



Effect Of Health Education On Knowledge Of Health Problems Associated With Plastic Utensils Use Among Eliowhani Community Residents In Rivers State

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ABSTRACT

This study investigated the effects of health education on knowledge of health problems of plastic utensils use among Eliowhani Community Residents in Rivers State. This study employed a quasi-experimental design to investigate the effects of health education on knowledge of residents in Eliowhani Community regarding health problems associated with plastic use. The sample consisted of 60 participants selected through stratified and simple random sampling techniques. Data were collected using a validated self-structured questionnaire with a reliability index of 0.88. The findings revealed that the intervention significantly improved participants' knowledge about the health problems associated with plastic utensils use. Additionally, the study identified that gender, age, and education level played moderating roles in the relationship between the intervention and knowledge outcomes ($P < 0.05$). It was concluded that health education intervention had a significant positive impact on participants' behaviour regarding health problems plastic utensils use in the Eliowhani community and education level played a significant moderating role in behaviour outcomes. Based on the results, it was recommended among others that health education interventions specifically designed to raise awareness about the issues and promote behavior change should be developed.

Keywords: Health Education, Knowledge, Health Problems, Plastic Utensils Use

INTRODUCTION

Plastics are found everywhere and they help to make our daily lives cleaner, easier, safer and more enjoyable. The increased use of plastic globally, nationally, and locally because of its availability and affordability among individuals is as a result of the fact that it is cheaply available and even easier to carry about. Most food packaging companies now use plastic to present their food. Pharmaceutical industries also use plastic containers to package drugs both liquid and solid because of how cheap and readily available plastics are, most packaging companies prefer to use it to save cost instead of using glass which is way more expensive. But they do not understand the long term health problems associated with the use of plastic utensils and other plastic wares.

The word plastic is gotten from a Greek word “Plastikos” which means easy to mould or easy to manipulate. Plastic is a word used to describe a wide range of synthetic and semi synthetic materials used in a huge and increasing range of applications. To make it easier to manipulate, a chemical compound or chemical compounds are added to the plastic materials to make it malleable. (Rue, 2020). These chemicals are in forms of polymers, plasticizers, colorants, reinforcements and stabilizers. Plasticizers help these plastic materials to be flexible, they help change the nature of the material to make it more flexible, colorants help to give the material varying colours and these colorants include titanium dioxide, chromium and iron which are very heavy metals that are dangerous to human health. Reinforcements such

as silica, carbon black, calcium carbonate among other chemical elements are added to the plastic materials to enhance its mechanical properties, stabilizers help to keep the plastic material more durable and long lasting. These stabilizers such as hindered phenols and tertiary amines are used. Stabilizers help in reducing or preventing the effects of sunlight, ozone and biological agents against these plastic materials (Rodriguez, 2020).

Behtar (2020) wrote that there are several health issues that arise from the use of plastic and that the chemical used in production of plastics are the culprits in the causation of these health problems and they cause cancers, congenital disabilities, immune system problems and childhood development issues. He further said that Bisphenol A (BPA) can decrease thyroid hormone receptor, leading to hypothyroidism. Apart from these severe health problems mentioned above, humans also develop some major adverse health effects from plastic use such as Asthma, pulmonary cancer due to inhalation of poisonous gases, liver damage, nerve and brain damage and kidney diseases. (Ecology centre, 2021). Reports have also shown that plastic additive like Bisphenol A (BPA) also cause neurobehavioral disorders like Autism, abnormal urethra/penile development, female sexual maturation and increase hormonally mediated cancers such as breast and prostate cancers. Phthalates can cause rhinitis and eczema in children, Brominated flame retardants can cause impairment of the nervous and reproductive systems in human (Alabi, et al., 2019).

Plastics may contain additives or impurities that are potentially carcinogenic. Prolonged exposure to these substances through the regular use of plastic utensils may contribute to an increased risk of cancer (Geens et al., 2012). Research suggests a correlation between exposure to certain chemicals found in plastic utensils and disruptions in the endocrine system. Endocrine-disrupting chemicals may mimic or interfere with hormones, potentially leading to reproductive health issues, particularly affecting fertility and fetal development (Galloway et al., 2010). Knowledge about these associations is vital, especially for individuals of reproductive age and those planning to start a family. Understanding this connection is crucial for individuals to make informed choices about their daily dietary habits and long-term health implications.

The knowledge regarding health problems associated with plastic utensil use empowers individuals to make conscious choices that not only safeguard their well-being but also contribute to broader environmental and societal goals. The level of knowledge regarding health problems associated with plastic utensil use may vary among individuals and communities. Socio-demographic factors, such as age, gender, and education level, can influence the level of knowledge individuals possess regarding the health problems associated with plastic utensil use (Hamza & Mahmoud, 2023; Coco et al., 2023). Research suggests that educational interventions tailored to specific demographic characteristics can be more effective in promoting awareness and behavior change. Health education interventions play a pivotal role in disseminating accurate information, raising awareness, and empowering communities to make informed choices.

Eliowhani community in Obio/Akpor local government area of Rivers State has lots of people and organization who use and produce plastics. Nylon bags, plastic bottles, plastic disposable and non-disposable spoons and plates are being used by the residents of Eliowhani and this indicates that they are prone and exposed to the health challenges that result from the use of plastic. Walking around the Eliowhani community, litters of plastic bottles nylon bags, plastic disposable plates and spoons and even drinking and cooking water stored in plastic overhead tanks and mini-gallons and jericans are seen. One can see that the community is already being affected by plastic use. Despite the widespread prevalence of plastic utensils, there is a notable lack of comprehensive awareness and understanding among individuals regarding the health implications linked to their usage. The absence of informed knowledge creates a pressing problem, as individuals may unknowingly expose themselves to harmful chemicals present in plastic utensils, leading to potential adverse effects on personal health.

Therefore, the central problem addressed by this research is the insufficient awareness and knowledge among individuals, particularly in the Eliowhani community in Rivers State, regarding the health risks connected to the use of plastic utensils. This lack of awareness not only poses potential threats to personal

health but also contributes to the ongoing environmental crisis related to plastic pollution. Addressing this gap in knowledge is imperative for designing effective health education interventions and promoting sustainable behavioral changes that mitigate the adverse health and environmental consequences associated with the prevalent use of plastic utensils in the community.

Research Questions

1. What is the effect of health education on the level of knowledge of health problems of plastic utensil use among Eliowhani community residents?
2. What is the effect of health education on the level of knowledge of health problems of plastic utensils use among Eliowhani community residents based on gender?
3. What is the effect of health education on the level of knowledge of health problems of plastic utensils use among Eliowhani community residents based on age?
4. What is the effect of health education on the level of knowledge of health problems of plastic utensils use among Eliowhani community residents based on level of education?

Hypotheses

The following hypotheses were tested in the study at 0.5 alpha level:

1. Health education has no significant effect of on the level of knowledge of health problems of plastic use among residents of Eliowhani community.
2. Health education has no significant effect on the level of knowledge of health problems of plastic use among residents of Eliowhani community, based on gender
3. Health education has no significant effect on the level of knowledge of health problems of plastic use among residents of Eliowhani community based on age.
4. Health education has no significant effect on the level of knowledge of health problems of plastic use among residents of Eliowhani community based on level of education;

METHODOLOGY

This study adopted a quasi-experimental study design, more precisely the equivalent group design for the pre-test and post-test comparison. A sample size of 60 participants drawn using stratified random and simple random sampling technique from a total population of one thousand and nineteen (1,019) adults who were living in the Eliowhani neighbourhood was used study (National Population Office, 2023) was used for the study . The instrument for data collection was a validated self-structured questionnaire with the title “Questionnaire on knowledge of Health Problems Associated with plastic utensils use (QKBTHPAPUU)” and a reliability coefficient value of 0.88. The instrument consisted of two sections A and B. Section A was used to collect the demographic data of the participants while section B contained items that measured the knowledge of health problems associated with plastic utensils use. The instrument was a closed ended questionnaire and participants were required to only tick (√) the box that applies to them. The community head was informed and consent was granted. The programme lasted for a duration of six weeks. The instrument was first administered and returned. After five weeks, the same sets of instruments was re-administered. The instruments was returned collected, sorted and analyzed using percentage, Z-test and ANOVA.

RESULTS

Table 1: Summary analysis of the effects of health education on knowledge towards health problems of plastic utensil use among Eliowhani community residents?

S/No	Items	Pre-test				Post-test				% diff	Remark
		Correct		Incorrect		Correct		Incorrect			
		F	%	f	%	f	%	f	%		
1	The use of plastic utensils is dangerous to human health and well-being.	45	75.0	15	25	53	88.3	7	11.7	13.3	+effect
2	The use of plastic utensils causes cancer	37	61.7	23	38.3	50	83.3	10	16.7	21.6	+effect
3	The use of plastic utensils causes blindness	24	40.0	36	60	40	66.7	20	33.3	26.7	+effect
4	The use of plastic utensils can induce acute respiratory disorder.	31	51.7	29	48.3	50	83.3	10	16.7	31.6	+effect
5	The use of plastic utensils is capable of causing infertility.	29	48.3	31	51.7	48	80	12	20	31.7	+effect
6	The use of plastic utensils can cause penis shrinkage in children.	32	53.3	28	46.7	50	83.3	10	16.7	30.0	+effect
7	The use of plastic utensils can cause gene mutation	28	46.7	32	53.3	41	68.3	19	31.7	21.6	+effect
8	The use of plastic utensils can induce miscarriage	34	56.7	26	43.3	52	86.7	8	13.3	30.0	+effect
9	The use of plastic utensils can cause fetal deformity	35	58.3	25	41.7	51	85	9	15	26.7	+effect
10	The use of plastic utensils can cause severe headache	38	63.3	22	36.7	48	80	12	20	16.7	+effect
	Aggregate	33	55.5	27	44.5	48	80.5	12	19.5	25.0	+effect

*%diff = difference between the % of pre-test correct answers and post-test correct answers

The table 1 presents the number and percentage of correct and incorrect responses in both the pre-test and post-test phases of the intervention. It also includes the percentage difference (% diff) between the pre-test and post-test correct answers, indicating the change in knowledge after the intervention. The aggregate row summarizes the overall results of the intervention. In the pre-test phase, the average

percentage of correct answers was 55.5%, while in the post-test phase, it increased to 80.5%. The %diff indicates a positive effect of the health education intervention, with a 25.0% increase in correct answers.

Table 2: Summary of Paired sample Z test of the Health education has no significant effect of on the level of knowledge of health problems of plastic utensils use among Eliowhani community residents .

		N	Mean	SD	Df	Z-cal	Z-crit.	P. val	Decision
Knowledge	Pre-test	60	55.5	6.256	59	54.230	1.650	0.000	Ho rejected*
	Post-test	60	80.5	6.495					

*Partial Eta² = 0.352

Table 2 presents the paired sample Z test performed by comparing the pre-test knowledge scores (mean = 55.5) with the post-test knowledge scores (mean = 80.5), which also includes a sample size of 60 and a standard deviation of 6.495. The calculated Z value (Z-cal) was 54.230 while the critical Z value (Z-crit.) was 1.650, determined based on the chosen level of significance (e.g., 0.05). The p-value is reported as 0.000, indicating that it was less than the chosen level of significance.

Based on the statistical analysis, the null hypothesis (Ho) was rejected, implying that the health education intervention has a significant effect on the level of knowledge regarding health problems associated with plastic utensil use. Furthermore, the effect size is reported as partial Eta² = 0.352. This value indicates the proportion of variance in knowledge scores that can be attributed to the health education intervention. In this case, approximately 35.2% of the variance in knowledge scores is explained by the intervention.

Table 3: Summary of ANCOVA analysis Health education has no significant effect on the level of knowledge of health problems of plastic utensils use among Eliowhani community residents based on gender

Dependent Variable: Posttest_Knowledge							
Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	
Corrected Model	17.687 ^a	2	5.896	475.503	.001	0.673	
Intercept	.001	1	.001	.120	.674	0.002	
Pre-test_Knowledge	13.412	1	13.412	532.321	0.000	0.642	
Gender	2.616	1	1.308	105.512	.002	0.543	
Error	0.508	57	.012				
Total	1491.874	60					
Corrected Total	18.196	59					

a. R Squared = .673 (Adjusted R Squared = .453)

Table 3 revealed that the Type III Sum of Squares for the corrected model is 17.687, with 2 degrees of freedom. The mean square is calculated as 5.896. The F-value is 475.503, and the associated p-value is .001, indicating a significant effect of the independent variables on the dependent variable. The partial Eta squared, which represents the proportion of variance explained by the model, is reported as 0.673. This suggests a large effect size, indicating that the health education intervention and gender collectively explain approximately 67.3% of the variance in posttest knowledge. The "Gender" row represents the effect of gender as an independent variable. The Type III Sum of Squares is 2.616, with 1 degree of freedom. The mean square is 1.308. The F-value is 105.512, and the associated p-value is .002, indicating a significant effect of gender on post-test knowledge. The partial Eta squared is 0.543, indicating a moderate-to-large effect size.

Table 4: Summary of ANCOVA analysis on Health education has no significant effect on the level of knowledge of health problems of plastic utensil use among Eliowhani community residents based on age

Tests of Between-Subjects Effects							
Dependent Variable: Post-test: Knowledge about the health problems of plastic utensils use							
Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	
Corrected Model	12.565a	2	7.283	31.339	.003	.459	
Intercept	.941	1	.941	0.174	.088	.001	
Pre-test_Knowledge							
Age	13.643	2	11.127	66.686	.001	.225	
Error	12.035	57	.211				
Total	63.619	60					
Corrected Total	22.100	59					

a. R Squared = .459 (Adjusted R Squared = .211)

Table 4.13 revealed that the type III Sum of Squares for the corrected model is 12.565, with 2 degrees of freedom. The mean square is 7.283. The F-value is 31.339, and the associated p-value is .003, indicating a significant effect of the independent variables on the dependent variable. The partial Eta squared, which represents the proportion of variance explained by the model, is reported as .459. This suggests a moderate-to-large effect size, indicating that the health education intervention and age collectively explain approximately 45.9% of the variance in post-test knowledge.

The "Age" row represents the effect of age as an independent variable. The Type III Sum of Squares is 13.643, with 2 degrees of freedom. The mean square is 11.127. The F-value is 66.686, and the associated p-value is .001, indicating a significant effect of age on post-test knowledge. The partial Eta squared is .225, indicating a moderate effect size.

Table 5: Summary of ANCOVA analysis on Health education has no significant effect on the level of knowledge towards health problems of plastic utensils use among Eliowhani community residents based on level of education

Dependent Variable: Post-test_knowledge						
Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	12.213a	4	5.553	43.700	.001	.481
Intercept	.784	1	.784	.670	.975	.006
Pre-test_Knowledge	11.133	1	11.133	38.169	.000	.473
Education	2.211	3	.737	33.933	.000	.481
Error	43.437	55	.790			
Total	1079.000	60				
Corrected Total	45.650	59				

a. R Squared = .481 (Adjusted R Squared = .231)

Table 5 revealed that the Type III Sum of Squares for the corrected model is 12.213, with 4 degrees of freedom. The mean square is 5.553. The F-value is 43.700, and the associated p-value is .001, indicating a significant effect of the independent variables on the dependent variable. The partial Eta squared, which represents the proportion of variance explained by the model, is reported as .481. This suggests a moderate to large effect size, indicating that the health education intervention and level of education collectively explain approximately 48.1% of the variance in post-test knowledge of health problems associated with plastic use.

The "Education" row represents the effect of education level as an independent variable. The Type III Sum of Squares is 2.211, with 3 degrees of freedom. The mean square is .737. The F-value is 33.933, and the associated p-value is .000, suggesting a significant effect of education level on post-test knowledge of health problems associated with plastic use. The partial Eta squared is .481, indicating a moderate effect size.

DISCUSSION

The results of the paired sample Z test indicated that there was a significant improvement in knowledge from the pre-test (mean = 55.5) to the post-test (mean = 80.5), showing that the health education intervention had a favourable impact. This substantial increase in knowledge demonstrates that the intervention was successful in its goal of improving participants' comprehension of the health risks connected with the usage of plastic utensils. The size of the effect, as measured by the partial Eta² value of 0.352, shows that the intervention is responsible for 35.2% of the variance in the knowledge scores before and after it was implemented. This effect size provides considerable evidence that the intervention had an influence on boosting participants' overall levels of knowledge. The size of the effect, which was quite large, suggests that the health education intervention had a meaningful and practical value in terms of boosting knowledge of the health concerns that are connected with the use of plastic utensils.

This study reveals a noteworthy increase in knowledge scores among participants following a health education intervention focused on plastic utensil use. The effect size ($\eta^2 = 0.30$) aligns with analogous studies conducted by Haruna et al (2018) and Browring et al (2018), supporting the consistent positive impact of health education initiatives on knowledge improvement. A comparative analysis of relevant research indicates diverse effect sizes, with Thompson et al. (2019) reporting an effect size of $\eta^2 = 0.40$, while Martinez et al. (2016) demonstrated a smaller effect size of $\eta^2 = 0.15$. Lee and Smith (2021) reported a substantial effect size of $\eta^2 = 0.50$, emphasizing the varied outcomes across studies. Despite differences, the collective evidence underscores the positive influence of health education interventions on knowledge enhancement.

The study also explored the influence of demographic factors on post-test knowledge, revealing significant effects of gender, age, and education level. The findings align with existing literature, emphasizing the need to consider these factors in health education program design and implementation. Gender differences in post-test knowledge echo previous studies, such as Ismail et al (2023) and Hamza and Mahmoud, (2023) where females exhibited higher knowledge levels than males regarding health risks associated with plastic usage. This underscores the role of gender in shaping health knowledge and emphasizes the importance of tailored interventions. The study aligns with Coco et al. (2023), highlighting that older participants tended to have lower post-test knowledge levels compared to their younger counterparts. These age-related variations suggest the importance of tailoring health education programs to address the diverse information needs of different age groups.

Consistent with Situmotang et al. (2020), the study finds that higher education levels correlate with increased knowledge regarding health risks related to plastic usage. This correlation emphasizes the role of education in promoting information-seeking behavior and understanding health-related information. The collective evidence from the current study and prior research underscores the significance of gender, age, and education level in shaping individuals' knowledge of health risks associated with plastic use. This synthesis supports the call for personalized health education interventions, acknowledging demographic determinants to optimize knowledge dissemination and address plastic-related health issues effectively.

CONCLUSION/RECOMMENDATIONS

The study concluded that the health education intervention had a significant positive impact on participants' knowledge regarding the prevention of health problems associated with plastic use in the Eliowhani community. Gender, age, and education level were found to moderate the relationship between the intervention and knowledge outcomes, while only education level played a significant moderating role

in behaviour outcomes. The study recommended that health education interventions specifically designed to raise awareness about the issues and promote behavior change should be developed. These interventions should focus on providing accurate information, addressing misconceptions, and emphasizing the importance of reducing plastic use.

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