

## Original Article

# Knowledge, Perception, and Consumption of Food Additives among Female Lecturers in Zaria, Nigeria

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## Abstract

**Background:** Food additives are being utilized for both small- and large-scale food production but often find more applicability in mass food production. Food additive consumption over a long period could pose adverse health outcomes. The study determined knowledge, perception, and consumption of food additives among female lecturers in Zaria. **Methodology:** It was a cross-sectional study conducted among 180 full-time female lecturers of the three tertiary institutions, selected through a multistage sampling technique. Data were collected using a pretested self-administered questionnaire. The data were entered into IBM SPSS Statistics 20 and analyzed. Univariate analysis for categorical variables was done using simple proportions. **Results:** A total of 167 female lecturers responded giving a response rate of 92.8%. Their mean age was  $42.7 \pm 8.2$  years. Majority (109, 65.3%) had good knowledge of food additives, less than half (77, 46.3%) had a good perception of them, and the overall consumption rate for food additives was 97.1%. Majority (77.8%) felt that the risks associated with food additives must never be ignored, about half (47.3%) felt that foods consumed by Nigerians were now generally more harmful. However, only about one-fifth felt that most fast foods do contain food additives (28.1%). Consumption rates were high for both natural and synthetic food additives (61.7%–92.2%), except for Ajinomoto and Vedan which were consumed by only 38 (22.8%). **Conclusion:** Knowledge of food additives was good, but their perception was poor and consumption was high. Stakeholders must begin to organize and sustain periodic sensitization campaigns on risks associated with the consumption of food additives. Futures studies should identify the reasons for poor perception and high level of consumption despite good knowledge among the study population.

**Keywords:** Consumption, female lecturers, food additives, Zaria

## INTRODUCTION

According to the European Food Safety Authority, additives are defined as “substances added intentionally to foodstuffs to perform certain technological functions for example to color, sweeten, or to help preserve foods.”<sup>[1]</sup> The use of food additives could be traced to time immemorial when substances that were considered to be beneficial were added to foods to improve taste or preserve them.<sup>[2]</sup> With rapid population explosion and an increase in societal complexity, the 21<sup>st</sup> century has witnessed an explosion of food industries with widespread production of a number of processed foods,<sup>[1]</sup> and therefore, in modern times, food additives have taken the center stage in the food production cycle.<sup>[3]</sup> They are being utilized for both small- and large-scale food production but often find more applicability in mass food production.<sup>[3]</sup>

Although food additives could be natural or synthetic, most individuals perceive additives as always unnatural and pose

risk to overall health and well-being.<sup>[4]</sup> On the other hand, food safety concerns have been shown to affect consumer choices and perceptions interms of food quality. Studies have shown that food additive consumption over a long period could pose adverse health outcomes.<sup>[2]</sup> As a result of this development, several regulatory bodies have been established to set standards, maintain, and enforce conformity in order to safeguard public health. Globally, the Joint FAO/WHO Expert Committee on Food Additives regulates food additives across

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the globe.<sup>[5]</sup> In Nigeria, the National Agency for food and drug Administration and Control (NAFDAC) is saddled with the responsibility of setting and monitoring standards in relation to food and related substances and therefore the use of food additives is highly regulated according to the Nigerian law.<sup>[2]</sup>

Several studies have consistently shown that people have poor knowledge and negative perception regarding food additives.<sup>[6]</sup> On the other hand, knowledge and perception of highly educated women in any given society can affect the pattern of consumption in the society because these groups of individuals are highly critical about food additives.<sup>[3]</sup> When they are at home, this category of individuals is likely to use a variety of food additives in their food due to their ability to afford them. Similarly, when at the workplace, they readily consume fast foods readily processed and prepackaged foods that contain a variety of additives. A significant relationship was also observed between a high level of education and knowledge of food additives.<sup>[7]</sup> Therefore, this study aimed to determine the knowledge, perception, and consumption of food additives among female lecturers who were generally of high levels of education.

## METHODOLOGY

The study was conducted in Ahmadu Bello University (ABU), Nuhu Bamalli Polytechnic (NBP) and Federal College of Education (FCE), all tertiary institutions in Zaria. ABU has two main campuses, and 15 faculties, and an academic staff population of about 1400. FCE is divided into five schools and has an academic staff population of about 350. NBP is divided into two campuses, six schools, and has an academic staff population of about 450. All the institutions have staff living within and outside the staff quarters. In the three institutions, most of the staff belong to ethnic groups from different parts of Nigeria, with a few from other countries, mostly West Africa and Asia.

The study was a cross-sectional study conducted among full-time staff of the three tertiary institutions. Part-time, contract, sabbatical, and visiting lecturers were all exempted from participating in the study.

Multi-stage sampling technique was used to select 180 female lecturers. In the first stage, using the list of all faculties/schools in each institution, 15 schools were proportionately selected through balloting from each of the three institutions; eight from ABU, three from NBP, and four from FCE. In the second stage, from each selected faculty/school, balloting was used to select three departments from a list of all the departments in each faculty/school, making a total of 45 departments. In the last stage, from each selected department, four lecturers were selected by balloting from a list of all female lecturers in the department. Thus, a total of 180 lecturers were selected for the study.

Data were collected using a structured self-administered questionnaire containing questions on sociodemographic

characteristics, knowledge, and perception of risks associated with food additives and their consumption. The questionnaire was pretested among female lecturers of Kaduna Polytechnic, an institution that was similar to the study sites but located about 70 km away in a different city. Adjustments were made to the questionnaire based on observations during the pretest. The data collection was done over a period of 20 weeks by a team of six community health officers. Completed questionnaires were either retrieved on the same day or a different day, as agreed with each respondent. In few cases of incomplete questionnaires, respondents were requested to complete this before it was filed as completed.

Prior, to each questionnaire administration, the nature and objectives of the study were explained to each participant and assurance of confidentiality was given, to obtain informed consent for participation in the study.

The data were entered into IBM SPSS Statistics 20 (IBM SPSS Statistics for Windows, Version 20.0, released 2011; IBM Corp, Armonk, New York, USA) and analyzed. The mean age of respondents was computed. Univariate analysis for categorical variable was done using simple proportion. Knowledge was assessed based on responses to eight questions. Each correct response was scored one and incorrect response was scored zero. Respondents with score of 0–4 were taken to have poor knowledge and 5–8 were taken to have good knowledge. The perception was assessed based on responses to seven questions. Similarly, each correct response was scored one and incorrect response was scored zero, and respondents with scores between 0 and 4 were considered to have poor perception and between 5 and 8 were considered to have good perception. In the case of consumption of additives, any respondent that answered “yes” to having consumed any of the listed food items in the last 24 h was taken to have done so.

## RESULTS

A total of 167 female lecturers responded, giving a response rate of 92.8%. Their mean age was  $42.7 \pm 8.2$  years. Majority were aged 40–49 years, Muslim, or Hausa. The educational qualification of most of them was either Bachelor’s degree or Masters [Table 1]. Majority had good knowledge of food additives but only less than half had a good perception of them [Table 2].

Looking at the individual variables that were used to assess knowledge, majority of the female lecturers knew that food additives could be naturally occurring (71.9%) and that they may boost immunity (67.0%). However, less than half of them knew that food preservatives were food additives (41.9%), salt was a food additive (35.9%), the law requires manufacturers to list all the content of their food products (35.3%), and that food carrying NAFDAC number may not necessarily be safe for consumption in all forms (32.9%). Less than one-fifth (18.6%) of them knew that foods may naturally toxic substances or that food additives could be harmful to a consumer’s health [Table 3].

**Table 1: Sociodemographic characteristics of female lecturers studied (n=167)**

Sociodemographics	Frequency (%)
Age	
20-29	8 (4.8)
30-39	47 (28.1)
40-49	83 (49.7)
50-59	26 (15.6)
≥60	3 (1.8)
Religion	
Muslim	127 (76.0)
Christian	40 (24.0)
Ethnicity	
Hausa	77 (46.1)
Yoruba	29 (17.4)
Igbo	18 (10.8)
Fulani	17 (10.2)
Others	26 (15.6)
Educational qualification	
NCE	10 (6.0)
Bachelor	66 (39.5)
Masters	67 (40.1)
Doctorate	24 (14.4)

NCE: Nigeria certificate in education

**Table 2: Knowledge and perception of food additives (n=167)**

Grading	Frequency (%)
Knowledge	
Good	109 (65.3)
Poor	58 (34.7)
Perception	
Good	77 (46.3)
Poor	90 (53.7)
Total	167 (100.0)

In the case of the variables that were used to assess perception, majority (77.8%) felt that the risks associated with food additives must never be ignored and that some food additives could be harmful even in small quantities (64.1%). About half (47.3%) of them felt that foods consumed by Nigerians are now generally more harmful. However, only about one-fifth of them felt that most fast foods do contain food additives (28.1%), chemicals that are safe could be added to foods (24.0%), food additives do not necessarily increase the variety of food items (23.4%), and that cooking could be complete even without food additives (17.4%) [Table 4].

The overall prevalence of consumption of food additives was 97.1%. Consumption rates were high for both natural and synthetic food additives (61.7%–92.2%), except for Ajinomoto and Vedan which were consumed by only about 22.8% [Table 5].

**Table 3: Indices used to assess knowledge of food additives (n=167)**

Indices	Frequency (%)
Some food additives occur naturally	120 (71.9)
Food additives may boost immunity	112 (67.0)
Food preservatives are food additives	70 (41.9)
Salt is a food additive	60 (35.9)
The law requires manufacturers to list content of their food products	59 (35.3)
Foods with NAFDAC number do not contain harmful chemicals	55 (32.9)
Some foods may contain chemicals that are naturally toxic	31 (18.6)
Food additives may be harmful to health	31 (18.6)

NAFDAC: National Agency for Food and Drug Administration and Control

**Table 4: Indices used to assess perception of safety of food additives (n=167)**

Indices	Frequency (%)
Risks associated with food additives must never be ignored	130 (77.8)
Some food additives could be harmful even in small quantities	107 (64.1)
Foods consumed by Nigerians are now generally more harmful than in the past	79 (47.3)
Most fast foods do contain food additives	47 (28.1)
Some chemicals could be safely added to foods	40 (24.0)
Food additives do not necessarily increase the variety of food items	39 (23.4)
Cooking could be complete without food additives	29 (17.4)

## DISCUSSION

Consumption of food additives has now become a universal phenomenon. A critical segment of the society that represents the working class is at an increased risk of repeated consumption of foods laden with additives that are often processed and prepackaged. We are yet not clear on the level of knowledge, perception, and consumption of food additives by female lecturers who are highly educated members of society. Assessing these variables will provide information upon which targeted interventions could be designed and implemented.

In this study, we assessed knowledge, perceptions, and consumption of food additives among female lecturers in tertiary institutions in Zaria. In terms of knowledge, we found that more than half of the respondents had good knowledge of food additives. This finding was not consistent with the finding that was obtained in a similar study in Ohio, where more than 40% of respondents had poor knowledge of food additives.<sup>[8]</sup> The difference could be explained by the sociodemographic differentials between the two study locations. In addition, the research subjects also differ, in our study highly educated individuals were interviewed, while in the other study, the general population was interviewed. Our finding was equally higher than what a study in Turkey found, where only about a

**Table 5: Food additives consumed by the lecturers in the last 120 h (n=167)**

Food additives	Frequency (%)
Natural	
Salt	154 (92.2)
Potash	142 (85.0)
Locust bean	117 (70.1)
Others	112 (67.1)
Synthetic	
Maggi/royco/knorr	149 (89.2)
Curry	129 (77.2)
Onga	114 (68.3)
Others	103 (61.7)
Ajinomoto/vedan	38 (22.8)

“/” means “or”

third of respondents had good knowledge of additives and the majority of them worked in the food sector.<sup>[7]</sup> Our study finding is consistent with that found among university students in Korea which revealed that more than three-quarters of regular patrons of processed foods had a good knowledge score of food additives.<sup>[9]</sup> This similarity could be due to the fact that the subjects in the two studies were located within the same environment and therefore, share some similarities in terms of access to processed foods. Similarly, based on the indices used to determine knowledge, our study showed consistency with the results of a study conducted in India, where more than women knew about synthetic and natural additives in processed food.<sup>[3]</sup> They were aware of E codes in food labelling and that the term “preservative” covers a wide range of agents such as coloring agents, flavoring agents, and preservatives.<sup>[3]</sup> In the same Korea an interventional study involving awareness campaigns led to an improvement in knowledge score from the baseline, although the baseline knowledge score was good in more than 60% of the respondents.<sup>[10]</sup>

In terms of perception, we found that most of the respondents had a poor perception of food additives. This is comparable to what a Korean study found where more than 90% of respondents had a poor perception of food additives and were of the opinion that most additives had significant health implications and that Mono Sodium Glutamate (MSG) was the most unsafe synthetic additive in food.<sup>[3]</sup> Similarly, in the UK, a study on safety concerns among the populace found that almost three-quarters of respondents perceived that salt is the most dangerous form of additive due to its link with hypertension while slightly over half of them perceived coloring agents to be more hazardous than any other additive.<sup>[11]</sup> In Korea, an interventional study found that at the end, respondents’ perception improved by 60% from baseline.<sup>[10]</sup> This underscores the importance of health education intervention in order to improve consumer awareness of food additives.<sup>[10]</sup>

In terms of consumption of additives, our study found that all the respondents consumed food containing at least one form of additive in the last 24 h preceding the survey. About

one-fifth of our respondents consumed “Ajino-moto” a seasoning containing MSG in the preceding 24 h before the survey. This is similar to what was obtained in the consumption of MSG among study subjects in Korea.<sup>[3]</sup> These may be explained by the similarity on consumption pattern of MSG in many countries which has declined in the last few decades. Our study also showed similarity with another study among female staff in eight Nigerian state universities which found that consumption of foods containing additives was influenced by respondents’ risk perception and health literacy.<sup>[12]</sup> This findings may be similar due to the similarity of the study population and the environment.

## CONCLUSION

The study is limited by the fact that it was conducted among female lecturers, a highly educated group. As such, the findings cannot be generalized to other females in Nigeria, and future studies should focus on the general population. Nonetheless, the study fills the gap of paucity of information on the knowledge and perception of consumption of food additives in Nigeria. The study observed that knowledge of food additives was good, but their perception was poor and consumption was high. Stakeholders must begin to organize and sustain periodic sensitization campaign on food safety awareness and culture as it relates to the risks associated with the consumption of food additives. Such campaigns could concentrate more on the females because they are usually involved in the preparation of food for the household. Furthermore, additional studies are needed to identify the reasons for poor perception and high level of consumption despite the good knowledge among the female lecturers studied.

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## Conflicts of interest

There are no conflicts of interest.

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