Assessment of Fish Consumption Patterns amongst Students in Kwara State Nigeria

Adeoso Abiodun[1*] and Adebayo-Oyetoro Abiodun[2]

[1]*Nutrition and Dietetics Department, Yaba College of Technology, Lagos, Nigeria.*
[2]*Food Technology Department, Yaba College of Technology, Lagos, Nigeria.*

Authors' contributions

This work was carried out in collaboration between both authors. Author AA designed and analysed the study. Author AOA interpreted and prepared the manuscript. Both authors read and approved the final manuscript.

Original Research Article

ABSTRACT

Fish is a nutrient dense food of animal origin commonly consumed across lifecycle. Different species are found across continents based on many factors with varying benefits of which health is key. The nutrition benefits of fish are not fully understood among youths as many consume other sources of protein for many reasons due to lack of information. The diverse reasons for consuming other sources of protein such as meat, eggs, poultry etc. need to be investigated so as to increase nutrition education among youths. This study was designed to determine the fish consumption levels among undergraduates, reasons for its consumption, and reasons for non-consumption. A descriptive cross-sectional study was carried out among one hundred and fifty(150) students from Kwara State Polytechnic and one hundred and fifty-two students (152) of the University of Ilorin with a total of three hundred and two (302) undergraduate students. Respondents were randomly selected in each institution. Self-administered structured questionnaires containing both persona and dietary information were filled. Results showed that about 92.4% (280) respondents consume fish in any form; 57.2% (174) preferred frying to boiling; 53.5% (162) preferred mackerel locally called Titus in Nigeria to any other species. Fish consumption when cross matched with educational qualification indicates increase in consumption with education qualification. Respondents with National Diploma qualification (51.8%) consumed fish more than once in a

---

*Corresponding author: Email: abiodunadeoso@gmail.com;

week, this could be as a result of their environment or financial status compared with others. Nutrition education on fish consumption especially amongst youths should increase to enable them obtain essential nutrients such as iodine, omega- 3 fatty acid necessary for memory improvement. Hygiene and display pattern by retailers should also improve to make purchase and consumption of fish more appealing for the youths. Government agencies such as the Ministry of Health should educate marketers on safer ways of handling fish from farm to retail. Members of the public should also be sensitized on consequences of consuming unwholesome foods particularly with respect to risk assessment.

1. INTRODUCTION

Fishes are known to be one of the healthiest foods on the earth containing numerous natural and essential nutrients which help reduce risk of many diseases [1].

In order to eradicate hunger and malnutrition which is a sustainable development goal, consumption of nutrient dense foods could be a solution to protein Energy Malnutrition. Nutrient dense foods such as fish, meat and protein based foods in general, delay hunger pangs and improve nutrition status. Fish is an animal product which contain important nutrients essential for keeping our hearts and brain healthy [2]. The nutrition knowledge of fish among young adults and youths is low and many source for protein, vitamin A, vitamin D, calcium and phosphorus from other foods. Minerals present in fish include iron, zinc and iodine which also play major role in mental health [3].

Over the years, young people prefer meat to fish because meat is juicier tastier due to its higher fat content and requires little or no special cooking skills. The diverse reasons for consuming other sources need to be investigated and upgrade nutrition education among youths. Some communities forbid killing and consumption of species of fish and this may create fear in the residents and they may not consume fish at all.

It is notable that fish provides more than 60.0% of the world's supply of protein, especially in developing countries [4]. Fish is an important protein source in the diet of Nigerians. Protein from fish is highly digestible and of high nutritional value and consists of complete arrays of amino acids, vitamins, and minerals [5]. Apart from its high quality, fish is a cheaper source of protein compared to other animal protein sources such as beef, pork, chicken, and goat meats [6].

Fish consumption however, increased over the years because of improved methods of preservation and distribution. Special cuisines were innovated in the hospitality industry and this resulted in better acceptability [7].

Fish consumption varies across and within regions because of cultural, economic and geographical reasons [8].

This study was designed to determine the fish consumption level and reasons for consuming fish among undergraduates who represent majority of Nigeria young people. It is necessary to take steps in order to improve consumption of fish rich in unsaturated fatty acids which include Docosahexaenoic Acid (DHA) and Eicosapentaenoic Acid (EPA) [9].

2. MATERIALS AND METHODS

2.1 Participants

This study was designed to determine the fish consumption levels and patterns among undergraduates in Nigeria, reasons for its consumption, reason for not consuming it and possible steps to take in order to improve its consumption. Considering the population of Kwara state students, sample size calculator was adopted to determine the sample size for the study. With 95% confidence interval, 5% margin of error, three- hundred and seventy (370) was the ideal sample size, but only 302 were willing to take part in the study. Kwara state is located in the North central geo-political zone of the country, making the location ideal because it is central.

Quantitative research design was adopted as a research method, while, descriptive cross- sectional study was carried out with one hundred and fifty students from Kwara State Polytechnic and one hundred and fifty-two students of the

University of Ilorin with a total of three hundred and two (302) undergraduate students.

Permissions were sought and received from the students' Affairs Units of both institutions to engage students. Respondents were practical appealed to before taking part as they shunned the researcher. Respondents were sought for within the department classrooms and cafeterias. Only willing students were randomly selected in each institution.

2.2 Data Collection Instrument

Qualitative questionnaires [10] bothering on personal, dietary food frequency table to evaluate significant factors influencing frequency of consumption, factors for consumption and other preferred choices were administered to the students. The multiple choice sections assessed the level of taste, price and hygiene. Cooking methods, freshness, appearance, nutritive value, dietary habits, price and availability was also considered.

2.3 Data Analysis

Statistical methods adopted in analysis of data include SPSS version 16.

3. RESULTS AND DISCUSSION

3.1 Socioeconomic Status of Respondents

The study responds consist 163 females and 139 male students. Forty-four were in vocational programmes, 115 were studying various National Diploma programmes, 24 Higher Diploma students, 99 undergraduate, 14 MSc. Students and 6 PhD students.

It was observed that majority of the National Diploma students (54.2%) whose monthly income/allowance is between N10,000 and N20,000 consumed fish more than once weekly. Those who received above N40000 a monthly income consumed fish the least. This may be because of the ability to afford other more expensive sources of protein.

3.2 Respondents' Opinion about Consumption of Fish

Many respondents gave reasons for non-consumption of cooked fish which varied from affordability, non-availability and non-hygienic preparation methods top the chart. While state of fish either thorough done/ half-done is a major concern for consumers which led to low patronage of fish.

Majority of the respondents (29%) were of the opinion that public fish consumption is satisfactory, 22% of them were of the opinion that it is affordable and it should be consumed often. Respondents who indicated lack of hygiene and improper preparation were 20% while 16% believed that it creates opportunity for increasing the consumption of fish.

The remaining 14% of the respondents showed that consumption of fish was low due to the availability of other alternatives and the manner fish is usually displayed for sales.

Majority of the females who consumed fish (27.0%) preferred it because of its low price, while 18.2% prefer it due to the nutritional values derived, 12.4% as a result of the amount of time spent in preparing it, 11.7% preferred to eat it when experiencing loss of appetite, 9.5% prefers it because it is tasty and 10.2% just take a special liking to it.

Twenty-seven percent (27%) females who consumed fish preferred fish because of price. Price of fish compared to meat is another factor. A larger percent of the consumers (47.19%) believe that fish is cheaper than meat, as opposed to this, 38.95% of them are of the opinion that it is more expensive, 8.24% believes that it depends on the type of fish and the size while 5.62% think it is actually equal.

Some respondents (18%) preferred fish for its nutritional values derived. While 12% as a result of shorter time of preparation, 12% preferred to eat it when experiencing loss of appetite, 10% preferred it because fish because it's tasty and less than 1% consumed as a favourite food. A higher percent of male appreciated the taste when compared to the female (14.4%, 9.5% respectively) and 8.1% of them preferred it for some other reasons such as its softness and ease of chewing.

About 53.74% of respondents complained that fish found were not properly preserved and spoil easily. Price variation was the complaint of 18.69%, while, 13.08% complained about the scarcity of fish due to poor power supply, which prevents proper preservation. Poor hygiene of

processing environment prevent consumption for 7.48% of the respondents in this category.

On the part of retailers, 5.14% and 1.87% of the retailer respondents respectively complained about the lack of capital to make available variety of fish and the lack of correct measurement scale for consumers and buyers.

Amongst the important steps highlighted in increasing consumption of fish, 37.19% suggests that there should be a reduction in price of the fish, 26.86% suggests that awareness, public lectures should be given to the general public to educate on the importance of fish consumption and sensitize them on the health benefit, 16.53% suggests that the fish should be sold or smoked within hygienic and conducive environments. Suggestion of 9.50% respondents is that government provide constant electricity for better storage and encourage fish farming in the country instead of importation of fish, 7.44% suggests that there should be increment in the varieties of fish available in the market, and 2.48% encourages the retailers to adopt good and proper hygiene.

In this study, reduced fish consumption could be associated with low availability of fish in the region as stated by many of the respondents since a very large proportion of the respondents signified their willingness to eat more fish when its availability increases.

However, the consumption of fish is low in the North, except in Makera and Dutsin-ma areas that are very close to the Zobe dam. Hence cost is certainly not a factor affecting fish consumption, though some respondents indicated high poverty level as a factor during the formal interview [11,12].

3.3 Academic Qualifications and Fish Preference

Those pursuing MSc. programme (58.2%) preferred fish most. The regularity of fish consumption when cross matched with educational qualifications displayed that a greater percent of people with ND qualification (51.8%) consumed fish more than once in a week, this could be as a result of their environment or financial status. The regularity of fish consumption when cross matched with educational qualification displays that a greater percent of people with ND qualification (51.8%) takes in fish more than once in a week. This could be as a result of their environment or financial status.

Though majority of the respondents were aware of high nutritious value of fish, they still ate more beef than fish, this is in line with findings of Dalhatu and Ala [13]. On the contrary, Robert and Juan [14] reported that more fish is consumed than beef in Imo State, Southern Nigeria.
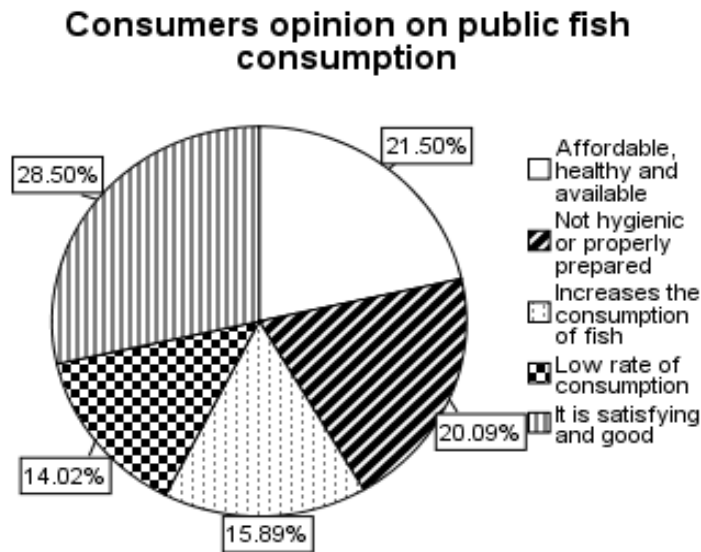

Fig. 1. Consumers' opinion on eating cooked fish

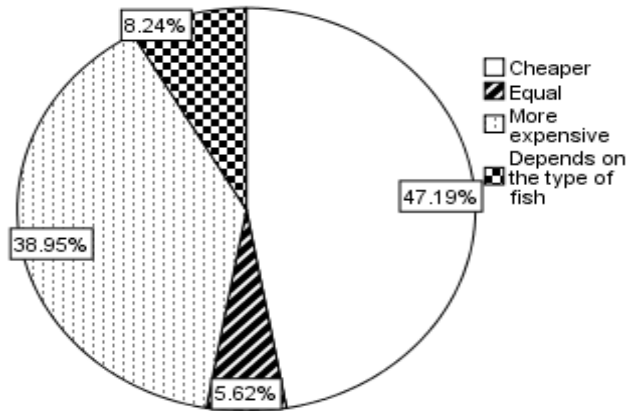## Consumers opinion on price of fish compared to meat

Cheaper
Equal
More expensive
Depends on the type of fish

8.24%
47.19%
5.62%
38.95%

Fig. 2. Comparative Price of Fish and meat

Problems in retail fish market

Inflation of price
Poor preservation, competition among retailers and spoilage of fish
No scale of measurement
Scarcity and poor power supply
Lack of capital and enough varieties
Dirty environment and poor hygienic culture amongst the fish sellers

7.48%
18.69%
5.14%
13.08%
1.87%
53.74%
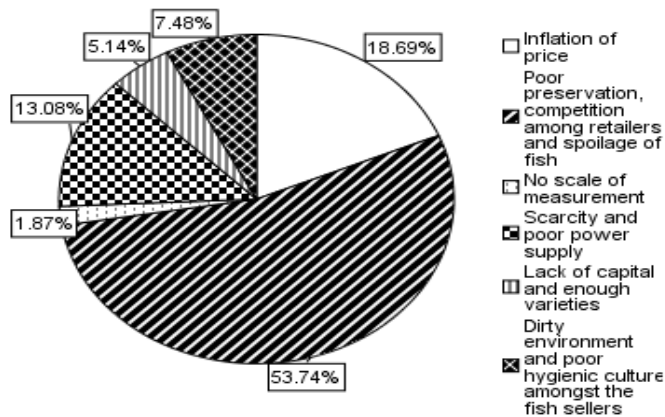
Fig. 3. Problems encountered in retail fish sales

Important step to increase fish consumption

Awareness. Public enlightment, educate and sensitize the public
Cleanliness and good hygiene among fish sellers
Better electricity supply and support from the goverment
Increment in the varieties of fish available for sale
Reduction in price
Proper and better cultivation of fish
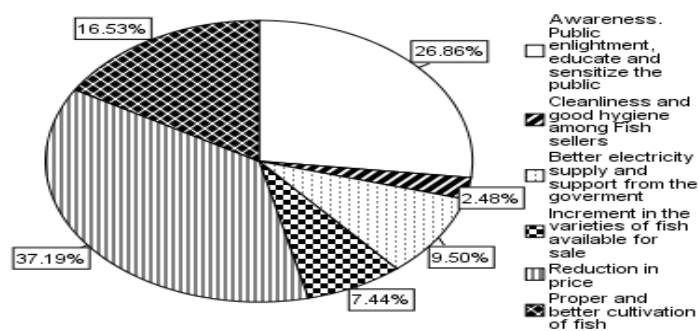
16.53%
26.86%
2.48%
37.19%
9.50%
7.44%

Fig. 4. Suggestions on ways to increase fish consumption

Table 1. Socio–economic factors of respondents

		Fish consumption frequency						Total
		Daily	More than once weekly	Once weekly	More than once a month	Once a month	Few times yearly	
Gender	Male	(22) 15.8%	(77) 55.4%	(10) 7.2%	(17) 12.2%	(11)7.9%	(2)1.4%	(139)100%
	Female	(24)14.7%	(77)47.2%	(19)11.7%	(28)17.2%	(11)6.7%	(4)2.5%	(163)100.0%
Education Qualification ND		(22)19.1%	(60)52.2%	(12)10.4%	(13)11.3%	(6)5.2%	(2)1.7%	(115)100%
	HND	(5)20.8%	(10)41.7%	(2)8.3%	(4)16.7%	(3)12.5%	(0)0%	(24)100.0%
	BSc./BA/B.Ed	(15)15.2%	(55)55.6%	(5)5.0%	(15)15.2%	(7)7.0%	(2)2.0%	(99)100.0%
	MSc	(0)0%	(8)57.1%	(0)0%	(6)42.9%	(0)0%	(0)0%	(14)100.0%
	PhD	(0)0%	(1)16.7%	(0)0%	(5)83.3%	(0)0%	(0)0%	(6)100.0%
	Vocation	(13)29.5%	(16)36.4%	(4)9.0%	(6)13.6%	(4)9.0%	(1)2.3%	(44)100.0%
Monthly Income								
N10,000-20,000		(28)15.6%	(97)54.2%	(17)9.5%	(23)12.8%	(11)6.1%	(3)1.7%	(179)100.0%
N21,000-30,000		(5)14.7%	(18)52.9%	(3)8.8%	(4)11.8%	(4)11.8%	(0)0%	(34)100.0%
N31,000- 40,000		(6)26.1%	(4)17.4%	(1)4.3%	(8)34.8%	(3)13.0%	(1)4.3%	(23)100.0%
N41,000 and above		(2)14.3%	(9)64.3%	(2)14.3%	(0)0%	(1)7.1%	(0)0%	(14)100.0%

Table 2. Frequency & preference of consumption

Usual accompaniment with meal	Beef 31.2%	Fish 41.2%	Chicken 16.1%	Cow skin 3.9%	Egg 1.3%	Nothing 3.2%	All 3.2%	
Most preferred	Beef 40.6%	Fish 47.9%	Chicken 11.2%	Cow skin 0.3%				
Do you take fish?	Yes 92.4%	No 7.6%						
Reason for not taking fish	Economic 23.3%	Taste 44.2%	Health 18.3%	Others 14.2%				
Why fish?	Money 24.3%	Lack of time 13.5%	Lack of appetite 13.9%	Taste 11.6%	Nutritional value 19.1%	Preference 8.0%	Others 9.6%	
Name of preferred fish	Mackerel (Titus) 53.5%	Sardine (Sawa) 17.2%	Horse Mackerel (Kote) 9.8%	Blue Whiting (Panla) 7.7%	Croaker 11.4%	Cat Fish 0.3%		
Preferred cooking method fish	Grilled 15.4%	Boiled 27.5%	Fried 57.2%					
Preferred type of fish	Cultivated 12.5%	Caught 26.3%	Frozen 55.3%	Canned 5.9%				
Frequency of consumption	Daily 15.7%	More than once a week 50.8%	Once a week 9.5%	More than once a month 14.8%	Once a month 7.2%	More than once a year 2.0%		

Table 3. Factors affecting fish consumption

Number of people who take fish	Yes		No			
	92.4%		7.6			
Preferred cooking method of fish	**Grilled**	**Boiled**	**Fried**			
	15.4%	27.5%	57.2%			
Usual accompaniment with meal	**Beef**	**Fish**	**Egg**	**Nothing**	**All**	
	31.2%	41.2%	1.3%	3.2%	3.2%	
Reason for consuming fish	**Money**	**Lack of time**		**Nutrition**		**Preference**
	28.3%	14.5%		19.1%		8.4%
Name of preferred fish	**Mackerel (Titus)**	**Sardine (Sawa)**		**Croaker**		**Cat Fish**
	53.5%	17.2%		11.4%		0.3%
Frequency of consumption	**Daily**	**More than once a week**		**Once a month**		**More than once a year**
	15.7%	50.8%		7.2%		2.0%

4. CONCLUSION

This study showed that though beef and other meat types were more expensive than fish, yet, students prefer them to fish. Major deterrence was the taste factor that prevented most youths from consuming fish. Secondly, lower price of fish is the only reason why students preferred fish to beef, chicken and cow skin (ponmo) thirdly, for its availability along the road, corner shops in various forms, smoked, roast, fried compared to other sources of protein which are sold in designated shops and markets only State Ministry of health staff should train food handlers especially fish sellers on hygiene and preservation methods.

Students should be taught to cook fish with natural spices such as ginger, cinnamon, turmeric to improve fish flavor and improve metabolism.

Cooking methods should be modified and changed from the usual frying and boiling to grilling which will reduce oil consumption and enhance taste.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Ruxton CHS, Reed SC, Simpson MJA, Millington KJ. The health benefits of omega-3 polyunsaturated fatty acids: A review of the evidence. Journal of Human Nutrition and Dietetics. 2004; 17(5).
2. Adeosun IO. Consumption pattern of fish among households in Offa, Kwara State. M.Sc. Thesis, Department of Agric. Economics, Obafemi Awolowo University Ile-Ife; 2006.
3. American Heart Association in Fish and Omega-3 fatty Acids.
   Available:www.heart.org
4. Babicz-Zieliñska E. Food preferences among the Polish young adults. Food Qual. Pref. 1999;10:139–145.
5. Olsen SO. Understanding the relationship between age and seafood consumption: The mediating role of attitude, health involvement and convenience. Food Qual. Pref. 2003;14:199–209.
6. Food and Agriculture Organization. Fisheries development in Nigeria: The current challenges. Paper presented by the Honourable Minister of State for Agriculture to the Fisheries Society of Nigeria (FISON), Lagos State. 2007;23.
7. Holland JO. Rising incomes, increased urbanization to underpin seafood consumption growth; 2019.
   Available:www.seafoodsource.com
8. Akinrotimi OA, Gabriel UU, Owhonda KN, Onunkwo DN, Opara JY, Anyanwu PE et al. Formulating an environmental friendly fish feed for sustainable aquaculture development in Nigeria. Agricultural Journal. 2007;2(5):606-612.
9. Available:www.doh.wa.gov-Health Benefits of Fish
10. Lee LK, Shahar S, Yusoff NAM, Chin AV. Validation of a food frequency questionnaire in assessing the omega-3 polyunsaturated fatty acids intake for Malays and Chinese elderly in Malaysia. Sains Malaysiana. 2013;42(11),1625-1632.
11. Federal Department of Fisheries. Fisheries Statistics of Nigeria Projected Human Population, Fish Demand and Supply in Nigeria, 2000-2015. 2008;56.
12. Fish consumption and knowledge of fish farming among inhabitants of Dutsin-ma local government area, Katsina state, Nigeria; 2019.
    Available:https://www.researchgate.net/publication/281246101_fish_consumption_and_knowledge_of_fish_farming_among_inhabitants_of_dutsinma_local_government_area_katsina_state_nigeria.
    Accessed Sep 17 2019
13. Dalhatu M and Ala A. Analysis of fish demand in Sokoto metropolis, Sokoto, Nigeria. Nigeria Journal of Basic and Applied Sciences. 2010;18(2).

14. Robert OU, Juan N. Micro level analysis of beef and fish consumption in Imo State, Nigeria. Agricultural Research and Reviews. 2012;1(1):1–8.

Available:http://www.wudpeckerresearchjournals.org/ARR