. This is because health knowledge correlates positively with health practice.However, the present result contradictedEseoghene and Ujiro's (2013) finding oflow utilization of hw facilities.All the same, the authors' finding could be linked toinadequate knowledge of hw of the pupils involved in their study unlike in the present study.

The ANOVA test showed that null hypothesis one, which stated that there was no significant difference between experimental and comparison group on hw knowledge was rejected (Table 3). Thus the finding was statistically significant, indicating that the rise in the hw knowledge among the primary school pupil in Nkanu West was due to the health education. Attributing the significant difference to the intervention was based on the fact that the pretest revealed that both groups of pupils had the same educational and environmental backgrounds before the treatment. The present finding agreed with RubanpremKum, Aruna and Sasikala (2014), who found a statistically significant difference betweenpretest and posttestmean achievement on knowledge of hwamong students in Mugalivakkam village, Kancheepuran District of India following a health education.

The result in Table 2 indicated that the intervention group had a higher mean achievement gain on skills of hw than the comparison group after the health education. The finding was expected sinceEne (2000); Idoko (2010) Hassan and Usman (2015) asserted that effective teaching methodis key to the achievement of any intended objectives of teaching.Therefore, the method of instruction employed in the present study which was composite in nature could have contributed to the result. This finding was alsoin consonance with Garg, Taneja, Badhan andIgle's (2013).The finding, however, contradicted the finding of Xuan and Hoat (2013) which indicated that very small proportion of school children in the minority area of Vietnam performed hw satisfactorily.Additionally, since proper use of soap is critical to the skills of hw, it is not amazing that this findingdisagreed with Lopez-Quintero, Freeman and Neumark (2009);Vavis, Gelaye, Aboset, Kumie, Berhane and Williams (2010); Omuewu, Ogboghodo, Opene, Oriarewo and Onibere (2013), who identified lack of soap and other things as some of the reasons for non-compliance with hw among the groups they studied.

The ANOVA test showed that null hypothesis two, which stated that there was no significant difference between experimental and comparison group on skills of hw was rejected (Table 4). Therefore, the finding was statistically significant. Hence the significant difference between the experimental and the comparison group was reliably ascribed to the intervention. This was based on the fact that the pretest indicated that both groups of pupils were equivalent at the beginning of the intervention. This finding corroborated Garg, Taneja, Badhan andIgle (2013), who showed that there was a significant increase in technique of hw after their intervention.

Conclusions

Based on the findings of the study the following conclusions were made.

1. The intervention group had a higher mean achievement gain on hw knowledge after the intervention than the comparison group.
2. The intervention group had a higher mean achievement gain on hw skill after the health education than the comparison group.
3. There was statistically significant difference between primary school pupils that received hw education and the comparison group on knowledge of hwin Nkanu West LGA.
4. There was statistically significant difference between primary school pupils that received hw education and the comparison group on skills of hw in Nkanu West LGA.
5. **Recommendation**

Following from the findings and the conclusions it was recommended that the hw education should be mounted in the primary schools in Nkanu West LGA. The intervention will promote the health of these pupils and that of their families. This is because it is expected that both the knowledge and skills they would acquire will be transferred to their homes.

Limitation of the Study

The use of test instead of observation in generating data on the skills of hw might have not completely eliminated socially desirable responses. Therefore, generalization based on the data need to be interpreted with caution.

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