

Assessing the Impact of Nutrition Education Instruction on Fruits and Vegetables Hygiene Behaviours of Secondary School Students in Delta State, Nigeria

Apaokueze, T. N (Ph.D)

Department of Vocational Education (Home Economics),
Delta State University, Abraka.

+2348037243377; tessyapaokueze@gmail.com

Abstract: *The study assessed the impact of nutrition education instruction on fruits and vegetables hygiene behaviours of secondary school students in Delta State, Nigeria. Two research questions and two hypotheses were developed to guide the study using ex-post facto research design. Through multistage sampling technique, 384 Senior Secondary School (SSS II) Students from public schools were selected across the state for the study. The instrument for data collection was structured questionnaire, face-validated by four experts. The reliability of the instrument was achieved using Cronbach Alpha reliability technique which yielded reliability coefficients of 0.76 and 0.84 for the two clusters of the instrument. Data were collected with the help of trained research assistants. Out of the 384 questionnaires administered, 363 copies were retrieved and considered suitable which represents 94.5% rate of return. Data collected were analysed using descriptive statistics such as mean (\bar{x}), standard deviations and t-test statistics. The results of the data analysis showed that Nutrition Education, to a high extent positively influenced observations of students' hygiene practices in fruits and vegetable consumption and food storage practices of urban and rural students of senior secondary schools in Delta State. The results of the hypotheses tested showed no significant ($p < 0.05$) differences between the mean ratings of urban and rural students on the extent to which Nutrition Education influence students' observation of personal hygiene and storage practices of fruits and vegetable in Delta State. Based on the findings, the study among others recommended well planned and delivered Nutrition Education instruction on fruits and vegetables hygiene and storage practices for students to learn.*

Keywords: Nutrition education, fruits, vegetables, hygiene behaviours, students, Delta State.

INTRODUCTION

Food and nutrition constitute extremely important aspect of human healthy living and wellbeing. This is because, effective growth and development of an individual can only be assured through consumption of healthy food with good knowledge of diets which can only be guaranteed through quality nutrition education. Nutrition education according to Washington State Department of Social and Health Services (2022) is a set of learning experiences designed to facilitate the voluntary adoption of eating and other nutrition-related behaviours conducive to health and well-being. Nutrition education as described by Radhika (2018) comprises training in skill building to make possible positive dietary behavioural change in individual of all ages. Campbell (2021) affirmed that Nutrition education is a key pillar of an effective healthy population which can complement existing health and wellness programmes. This is because, Nutrition education provides people with knowledge, skills, and confidence to change harmful food habits while adopting positive and lasting healthy nutritional practices. Food and Agriculture Organization [FAO] (1997) reported that Nutrition education provides the necessary awareness on dieting and health, nutritional requirements of individuals and food nutritional value thereby helping individual to make informed food choices. Campbell (2021) stated that benefits of nutrition education to include: improved health and wellbeing of individual beneficiaries, increase understanding of healthy nutrition and efficiency, and behavioural change towards healthy nutrition.

Good nutritional knowledge through quality nutrition education is one of the variables that influence the nutritional habits of individuals, families, and communities (Apaokueze, 2022). For instance, Spruit-Metz (2009) noted that Nutrition education provides information on disease prevention, making informed food choices, and obeying hygiene practices in food preparation and consumption for enhanced health. According to Ajala (2006), lack of nutrition education can expose individuals to some preventable dietary problems that have been implicated in most chronic diseases. The need for Nutrition Education is important among Secondary School Students who are more likely to be susceptible to Nutrition-related diseases, such as scurvy, and beriberi among others due to a lack of knowledge about the importance of fruits and vegetables consumption patterns for healthy living.

Fruits are widely accepted as an important aspect of a good healthy diet and adequate consumption helps the body reduce a whole lot of diseases (Dimelu and Odo, 2013). According to Gollner (2010), Fruits are edible and fleshy plant bearing commodities that are sweet or sour, and good for eating in the raw state, like apples, bananas, grapes, lemons, oranges, strawberries, watermelon, pear, mangoes, cashew, and pawpaw among others. Vegetables on the other hand are edible parts of a plant endowed with vitamins and minerals. Vegetables as described by Rickman, Bruhn, and Barrett (2007) are edible plant matters that include flowers, stems,

leaves, roots, and seeds. Vegetables are either raw or boiled and they play a great role in the nutrition of man, being very low in fat and carbohydrates compared to other sources of food, but high on the other hand, it is a rich source of vitamins, minerals and dietary fiber (Sinha, Hui, Evranuz, Siddiq and Ahmed, 2010). The intake of fruits and vegetables is important due to their high composition of vitamins A, B, C, and D and important minerals and carbohydrates.

Fruits and vegetables are important parts of the dietary requirement of a healthy human (Layade and Adeoye (2014). Diets high in fruits and vegetables contribute to anti-oxidants which help in the reduction of cancer and cardiovascular disease. Consuming plenty of fruits and vegetables help reduce heart-related diseases and stroke, controlling blood pressure and cholesterol level in the body. It will also lead to the prevention of some certain cancer, avoid diverticulitis as well as guard against cataract which is one of the major causes of vision loss. In affirmation, Banwat, Lar, Daber, Audo, and Lassa (2012) reported that the micronutrients supplied by fruits and vegetables are also vital for the optimal functioning of the gastro-intestinal tract as they enable the body to use other nutrients required for its normal function like energy from fats and carbohydrate. In addition, Nwamarah and Otitoju (2014) added that high fruits and vegetable consumption will help to reduce many chronic diseases like stroke, cardiovascular disease, metabolic disease, and some cancers. They contain essential vitamins, minerals, fibers, and other bioactive compounds. Moreover, an increase in fruits and vegetables consumption has been linked to a reduced risk of health conditions such as obesity, diabetes, cancer, and cardiovascular disease globally. Despite the aforementioned health and nutritional benefits of fruits and vegetables, Hall, Moore, and Lynch (2009) stated that their consumption and hygiene practice in Africa is in the relatively poor.

Hygiene and cleanliness are often used interchangeably, which can confuse. According to Njunina (2021), food hygiene is a set of food handling practices that aim to minimize poisoning and biological food hazards through safe and clean operations to protect public health from food-borne diseases. In general, hygiene mostly means practices that prevent the spread of disease-causing organisms (Australian Government, 2014). Hygiene practices in food preparation and consumption are employed as preventative measures to reduce the incidence and spread of diseases. Food Hygiene also deals with the promotion and preservation of health through healthy preparation, storage, and consumption of healthy food. Muller-Hauser, et al (2022) stated that food hygiene practices are needed to achieve a substantial reduction of complementary food contamination. Microbial contamination of complementary foods puts people at risk of developing intestinal infections and could be reduced by improved hand-washing and food hygiene practices. Food poisoning precautions can be handled through personal hygiene, environmental hygiene, and hygienic handling of food storage. Food storage is the process in which both cooked and raw materials are stored in appropriate conditions for future use without any entry or multiplication of microorganisms. It allows food to be eaten for some time after harvest rather than solely immediately (Khan, Bhat, and Narayan, 2017).

The poor dietary pattern and inadequate fruits and vegetables consumption among the students constitute major risk factors of micronutrients deficiencies, overweight, obesity, cardiovascular disease, cancer, and other non-communicable diseases such as diabetes, high cholesterol, adolescent high blood pressure and poor health status of the students which have significant negative impact on their families' resources and wellbeing. There are common factors that influence students' hygiene practices and consumption of fruits and vegetables. Some of these factors include school location in terms of rural and urban (Apaokueze, 2022). According to Owoeye and Yara (2011), school location as either urban or rural is further explained by physical aspects, site, and type of building. Students' approaches to fruit and vegetable consumption and hygiene practices are hypothesized to be influenced by their students school location among other factors (Food and Agriculture Organization, 2012). Hence, this study assessed the impact of nutrition education instruction on fruits and vegetables hygiene behaviours of secondary school students in Delta State, Nigeria.

Purpose of the Study

The broad purpose of the study was to assess the impact of Nutrition Education instruction on fruits and vegetables hygiene behaviours of Secondary School students in Delta State, Nigeria. Specifically, the study found out the extent to which:

1. Nutrition education influenced Senior Secondary School Students' observation of personal hygiene practices in fruits and vegetables consumption in Delta State;
2. Nutrition education influenced Senior Secondary School Students' fruits and vegetables storage behaviours in Delta State;

Research Questions

In line with the specific purposes, the study answered the following research questions:

1. To what extent does Nutrition education influenced Senior Secondary School Students' observation of personal hygiene practices in fruits and vegetables consumption in Delta State?
2. To what extent does Nutrition education influenced Senior Secondary School Students' fruits and vegetables storage behaviours in Delta State?

Hypotheses

The following hypotheses were tested at 0.05 level of significance:

H0₁: There is no significant difference in the mean ratings of Urban and Rural Senior Secondary School Students on the extent to which Nutrition education influenced their observation of personal hygiene practices in fruits and vegetables consumption in Delta State;

H0₂: There is no significant difference in the mean ratings of Urban and Rural Senior Secondary School Students on the extent to which Nutrition education influenced their fruits and vegetables storage behaviours in Delta State.

METHODOLOGY

The study assessed the impact of nutrition education instruction on fruits and vegetables hygiene behaviours of secondary school students in Delta State, Nigeria. Two research questions were answered by the study while two hypotheses were tested at 0.05 level of probability. Ex-post facto research design was adopted in carrying out the study. Ex-post facto research design according to Saleh (2022) is also known as "after-the-fact" research, defined as a research method that looks into how an independent variable (groups with certain qualities that already exist prior to a study) affects a dependent variable. The population for the study was forty six thousand, two hundred and eighty six (46,286) Senior Secondary School II Students comprising twenty two thousand, seven hundred and nineteen (22,719) males and twenty three thousand, five hundred and sixty seven (23,567) Females Students in Public Secondary Schools in Delta State (Delta State Ministry of Basic and Secondary Education, 2019).

Multistage random sampling technique was used to select 384 Senior Secondary School (SSS II) Students from public Schools that constituted the respondents for the study. The first stage involved purposive selection of the three education zones in the State which are: Delta North, Delta Central and Delta South. The reason for purposive selection of the three zones was because food selection attributes are similar across all classes in the State. At the second stage, two local government areas (LGAs) were randomly selected from each of the three sampled zones making six LGAs for the study. Hence, Aniocha South and Ika North east LGAs were randomly selected from Delta North. Okpe and Ugelli South LGAs were randomly selected from Delta Central zone while Isoko North and Bomadi LGAs were randomly selected from Delta South of the State. The third stage involved purposive selection of three public coeducational Secondary Schools from each of the six LGAs making a total of 18 Secondary Schools for the study. The fourth stage of the selection involves purposive selection of all 384 SS II Students offering food and nutrition across the 18 sampled schools.

The instrument for data collection was structured questionnaire developed by the researcher. The questionnaire was structured into three parts A, B and C. Part A is structured to obtain information on the personal data of the respondents (SSS II Students). Part B was designed to collect data on extent to which Nutrition education influenced students’ observation of personal hygiene practices in fruits and vegetables consumption. Part C was made to elicit data on the extent to which Nutrition education influenced students’ fruits and vegetables storage behaviours in Delta State. The 5-point response options for Part B and C were structured to: Very High Extent (VHE), High Extent (HE), Moderate Extent (ME), Low Extent (LE), and Very Low Extent (VLE) with corresponding weight values of 5, 4, 3, 2, and 1 respectively.

The instrument was face-validated by four experts which include two experts in Home Economics in Delta State University, Abraka, one lecturer in Measurement and Evaluation in the DELSU and one Secondary School Home Economics teacher In Delta State. The reliability of the instrument was achieved using Cronbach Alpha reliability technique which yielded reliability coefficients of 0.76 and 0.84 for Parts B and C of the questionnaire respectively. Out of the 384 questionnaires administered to the respondents, 363 copies were retrieved and considered suitable which represents 94.5% rate of return. Data collected were analysed using Mean (x) and Standard Deviations for answering the research questions while the null hypotheses were tested using t-test statistics at 0.05 level of significance. The criterion reference point (cut-off value) of 3.00 was used for interpreting the result of the research questions on 5-point rating scale. Hence, any item with mean value of 3.00 and above was interpreted as “High Extent (HE)” while items with mean value of less than 3.00 was interpreted as “Low Extent (LE)”. On the hypotheses tested, the null hypothesis of no significant difference was accepted for clusters when p-value was greater than or equal 0.05 level of significance. On the other hand, the hypothesis of no significant difference was rejected when p-value was less than 0.05 level of significance.

RESULTS AND INTERPRETATION

Research Question One

To what extent does Nutrition education influenced Senior Secondary School Students’ observation of personal hygiene practices in fruits and vegetables consumption in Delta State?

Data for answering research question one are presented in Table 1 below.

Table 1: Mean Ratings of Urban and Rural Senior Secondary School Students on the Extent to which Nutrition Education influenced their Observation of Personal Hygiene in Fruits and Vegetables Consumption in Delta State

SN	Item Statements	Urban 200		Rural 163		\bar{X}_G	SD _G	Rmk
		\bar{X}_U	SD _U	\bar{X}_R	SD _R			

1	I have learned more about the importance of maintaining food hygiene.	4.86	0.34	4.66	0.57	4.77	0.47	HE
2	I learned that Fruits and Vegetables should not be carried with dirty hands	3.86	0.75	4.11	0.93	3.97	0.85	HE
3	I have learned to wash my fruits and vegetables and other food items before eating them.	4.63	0.64	4.33	0.94	4.49	0.80	HE
4	I have learned to cover Fruits & Vegetables against flies, bacteria, germs, and organisms.	4.54	0.72	4.55	0.76	4.55	0.73	HE
5	I am now aware that over rip or spoiling Fruits & Vegetables are harmful to human health.	4.31	0.76	4.39	0.75	4.34	0.76	HE
6	I have learned to keep kitchen utensils for cutting Fruits and Vegetables clean.	4.32	0.82	3.88	0.81	4.12	0.84	HE
	Grand mean (x)̄	4.42	0.68	4.32	0.67	4.37	0.74	HE

Note: \bar{X}_U = Mean of urban; \bar{X}_R = Mean of rural; \bar{X}_G = Grand Mean; SD = Standard Deviation;
HE = High Extent.

The result in Table 1 revealed that the grand mean ratings of students' responses on the 6 items ranged from 3.97 to 4.77 which is greater than the criterion cut-off point value of 3.00 on a 5-point rating scale. This indicates that Nutrition Education had, to a High Extent positively influenced observance of personal hygiene practices in Fruits and Vegetable consumption among Urban and Rural Senior Secondary School Students in Delta State. The overall mean of urban students is 4.42 which is slightly greater than that of rural students which are 4.32. This reveals that Nutrition Education has a greater influence on Urban Senior Secondary School Students' observation of personal hygiene practices in Fruits and Vegetable consumption than their rural counterparts in Delta State. The standard deviation values of the 6 items in the Table ranged from 0.47 to 0.85 which indicates that the respondents' responses are close to the mean and one another.

Hypothesis One

H01: There is no significant difference in the mean ratings of Urban and Rural Senior Secondary School Students on the extent to which Nutrition education influenced their observation of personal hygiene practices in fruits and vegetables consumption in Delta State.

Data for testing hypothesis one are presented in Table 2 below.

Table 2: Result of t-test Statistics of Significant Difference in the Mean Ratings of Urban and Rural Students on the Extent to which Nutrition Education Influenced their Observation of Personal Hygiene in Fruits and Vegetables Consumption

SN	Groups	\bar{X}	SD	N	DF	Std. Error	t- Cal	t-Critical	Level of Sig.	Rmk
1.	Urban	4.41	0.68	200						
					361	0.033	1.94	1.96	0.05	NS
2.	Rural	4.33	0.67	163						

Note: **NS** = Not Significant at 0.05

Table 2 showed that the calculated (t-cal) t-value of 1.94 is less than the t-critical (t-tab) value of 1.96 given a degree of freedom of 361. This implies that there is no significant ($p < 0.05$) difference between the mean ratings of urban and rural students on the extent to which Nutrition Education influence their observation of personal hygiene practices in Fruits and Vegetable consumption in Delta State. Therefore, the null hypothesis is accepted in hypothesis seven.

Research Question Two

To what extent does Nutrition education influenced Senior Secondary School Students' fruits and vegetables storage behaviours in Delta State?

Data for answering research question two are presented in Table 3 below.

Table 3: Mean Ratings of Urban and Rural Senior Secondary School Students on the Extent to which Nutrition Education influenced their Fruits and Vegetables Storage Behaviours in Delta State

SN	Item Statements	Urban 200		Rural 163		\bar{X}_G	SD _G	Rmk
		\bar{X}_U	SD _U	\bar{X}_R	SD _R			
1	Nutrition education exposes one to Fruit and Vegetable storage to minimize water loss.	3.96	1.15	3.87	1.29	3.92	1.21	HE
2	Information on Fruits and Vegetable storage for maintaining nutritional value is learned.	4.01	0.72	4.09	0.86	4.04	0.79	HE
3	Fruits and Vegetables spoilage in storage is learned through nutrition education.	3.75	1.14	4.03	1.10	3.87	1.13	HE
4	Nutrition education teaches the storage of fruits and vegetables to avoid cuts, bruises, pests, or infections.	4.22	0.71	3.92	0.98	4.09	0.86	HE
5	Appropriate refrigerating temperature for fruits & vegetables is learnt through nutrition education	3.38	1.14	3.80	0.97	3.57	1.08	HE
6	Nutrition education teaches us the role of storage in increasing fruits & vegetables' shelf life.	3.39	0.97	3.50	0.98	3.44	0.97	HE
	Grand mean (x) ⁻	3.78	0.47	3.87	0.58	3.82	0.52	HE

Note: \bar{X}_U = Mean of urban; \bar{X}_R = Mean of rural; \bar{X}_G = Grand Mean; **SD** = Standard Deviation;

HE = High Extent.

Table 3 showed that the grand mean ratings of the responses of senior secondary school students on the 6 items ranged from 3.44 to 4.09 which is greater than the criterion cut-off point value of 3.00 on the 5-point rating scale. This implies that Nutrition Education had, to a high extent, positively influenced fruits and vegetable storage behaviours of urban and rural students in Delta State. The overall average mean of urban students is 3.78 which is less than that of rural students given at 3.87. This showed that Nutrition Education has a slightly higher influence on the Fruits and Vegetable storage pattern of Rural Secondary School Students than urban Secondary School students in Delta State. The grand standard deviation values of the entire items in the Table which ranged from 0.86 to 1.21 imply that the respondents' responses are close to the mean and one another.

Hypothesis Two

H₀₂: There is no significant difference in the mean ratings of Urban and Rural Senior Secondary School Students on the extent to which Nutrition education influenced their fruits and vegetables storage behaviours in Delta State.

Data for testing hypothesis two are presented in Table 4 below.

Table 4: Result of t-test Statistics of Significant Difference in the Mean Ratings of Urban and Rural Students on the Extent to which Nutrition Education Influenced their Fruits and Vegetables Storage Behaviours.

SN	Groups	\bar{X}	SD	N	DF	Std. Error	t- Cal	t-Critical	Level of Sig.	Rmk
1.	Urban	3.78	0.47	200						
					361	0.056	1.53	1.96	0.05	NS
2.	Rural	3.87	0.58	163						

Note: **NS** = Not Significant at 0.05

Table 4 showed that the calculated t-value (t-cal) of 1.53 is less than the t-critical value of 1.96 at 361. This implies that there is no significant ($p < 0.05$) difference between the mean ratings of urban and rural students on the extent to which Nutrition Education influences fruits and vegetable storage patterns adopted by students in Delta State. Consequently, the null hypothesis of no significant difference in the mean response rate of urban and rural students is accepted.

Discussion of Findings

Nutrition Education, as revealed from the analysis of data, showed that to a high extent it positively influenced observations of students' hygiene practices in fruits and vegetable consumption among urban and rural students of senior secondary schools in Delta State. Nutrition education benefit is not only limited to food consumption behaviour but also hygiene practices of the recipients. In affirmation of the findings of this study, Yahia, *et al* (2009) recognized the fact that Nutrition Education had greatly improved nutritional knowledge, as well as food hygiene practices and lifestyle of adolescents. Similarly, the above finding conformed to the submission of Achor (2014) who noted that nutrition education is mainly designed to help learners acquire nutritional knowledge including the gains derived from healthy eating, practices of food hygiene, and healthy weight management. Nutrition education is highly essential and has had considerable influence on practices of hygiene of secondary school students to fruits and vegetable consumption and food hygiene generally.

As revealed in the study, Nutrition Education to a high extent positively influenced fruits and vegetable storage patterns adopted by urban and rural secondary school students in Delta State. Nutrition education, as seen from the study, is not only important for its influence on food consumption behaviour; it also provides the recipients with knowledge on food storage and preservation techniques. This finding study corroborated that of FAO (2007) which affirmed that some of the aims of Nutrition education include the provision of awareness and required information on storage, processing, and presentation of food, conservation of nutrients during cooking, and nutritional needs of family members in sharing food. Ukpore (2009) stated that Nutrition Education had a significant influence on nutrition issues, food safety, storage pattern, food management, and the application of scientific knowledge in the daily lives of a community for the improvement of individuals and family health. It is imperative to state that Nutrition education covers knowledge of storage patterns and the nutritional benefits of appropriate food storage.

Conclusion and Recommendations

Fruits and vegetable consumption play significant roles in the healthy living of people and their inadequate consumption and hygiene practices could pose some health challenges. There is confirmed unhealthy and unhygienic food handling practices among secondary school students and other groups of students. This observation instigated this study to assess the impact of nutrition education instruction on fruits and vegetables hygiene behaviours of secondary school students in Delta State, Nigeria. Therefore, from the results obtained, the study concluded that nutrition education instruction had great influence on fruits and vegetables hygiene and storage behaviours of secondary school students in Delta State. Based on the findings, the study recommended that:

1. There should be increased awareness of the importance, health, and nutritional benefits of hygienic fruits and vegetable consumption through various media to boost students' consciousness of the importance of food hygiene practices.
2. Giving talks to Senior Secondary students on the value of food hygiene and storage practices for healthy living.
3. There should be a well planned and delivered Nutrition Education instruction on fruits and vegetables hygiene and storage practices for students to learn.

REFERENCES

- Achor, N. C. (2014). Utilizing Nutrition Education for Sustainable Household Nutrition in Nigeria. *International Journal of Humanities and Social Science*, 9 (1): 249 – 254.
- Ajala, J. A. (2006). *Understanding Food and Nutrition*. Ibadan: May Best Publications.
- Apaokueze, T. N. (2022). Nutrition Education and Consumption Patterns of Fruits and Vegetables among Senior Secondary School Students in Delta State, Nigeria. A Ph.D. Thesis submitted to Department of Vocational Education, Delta State University, Abraka.
- Australian Government (2014). Personal hygiene for food handlers. accessed from Queensland Health. Retrieved 10 October, 2022 from: www.health.qld.gov.au/foodsafety/
- Banwat, M. E., Lar, L. A., Daboer, J., Audu, S & Lassa, S. (2012). Knowledge and Intake of Fruit and Vegetables Consumption among Adults in an Urban Community in North Central Nigeria. *The Nigerian Health Journal*, 12 (1): 12 – 15.
- Campbell, T. C. (2021). Nutrition Education: A Practical Guide for Employers to Strengthen their Workforce Nutrition Programme with a Nutrition Education Component. Switzerland: Workforce Nutrition Alliance.
- Delta State Ministry of Basic and Secondary Education. (2019). Summary of Students Enrolment in Public Secondary Schools, 2018/2019 Academic Session. Asaba: Delta State Ministry of Basic and Secondary Education.
- Dimelu, M. U & Odo, R. N. (2013). Production preference and importance of fruit species in the home garden among rural households in Igbo-Eze North Agricultural Zone of Enugu State, Nigeria. *African Journal of Agricultural Research*. 8 (46): 5733 – 5740.

- Food and Agricultural Organization, (FAO), (2007). *Agriculture, Food, and nutrition for Africa*. Rome: FAO Publishing Management Group.
- Food and Agriculture Organization, (FAO), (1997). *Agriculture, Food, and Nutrition for Africa*. Rome: FAO Publishing Management Group.
- Food and Agriculture Organization, (FAO), (2012). *Field Programme Management, Food Nutrition, and Development*. Rome: Food and Agriculture Organization.
- Gollner, A. J. (2010). *The Fruit Hunters: A Story of Nature, Adventure, Commerce, and Obsession*. New York: Scribner Publishers.
- Hall, J.N, Moore, S. and Lynch, J.W. (2009). Global variability in fruit and vegetable consumption. *American Journal of Preventive Medicine*, 36(5): 402 - 409.
- Khan, F. A., Bhat, S. A & Narayan, S. (2017). Storage Methods for Fruits and Vegetables. *An Unpublished Manuscript*, Division of Basic Sciences and Humanities, Division of Vegetable Science (Faculty of Horticulture), Sher-e-Kashmir University of Agricultural Sciences and Technology of Kashmir, Shalimar.
- Layade, A. A & Adeoye, I. B. (2014). Fruit and vegetable consumption among students of tertiary institutions in Oyo State, Nigeria. *RJOAS*, 6 (30): 3 – 8.
- Muller-Hauser, A. A., Sobhan, S., Huda, T. M. N., Waid, J. L., Wendt, A. S., Islam, M. A., Rahman, M and Gabrysch, S. (2022). Key Food Hygiene Behaviours to Reduce Microbial Contamination of Complementary Foods in Rural Bangladesh. *American Journal of Tropical Medicine and Hygiene*, 107 (3), 709 – 719.
- Njunina, V. (2021). What is food hygiene? Food hygiene in 2022. Retrieved 10 September, 2022 from <https://www.fooddocs.com/post/what-is-food-hygiene>
- Nwamarah, J. U & Ototoju, G. T. O. (2014). Fruit and Vegetable Consumption Pattern and Health Challenges of Elderly (>60 Years) Staff in the University of Nigeria, Nsukka and Enugu Campuses: A Case Study. *Pakistan Journal of Nutrition* 13 (11): 626 - 630.
- Owoeye, J. S & Yara, P. O. (2011). School Location and Academic Achievement of Secondary School in Ekiti State, Nigeria. *Asian Social Science*, 7 (5): 170 – 175.
- Radhika, K. (2018). The Significance of Nutrition Education. Retrieved Sept, 2022 from https://www.researchgate.net/publication/323770755_The_Significance_of_Nutrition_Education
- Rickman, J. C., Bruhn, C. M & Barrett, D. M. (2007). Nutritional Comparison of Fresh, Frozen, and Canned Fruits and Vegetables II. Vitamin A and Carotenoids, Vitamin E, Minerals, and Fiber. *Journal of the Science of Food and Agriculture*. 87 (7): 1185–1196.
- Saleh, Z. (2022). What is an Ex Post Facto Design? Retrieved 18th January, 2022 from <https://study.com/learn/lesson/ex-post-facto-designs-research-methodology-examples.html/>
- Sinha, N., Hui, Y. H., Evranuz, E. Ö., Siddiq, M., & Ahmed, J. (2010). *Handbook of Vegetables and Vegetable Processing*. New York: John Wiley & Sons.
- Spuijijt-Metz, D. (2009). Adolescence, Affect and Health. Retrieved October, 7th, 2022, from <http://books.google.co.uk/bookid/>
- Ukpore, B. A. (2009). Barriers to Effective Implementation of Nutrition Education in Nigerian Secondary Schools and Solutions to Overcoming Them. *An International Multi-Disciplinary Journal, Ethiopia*, 3 (5): 121 – 131.
- Washington State Department of Social and Health Services (2022). Nutrition Education. Retrieved 10 September, 2022 from <https://www.dshs.wa.gov/altsa/program-services/nutrition-education>
- Yahia, N., Achkar, A., Abdallah, A & Rizk, S. (2009). Eating Habits and Obesity among Lebanese America University Students. Retrieved 11 October, 2021 from <http://www.pubmedcentral.nih.gov/redirect3.cgi/>.