



EFFECTS OF HEALTH EDUCATION INTERVENTION ON USE OF FOODS LABELS AMONG STUDENTS OF FEDERAL UNIVERSITY DUTSE.
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Abstract

Packed food labels display sensitive Health related information like nutrient content, expired date, storage guidelines, mixing guidelines, Health claims and sensitive ingredient in food, drink and other products which are intended to guide consumers on healthy food choices..This study was conducted to assess the effect of six weeks consumer Health Education intervention on use/practice of packaged food label information among the students of Federal University Dutse, Jigawa State. To achieve this purpose, a pretest-posttest experimental research design was used. A total 180 sampled students (90 each for intervention and control) were selected and placed into control and intervention through multi stage sampling procedures of stratified random sampling, systematic, proportionate and simple random sampling techniques. A manual tagged label literacy manual, eight posters and packaged foods labels were used as training aids while a validated questionnaire PFL –PQ was used to test the participants pre and post intervention level of practice of labels. Inferential Statistics of paired sample t-test and effect of size were used to test the effectiveness of the intervention Programme at 0.05 level of significance. The result revealed there is significant improvement on practice of packaged food label from the baseline score in the intervention group $t(89) = 40.05$, $p < .00001$).Meanwhile the post intervention scores of the variable used /practice of packaged food label among the students showed significant improvement on the intervention group compared to the control group(Value of $t(89) = 35.64$, $p < .00001$ and effect of size of 2.69).Based on this results ,it was concluded that the six week consumer Health Education intervention Programme is effective in improving students practice /use of packaged food label information. It was therefore recommended among others that; this research can be applied to a national level to require label education within all high school and college curricula to increase food label education and nutrition awareness among these age groups.

Keywords: Health Education Intervention, Food, Labels

Introduction

Packed food labels display sensitive Health related information like nutrient content, expired date, storage guidelines, mixing guidelines, Health claims and sensitive ingredient in food, drink and other products which are intended to guide consumers on healthy food choices. Consumer use of this information varies, but it is estimated. A healthy dietary choice requires consumer understanding and interpretation of label information. Therefore, an individual understands and “knowledge” of what label information means, developing positive attitude and practice of the label information is central to consumers’ Health.

Packaged foods are wrapped with array of information on it labels that are meant to guide food consumers on healthy eating and make wise and informed decision at point of purchase that will suit their health or health of family members. High burden of Non-Communicable Diseases (NCDs) among the general public that requires dietary control/management implies attention must be focused on packed food label information in order to curtail the NCDs spurs.

Poor diet is the leading cause of high rate of mortality and morbidity globally, [World Health Organization (WHO) 2018]. This refers specifically to excessive intakes of energy, saturated fats, hydrogenated fats (Tran’s fats), sodium and free sugars and low intakes of fruits, vegetables and polyunsaturated fatty acids. Such dietary practices contribute to metabolic risk factors, including high blood pressure, high body mass index (commonly referred to as overweight and obesity), high fasting plasma glucose and high total cholesterol, which, in turn, increase risk for diet-related Non-Communicable Diseases NCDs, including type 2 diabetes mellitus, cardiovascular diseases and some types of cancer. The WHO (2018) reports showed NCDs prevalence rate to stand at 29% in Nigeria.

Poor diet is a known modifiable risk factor for Non-Communicable Diseases (NCDs) which are among the leading causes of death and disability globally. About 70% of deaths worldwide are attributable to NCDs and they are rising very rapidly in incidence and prevalence in developing countries like Nigeria (WHO, 2018). With rapid industrialization and globalization, there has been a gradual shift from the traditional diet which is fiber-rich and minimal in fat to pre- packaged foods that are energy dense, and high in sugar and salt (Maiyaki & Garbati, 2014).

The Codex Alimentations Commission (Codex) is the Joint WHO/Food and Agriculture Organization (FAO) of the United Nations body that produces internationally adopted food standards and guidelines intended to facilitate International trade and promote food safety and public health. Codex categorizes nutrition labeling into two components: nutrient declarations and supplementary nutrition information. A nutrient declaration is a standardized listing of the nutrient content of a food, usually positioned on the back or the side of the package. Since 2012, Codex guidelines have recommended the mandatory use of nutrient declarations on food packages, even in the absence of nutrition and health claims (codex & FAO, 2017).

In Nigeria, National Agency for Food and Drug Administration and Control (NAFDAC) act of (NAFDAC'S pre-packaged food labeling regulations, 2005) for pre-packaged food (labeling) regulations prohibited the selling of pre-packaged unlabeled food and mandated that the label come up with various guides and information that will help the packaged food consumer to make healthy

ing of things. However, according to Medeiros, Ramalho, Pereira and Machad, (2019), there was no significant increase in practice of labels after the intervention.

Use of labels implies putting the label information in to practice, "Practices" is defined as the observable actions of an individual that could affect his/her or others' nutrition, such as eating, feeding, cooking .information on labels are meant to be put into practice, for example where on a label drink/food are directed not to be kept under sunlight ,by so doing the nutritional composition may be altered ,the chemical nature of the food change or chemical transformation from a harmless drink to a toxic drink could happen. In some milk, it is boldly written not to be giving to infants; by giving the milk to the infants it may predispose the child to digestive difficulties, indigestions, pile, reticular problem and many Gastro Intestinal tract problems. Some food labels come with sodium, saturated fat, cholesterol, caffeine, calories values and host of more. All these are guides that should be practice d by peculiar consumers.

Packed food label information is essential tools that guide food consumers on healthy eating. Good knowledge and use of labels information reduce the threats to Non-communicable diseases and help in managements of NCDS. Globally there is huge shift towards consumption of packed foods because of rapid industrialization and technological advancements, is fair to say foods manufacturers are doing enough to provide consumers with the vital information/guides required for Healthy eating as foods labels are displayed with array of information and claims. However, putting the information to practice is a major global concern.

Methods and Material

This research study employed pre-test post-test control group design, this is experimental research approach according to (Fredrick, 2015). Distinguishing peculiarities of this design is that the placement into intervention or control groups must be done through randomization, thus reducing the threats to internal validity and the researcher have full control over the independent variable(s) which is the six-weeks Health Education intervention in this case. The nature or characteristic of the participant should be homogenous, in this case undergraduate. This design allows the researcher to truly test the effect of six weeks consumer health education on the respondents. The design gives room for comparison on the respondent's prior practice / use of packed food label information and the improvement they will have on the same variable after receiving the training.

The inclusion of a control group within the sample that will be measured twice at the same time as the treatment group will further give room to prove that any improvement witness in the treatment group (those that will be given training) is as result of the training not by chance of history or maturation.

The sample for this study includes both male and female undergraduate students from FUD. Sample size of 180 for this intervention research was calculated using power formula for sample size for Hypothesis testing for two independent groups, Continuous outcome; this allows the researcher to estimate the difference in means between two independent groups. The formula determines the sample size for each comparison group (Sullivan,2021). The formula is given by; $n_i = 2 \left(\frac{Z_{1-\alpha/2} + Z_{1-\beta}}{ES} \right)^2$, n_i is the sample size required in each group ($i=1,2$), Where α is the selected level of significance and $Z_{1-\alpha/2}$ is the value from the standard normal distribution holding $1-\alpha/2$; since the α is = 0.05, then $1-\alpha/2$ is = 0.975 and $Z = 1.960$. $1-\beta$ is the selected power and $Z_{1-\beta}$ is the value from standard normal distribution holding $1-\beta$ below it. Sample size estimate for hypotheses testing are often base on achieving 80% or 90% power (Sullivan, 2020). The $Z_{1-\beta}$ values for these popular scenarios are given:

- 80% power $Z_{0.80} = 0.84$
- 90% power $Z_{0.90} = 1.282$

And ES is the effect of size and can be computed as $ES = |U_1 - U_2| / \sqrt{\delta^2}$, δ is the standard deviations of the outcome variables, $|U_1 - U_2|$ is the absolute value of the dif

To select participants the following multi stage sampling procedures were followed.

First stage: stratify random sampling approach was used to separate the preexisting six faculties.

Second stage: proportionate sampling was used to generate samples proportionately from the six faculties based on their relative strength of number.

Third stage: Simple random sampling was used further for Placement of participants into control and Intervention groups.

Instrument for Data Collection

For the purpose of this research work a questionnaire PFL-P-Q was designed by the researcher putting into considerations Food and Agriculture Organization of the United Nations FAO (Rome, 2014) Guidelines for assessing nutrition-related Knowledge, and Practices labels information peculiar to foods and Nigerian markets and NCDS related to this label information.

A training manual tagged packed food label literacy manual was also produced by the researcher; it contains all the content to be discussed on weekly basis in explicit form. It is a thirteen pages document with various information n adapted from FAO (2016) Hand Book for labeling to protect consumers, FAO /WHO Food standard program (2016) and host of more.

The manual was comprehensive and tailored to the need of the consumer (students).in addition eight posters were designed to serve as aids for the consumer Health label literacy program. Some of the posters are direct scan of some common packed food labels within the locality. Real labels from drinks and some foods were also used during the Programme to motivate the learners, for examples soft drinks with black cap, zero sugar, lite and many more packed foods were used to highlight the difference.

In addition, this current research will create a social media platform (What Sapp) for respondents in experimental group; this shall serve as reinforcement (one unique characteristic of Health Education Intervention programs) channel for reemphasizing on the content taught in a particular work session.

Data generated from this research were analyzed (online) using statistical software of Social Science (2023). The following statistical procedure was used by the researcher to analyze and interpret the research hypotheses.

Results and Discussion

This consumer Health Education intervention research was conducted among undergraduate students of Federal University Dutse, Jigawa State. The research was conducted for six weeks between Saturday 18th of February 2023 and Saturday 25th of March, 2023. seisions were conducted on Saturdays as consented by the research participants. The first two sessions and last s were physical. However, due to logistic difficulties encountered as a results of new Naira policy in Nigeria coupled with the fact that most of the students were on holiday since November, 2022 it was agreed to move to virtual form using Google meeting applications.

Research questions:

Research Question one: What are the effects of six weeks consumer Health Education Intervention about packaged food label information on practice of food label information among students of federal University Dutse?

Table 4.1: Pre and post Health Education Intervention Scores of Practice among intervention group

Variable	Pretest score	Post test score
	Mean ± Std	Mean ± Std
Practice	6.71±2.01	16.23±4.27

Standard passing score is 10 and maximum score is 20.

Research Question two: What would be the difference in use of packaged food label information between students of federal university Dutse that would receive Health Education Intervention and the student in control group?

Table 4.2: Pre and post Health Education Intervention Scores of Practice of food label information among control group students.

Variable	pretest score	post test score
	Mean ± Std	Mean ± Std
Practice	6.53±2.3	6.22±2.83

Standard passing score is 10 and maximum score is 20.

Practice Results of pre and post Health Education intervention on package Food labels among the students.

The pre intervention mean score of practice showed use of food label information was poor for the two research groups, the intervention group has (6.71±2.01) and the practice score is nearly the same for the control group, the baseline mean score was (6.53±2.3) all below pass make of 10. These results shows baseline score for the research variable practice of packaged food label information was poor among the students of federal university Dutse.

On the contrary there was significant improvement of mean score across the variable of practice from the baseline score after the Health education intervention on packaged food label information as shown on table 4.1 for the group that received the label literacy training. A post intervention score of (16.23±4.27) was obtained for practice of package food label information, compared to pre intervention score of 6.71±2.01 for the same variable and same group, it shows how the intervention Programme had significantly affected the students’ practice of package foods label information.

On a sharp contrary to the post test results of the intervention group as shown on table 4.2, the results of the control group remain nearly the same for all the two variables with no significant increase or decrease from the baseline score. Post intervention score for practice or use of label information showed no significant change for the post intervention mean score of practice for the control group in this research as a practice score of (6.22±2.83) with an insignificant decrease from the pre intervention score of practice of the same group (6.53±2.3), both scores are insignificant because they are below the pass mark of 10. The insignificant score recorded for the post intervention test for the control group compared to significant increase recorded for the intervention groups demonstrated strongly the effectiveness of the consumer Health education intervention Programme. Therefore, huge difference was recorded on the variable of practice of packaged food labels information among these two sets of students.

Hypotheses Testing

Hypothesis one there is no significant difference between pre-Health Education intervention scores and post health education intervention scores about use of packaged foods label information among students of federal university Dutse.

Table 4.3: Paired Sample T-Test result on practice/use for pre and post intervention scores for intervention group

Variable	Mean difference (Std)	P-value	Cohen's d Effect of size
Practice	9.97(0.24)	<.00001	2.7

Results of paired sample t-test conducted on scores for practice of packaged food label information shown on table 4.3 showed there was a significant increase on students use of packaged foods label information after the consumer Health education intervention (M = 6.23, SD = 4.27) and post-test (M = 16.2, SD = 2.7) indicated there was significant improvement practice of label information after the intervention, $t(89) = 40.05$, $p < .00001$. Further more, Cohen's d Effect of size of 2.7

recorded also indicated large effects and consequently the results is effective. The null hypothesis which posits no significant difference between pre health education intervention scores and post intervention scores is therefore rejected.

Hypothesis two: There is no significant difference between post intervention scores on practice of packaged food label information between students of federal university Dutse who received Health education intervention Programme and the control group students.

Table 4.4: Paired Sample T-Test result for posttest intervention score between intervention and control group

Variable	Mean difference (Std±)	p-value	Cohen's d Effect of size
Practice	10.01 (1.34)	<.00001	2.69

Lastly table 4.4 showed participants who received the Health education intervention on packaged food label information had a significant improvement on practice score of (M =16.23 , SD = 4.27) after the intervention compared to the participants in the control group (M = 6.22 , SD = 2.83) which demonstrated significantly better score of practice at Value of $t(89) = 35.64$, $p < .00001$ and effect of size of 2.69, which implies higher magnitude or effects (the two groups differ by more than two standard deviation) see table 4.4 .This result proves significant difference in practice of packaged foods label information between the two groups and thus effectiveness of the Health education intervention programme .Therefore the hypothesis which posited no significant difference between post Health Education intervention scores of practice on packaged foods label information among intervention group and control group is rejected.

Discussions

This study was conducted to assess the effects of consumer Health education intervention on practice/use of packaged food label information among students of federal university Dutse. The most unique aspect of this intervention is that it was tailored to the students need, more number of participants were used for the intervention study, simplified, use school as setting, target label information that are risk factors for controlling NCDS and reinforcement was used on social media platform to ensure participants had full effects of the intervention. This is in contrast with other researchers that were mostly not intervention research, use other participants , laid emphasis on other components of label information, researchers like Olatona, Nwankwo, Ogunyemi and Nnoaham (2019), Nivedhakumari, Porchelvan and Shavani (2020) and Asouzu and IHEME (2020) had conducted non interventional studies on packed food labels focusing on different food consumers. Finkelstein and Volpe (2015) had conducted intervention study focusing only on nutritional aspect of food labels. Earlier Steven, Nicks and Fergusson (2014) had conducted label intervention research using in-store consumers as participants.

Findings at baseline on practice of package food label information was poor as both intervention and control group have low practice scores on packaged food label information. Scores of 6.71 and 6.53 recorded for both intervention groups though slightly higher score compared to other variables. However, the scores were grossly not significant .This finding is in agreement with findings from studies conducted by other researchers, Jike (2011) reported a significantly Poor usage of nutritional label among commuters. Alsaddah, (2014) had reported poor usage of label information by students studying at Kent State University (KSU), in United States of America. However, in contrast to this finding, Norazmir, (2011) reported significantly high use of food label information among under graduate student of UiTM Puncak Alam in Kuala Selengor district of Malaysia.

The purpose of the current study was to assess the effectiveness of consumer Health education intervention on practice of packaged foods Label information among students of federal university Dutse, comparing intervention post test score from baseline score from the intervention group and compared post intervention score to that of control group.

Post intervention score of 16.23 compared to 6.71 recorded for the intervention group is a marker of effectiveness of the Health education intervention on packaged food labels. Similarly, the posttest mean score of 6.22 for practice of label information recorded for the control group had further add rigidity to the effectiveness of the intervention Programme. In contrast to this study finding, Richard, Peter, Charo, Monique, Gill, Moira (2010) had found no difference in the healthiness of purchased ready meals and pizzas between the intervention and control arms either during the intervention period ($P=.32$) or at washout ($P=.59$). it was concluded that although the FLICC study did not find evidence of an impact of the intervention on food purchasing behaviour, the unique methods used in their pilot trial are informative for future studies that plan to use supermarket loyalty card data in collaboration with supermarket partners. However, according to Medeiros, Ramalho, Pereira and Machad, (2019), there was no significant increase in practice of labels after the intervention. The results from these research findings are in agreement with that of Chai and Czaja (2017) where education intervention was found to have positive effect on practice. Pilot Evaluation of an In-Store Nutrition Label Education Programme was carried out by Steven, Nicks and Ferguson(2014) ,results from the Programme showed increased mean score of use of label information compared to the base line score on the same variable with significantly ($P < .01$) which proves significant change in use of label information after the intervention. Marwan, Jalambo, Razina, Naser and Norimah (2017) had also reported a significant increase in posttest mean of practice ($p < 0.001$) in an assessment of improvement nutritional education intervention would have on Knowledge, Attitude and Practice of Iron Deficiency Anemia among Iron-Deficient Female Adolescents. Sally, Judy, Steve and Cade (2018), in a systematic review had their findings in line with that of this study, positive effects of educational intervention on use of labels in many researches they reviewed, all studies reported a statistically significantly improvement in one or more outcomes of participant understanding or use of nutrition labels

Conclusion

Based on finding of this study, the following conclusions were drawn;

1. Health education intervention is effective in improving students' use of packaged food label information.
2. Proven difference exists on post intervention scores of practice/use of packaged food label information between students in intervention and that those in control group.

Recommendation

Based on the outcome of this intervention research the following recommendations were made;

1. Consumer Health Education Intervention should be adopted by NAFDAC, Consumer protection Council, Tertiary institutions curriculum developers, Health professionals and affiliate to improve knowledge of packaged foods labels information among consumers.
2. Consumer Health Education Intervention should be adopted by NAFDAC, Consumer protection Council, Tertiary institutions curriculum developers, Health professionals and affiliate to improve use and practice of packaged foods labels information among consumers.
3. This research, and future research alike, can be applied to a national level to require label education within all tertiary institutions and colleges curricula to increase food label education and nutrition awareness among these age groups.
4. This research, and future research alike, can be applied to a national level to require label education within all tertiary institutions and colleges curricula to increase attitude toward food label and nutritional attitude among these age groups.

This research, and future research alike, can be applied to a national level to require label education within all tertiary institutions and colleges curricula to increase food label information use and nutrition information use among these age groups.

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