

Comparison between diet-intake before and after COVID-19 lockdown in selected households in Chikun Local Government Area of Kaduna State, Nigeria

Abstract

Background: The COVID 19 pandemic between 2019-2020 resulted in lockdowns and travel restrictions worldwide. This could however, significantly influence the dietary habits of humans worldwide considering its economic, financial and health impacts

Aims: The study aims to investigate dietary habits in selected households in Chikun Local Government Area of Kaduna State, Nigeria.

Methodology: 24 hour dietary recall was used to collect dietary data on meals consumed a day before interview both before and after the lockdown was lifted using the same questionnaire

Results: The respondents had an improvement in diet choices post COVID-19 lockdown as show on the charts above, the increase in the consumption of fruits /vegetable (7%) and spice/seasoning (5%) food groups was majorly as a result of their associated health and wellbeing benefits however, there was also a reduction in the percentage intake of protein (5%) and complex carbohydrates (13%) probably due to the overall reduction in caloric intake. An increase of 4% was also recorded in the intake of simple carbohydrates.

Conclusion: There was an overall improvement in diet choices and lifestyle post Covid-19 in the Study Area.

Keywords: COVID-19, diet, lockdown, Kaduna, Nigeria.

Introduction

COVID-19 illness was more prevalent in vulnerable groups such as most individuals who are older than 60 years, those who have underlying health conditions such as pulmonary disease, cardiovascular disease, metabolic diseases such as diabetes mellitus and conditions that affect the immune system (WHO). Nutrients from diet is a fundamental tool in improving resistance and immunity to illnesses (6) . The functional choices of diets should include foods from at least five food groups namely; one sourced from animal flesh, one fruit or vegetable source in addition to staple foods such as grains, tubers, legumes, dairy products, flesh foods, eggs, Vitamin A rich fruits and vegetables and other fruits and vegetables (7) The Nigerian diet has its peculiarities

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that cut across all geopolitical zones with staple food easily found in markets all year round. The Northern parts which are suitable for farming grains, the southern parts have fruits and vegetables of varying kinds all year round though there is still a prevalence of micro nutrient deficiencies and poor nutritional status (8) , micronutrient deficiencies such as vitamins and minerals examples include; Iron deficiency, iodine deficiency, Vitamin D, Vitamin B-12, calcium and magnesium could also contribute to lowered immune system unable to fight infections like COVID-19. Likewise specific functional sourced from various food groups of Nigerian cuisine have been touted for their health promoting benefits, such as boosting immunity, phytochemical properties, anti-oxidants, enhancement of physiological function, preventing chronic disease progression. The functional foods can be conventional, modified medical in nature (9) . Other food substances worthy of note which have been found to improve immune system include fruits such as oranges, mangoes, pawpaw, guava, pineapple, grapefruits. These fruits are available either during the rainy or dry seasons (10) and indigenous spices such as Piperaceae, Afrmomom melegueta K, and Tetrapleura tetraptera are few of the many notable spices which have good nutritional value and can boost immunity. Spices are known to not enhance the flavor of food but likewise improve on the nutrient value of diet (11). Majority of the ethnic groups across all the geopolitical zones in Nigeria have peculiar dough based food called swallow usually eaten with soups or stews, loaded with healthy locally sourced vegetables, drizzled with vegetable oil and meats or fish as very common nutrient source (12). Food also serves as a bonding agent in various Nigerian family cultures and community holidays or festivals with meals prepared using unique techniques and recipes as a requirement for such festivals success. Festivals such as Christmas, Salah, Independence day, New year's day, children's day are all worthy of note (13) the most recent Nigerian vulnerable population nutritional status stands at 12% underweight with a body mass index BMI< 18.5, 28% overweight as well as 56% minimum dietary diversity for women of child bearing age. The first 1000 days of life as well as that of adolescent and Women of reproductive age also consumed 5 or more out of 10 specified food groups while for children between 6-59 months of age, 37% were stunted (height-for-age), 7% wasted (low weight-for-height) , 22% underweight (low weight-for-age) and 2% overweight (BMI between 25.0-29.9) (14) An online survey with data collected via an app called ALO mama shows that the pandemic affected the dietary patterns of respondents in the research area who consumed various food groups (15) likewise another study using a drive through distribution of consumable food style program was effective during the COVID-19 lockdown period in meeting the nutritional needs of residents of the study area (16). Diet was found to be an effective strategy in preventing diseases such as kidney infection during the COVID-19 lockdown thus preserving kidney health and management of kidney disease in cases applicable (17), eating habits in Saudi Arabia improved with as much as 85.6% eating home cooked meals which is a standard in terms of monitoring diet condiments and keeping track of intake of nutrients as opposed to 35.6% before the pandemic, showing that there was an improvement in dietary lifestyle generally following the lockdown (18). There was found to be a strong correlation between low income earning and adverse effects of COVID-19 infection as

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reported by researchers this was connected to the inadequate amount of nutrients available to households living below the average standard for diet consumption caused by the lack of socially acceptable amount of money or purchasing power (19) another research showed a mean reduction in food shopping and consumption frequency which is a direct effect of lack or low financial capabilities characteristic in many households with poor access to adequate food or nutrient required to maintain optimum health (20). The influence of the pandemic on nutrition and diet intake has gone beyond individual and community levels and reached global levels thus posing a global threat to nutrition and overall health of millions of affected people (21) as an adherence to Mediterranean diet pattern was more evident during the pandemic, a Mediterranean diet consists of vegetables; such as tomatoes, broccoli, carrots, cucumbers, potatoes, fruits; such as bananas, grapes, dates, watermelons, and avocado pear, nuts/ seeds; such as cashews, walnuts, chia seeds, pistachios, almonds, groundnuts to mention a few, Legumes; such as beans , and peas, whole grains; such as whole wheat, barley, oats, whole grain pasta, brown rice, fish and seas food; such as , sardines, mackerel,, shrimps and lobsters, poultry such as chicken, turkey, eggs , Dairy; such as fermented greek yogurt, cheese and milk, herbs and spices; such as cinnamon, nutmeg garlic, curry, thyme, all colors of peppers and basil, Unsaturated fats; such as olive oil, avocado oil. It is also important to avoid certain food such as highly processed red meats, refined grains, added sugars and saturated fats. Drinks such as water for hydration, teas (black, green, white), coffee, red wine are also healthy choices when on a Mediterranean diet (22). Nutrients sourced from diet have powerful immuno-modulatory actions with the potential to alter susceptibility to corona virus disease, the more functional nutrients consumed by populations the less likely such individuals would come down with the negative effects of COVID-19 disease on health (23). The consumption of certain foods like coffee, vegetables and breast milk were associated with reduced Covid-19 incidence as reported in a study this could be as a result of the activity of functional components of such food items to physiologic functioning of the body system of consumers (24).

MATERIAL AND METHODS

Study Design

24 hour dietary recall was used to collected dietary data on meals consumed a day before interview both before and after lockdown was lifted using the same questionnaires. A 24- hour dietary recall is an interview conducted by an interviewer to an interviewee with the intention to document all food items and beverages consumed over a period of 24 hours, usually all that was eaten from day break to bedtime is recorded.

Duration of Study

The study began in January 2020 at the onset of covid-19 in Nigeria, the lockdown began in February and ended in October 2020 after the lockdown was fully lifted. A total of 10 months in all.

Study Area

Gonin-Gora is a small settlement located along Kaduna – Abuja express way in Chikun Local Government Area of Kaduna State, situated in the North-western parts of Nigeria. It is in an area of 4,466KM² and a population of 372,272. Its geographical coordinates is 10° 26' 0" North and 7° 23' 0" East.

Study Population

A total of 50 adults were coopted as respondents for the study 25 Females from different households and 25 Males from different households making a total of 50 different households. The age groups were with an age bracket from 20-70 years of age with 10 respondents taken from each age bracket of 10 years. For example 10 respondents were selected from age bracket 20-30 years and selection continued up to the last age bracket of 60-70 years.

Sample Size

Convenience sampling technique was used given that research started out at a time when few respondents were willing to participate in any form of research for fear of contracting COVID19 or the spread to communities. Convenience sampling is a type of sampling used in population research where there is no probability correlated to another population.

Field Data Collection

Semi structured questionnaires were administered to respondents from 50 different households in Federal Housing Estate, Gonin Gora, Chikun Local Government area of Kaduna State. Data collected included socio demography and dietary recalls of past 24hours and a list of staple food available at home prior to day of interview. No specific dietary changes were required of respondents during sensitization of selected respondents such that the accurate diet of households were captured before and after the COVID-19 lockdown.

Permission for Questionnaire Administration

Consent forms were given to all individuals who participated in the research for approval and protective gear such as face masks, hand sanitizers were provided all through the duration of research.

Results **no written matter under this head??**

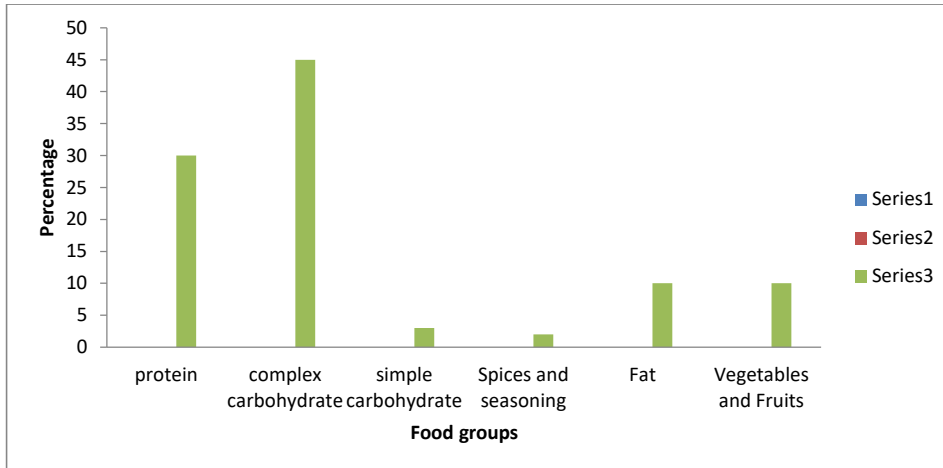


Fig 1: Percentage food consumption before COVID-19 **only series 3 is depicted; what about others?**

UNDER PEER REVIEW

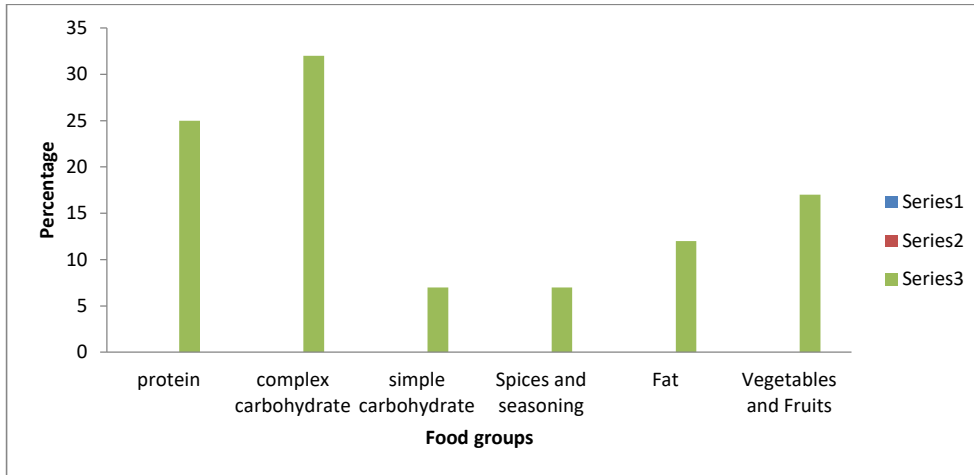


Fig 2: Percentage food consumption after COVID-19

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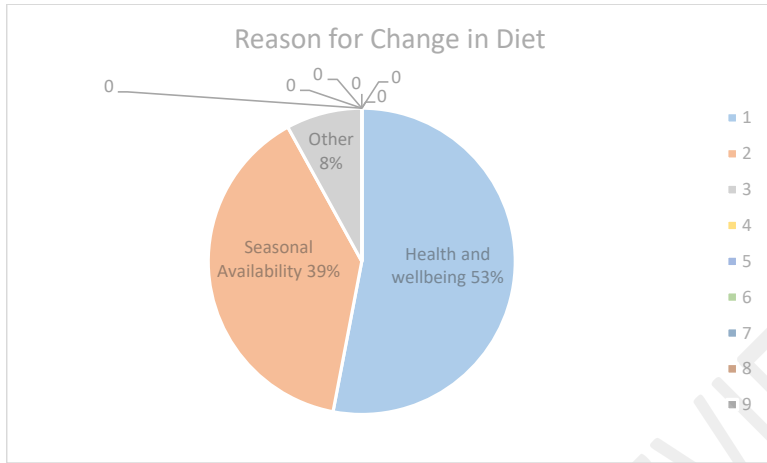


Fig 3: Reasons for diet change *Not part of the discussion*

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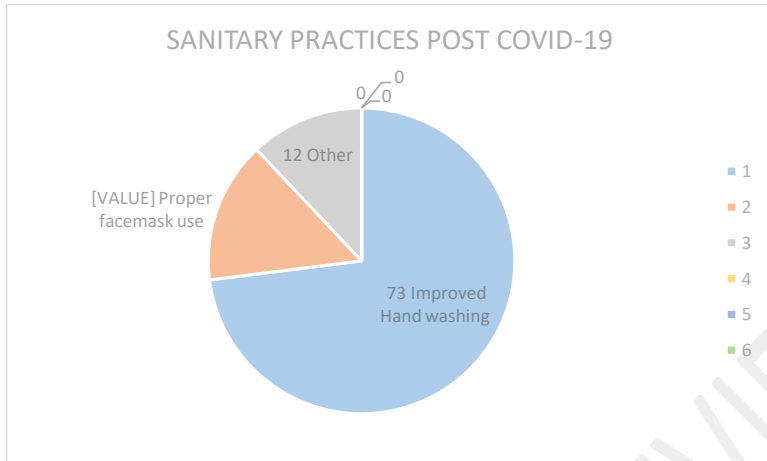


Fig 4: Sanitary practices post COVID-19 (in percentages) not part of discussion, what is the relation to the subject)

Discussion

The Results show that respondents in the survey improved on their diet choices post COVID-19 lockdown as show on the charts above, the increase in the consumption of the fruits /vegetable (7%) and spice/seasoning(5%) is in agreement with the works of Ampofo-Asiama et al. (25) who also reported a similar increase in fruit consumption following the covid 19 pandemic in Ghana, this could be due to the series of sensitization schemes by the government through media houses and social media on health benefits of such food. Other studies reported increases in the purchase or consumption of fruits and vegetables (26, 27). This could be ascribed to the perception that fruits and vegetables contain high amounts of vitamins, minerals and valuable compounds that could enhance the immune system for resisting the COVID-19 infections (28). Those who were opportune to visit hospitals and primary health care facilities also benefitted from such health campaigns on diet choices. The citrus family of fruits loaded with Vitamin C is an age long favorite in managing flu and flu-like infection and its use in COVID-19 times were no different however, other fruits worthy of note were mango, pawpaw, avocado, watermelon, guava, dates, and apples. The major vegetables consumed include; carrots, cucumber, lettuce, cabbage, spinach, beets, green pea, tomato, pepper, onion, pumpkin leaves, jute leaves, bitter leaf, wild spinach, false cubeb leaves, bushbuck,, basil leaves, water leaf, lagos spinach, green african spinach, african eggplant leaf, moringa leaf, oha leaf, roselle leaf, english spinach, english bush apple leaf, cocoyam leaf, cassava leaf, dandelion leaf, sweet potato leaves are all worthy of mention. There was also a reduction in the percentage intake of protein (5%) protein food group consumed include; beef, wild chicken, turkey, sardines, stock fish, eggs, wara (fermented soybean), cheese, marcel fish , cat fish, crayfish, snail, melon seed, and oat meal. Consumption of protein which is considered to promote good health and enhance immunity (29) was found to reduce following the pandemic. This observation was however found to be in disagreement with the studies of Bracale and Vaccaro (30). Complex carbohydrates intake reduced (13%) probably due to the overall reduction in caloric intake. This finding is in disagreement with the findings of Ankrah et al. (31) who reported an improved convenience of rice purchase in Ghana during the pandemic. Complex carbohydrates consumed include; Rice of varying species, sweet potato, yam, yam flour made into dough, cassava dough, beans of varying species, cocoyam, plantain, grain dough made from maize, guinea corn, millet, African fonio, wheat, bread, pastries, whole grain cereals and sorghum. An increase of 4% was also recorded in the intake of simple carbohydrates. Examples of simple sugars consumed include; Honey, sugar, sweets, sugar cane, molasses, date-palm, and sweeteners made by different manufacturers. Fats and oils consumed by respondents include; palm oil, groundnut oil, olive oil, palm kernel oil, cheese, soy bean oil, corn oil, butter, margarine, coconut oil, pumpkin seed oil, almond nuts, pistachio nuts, groundnut, and canola oil. The spice and seasoning food group had the following used to cook during the lockdown; curry, rosemary, bay leaves, parsley, fenugreek, fermented locust bean, ginger, achi, ogbono, black pepper, garlic, turmeric, alligator pepper, Cameroun pepper, lemon

grass, Jamaican nutmeg also known as calabash nutmeg, thyme, onion, cloves nutmeg, bouillon cubes, fermented melon seeds, cumin, sweet pepper and uda. The food group had predominant foodstuff consumed, Rice and Sweet Potato for complex carbohydrates, Sugar and sweet for simple carbohydrates, Meat and Egg for Protein, Spinach, lemon and Oranges for fruit and vegetable, Vegetable oil and margarine for Fat and Ginger root, Garlic and Cayenne pepper for Spice and seasoning.

Conclusion

The findings of the present study showed that COVID-19 pandemic influenced the consumption of certain food groups. However, the observed significant increase in the consumption of fruits and vegetables following the outbreak indicates that respondents understood the health benefits and the essence of healthy feeding especially when faced with a pandemic. This study is therefore important for informing the food and agricultural sector towards establishing a sustainable healthy population in the face of a pandemic.

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