



RESEARCH ARTICLE

PERCEPTION PICTOGRAPH DESIGN OF AFRICAN INDIGENOUS FRUITS AMONG ADULT POPULATION IN MGBOUBA COMMUNITY, RIVERS STATE, NIGERIA: A PILOT STUDY.

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ABSTRACT

Background: Fruits constitute an important component of balanced diet and provide a variety of important micronutrients that help to remedy metabolic and chronic inflammatory diseases. Pictographs design is an important tool in health promotion of indigenous fruit consumption for the management of health conditions. This study aimed to investigate the level of perception of use of pictographs design in promoting the health value of indigenous fruits among adult population in Mgbouba community, Obio-Akpor Local Government Area, Rivers State, Nigeria. **Methods:** This was a pilot study of pictographs design of six indigenous African fruits; avocado pear, orange, water melon, pineapple, banana and mango among 30 samples aged 18 years and above randomly selected using purposive sampling technique from Mgbouba community. Data were collected using self administered questionnaire to assess the perception of the pictographs design. Data collected were analyzed using SPSS version 27.0 with 95% confidence level, and significant at $P > 0.05$. **Results:** Fifty percent (15) of the respondents were males. Age range between 41 – 50 years made up 26.67% (8) of the respondents. Findings showed that 100% (30) of the respondents stated that the pictographs design fulfill its educational purpose of highlighting medicinal value, giving a high perception score of 100 (good level of perception). Meanwhile, 70% of the respondents has poor perception of the textual scientific information of the graphic design with a perception score of 40. **Conclusion:** Majority of the respondents has high level of perception for the African indigenous fruits pictographs. This implies its usefulness as a health education and promotion tool to promote consumption of fruits.

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INTRODUCTION

Fruits contain a variety of micronutrients critical to physical and mental function because of their antioxidant content. Antioxidants play a pivotal role in protecting the body against oxidative stress, which is responsible for the causation and progression of neurodegenerative diseases, chronic inflammatory disease, metabolic disease atherosclerosis, some cancers, and some forms of depression. Furthermore, the water-soluble vitamins (vitamin C, and B vitamins), and certain minerals (calcium, magnesium, and zinc) that are present in fruits are important for optimal cognitive and emotional functioning (1–3). African indigenous fruits have been shown to possess the potential to contribute to a balanced diet, improved immune system, improved wound healing, disease prevention, and management of some diseases (4).

According to the 2003 Joint Food and Agricultural Organization (FAO) and the World Health Organization (WHO) consultation on Diet, Nutrition, and the Prevention of Chronic Diseases, the recommended minimum daily intake of fruits and vegetables is 400g (5). Indigenous fruits found in many ecological zones in Africa are abundant in vitamins, minerals, proteins, and important phytonutrients. They are acknowledged for their medical properties and various therapeutic uses by several ethnic groups in Africa (6). A good understanding of the nutritional values of fruits will therefore help to increase the intake of fruits among the public to promote health and prevent chronic diseases. This study therefore aimed to investigate the perception of developed pictographs designed to educate adult population in Mgbouba community, Obio-Akpor Local Government Area, Rivers State, Nigeria about the nutritional values of African indigenous fruits as well as the benefits of the indigenous fruits in health

promotion and prevention of chronic diseases such as cancer, heart disease, and chronic inflammatory diseases.

MATERIALS AND METHODS

This was a pilot study of 30 adult population aged 18 years and above randomly selected from Mgbouba community, Obio-Akpor LGA of Rivers State, Nigeria using purposive sampling technique. Obio-Akpor is one of 8 local government areas in Rivers East Senatorial District having a land mass of 260 km², population of 464,789, postal code or ZIP code of 500102 and headquarters located at Rumuodomaya (7). This research was conducted in two stages. In the first stage, pictographs of six indigenous African fruits were designed as a health education tool to educate the target population about the health benefits of the fruits. During the second stage, an assessment of the quality of the tool was tested among the 30 research participants of which the research participants were asked to give feedback of the pictographs. Data were collected using self-administered questionnaire. Information about the respondent’s demographic variables like age, educational status, occupation, marital status, educational level were elicited in part A of the questionnaire. Part B comprises of 10 item dichotomous yes/no questions; to determine the quality rating of the pictographic materials that were presented. Perception score was calculated by subtracting percentage of ‘Yes’ responses from percentage of ‘No’ responses, and level of perception was classified as follows; Poor ≤ 50%; Moderate, 51-75%; Good, > 75%(8). Data collected were entered in Excel Analysis Tool Pak and analyzed using IBM SPSS version 27.0. Descriptive statistics were presented in frequency tables and figures.

Pictograph Designs to Promote Health Benefits of Six African Indigenous Fruits

Pineapple (*AnanasComosus*)



Figure 1. Showing the health benefits of pineapple [9, 10]

RESULTS

Table 1 shows the sociodemographic characteristics of participants involved in this pilot survey. Fifty percent (15) of the respondents were males and females respectively. Age range between 41 – 50 years made up 26.67% (8) of the respondents, while age >50 years constituted 30% (9) of the respondents. The respondents with secondary and university educational level were 36.67% (11) respectively.

Avocado pear (*Perseaamericana*)



Figure 2. Showing the health benefits of avocado pear [11–13]

Watermelon (*Citrulluslanatus*)



Figure 3. Showing the health benefits of watermelon [14–16]

Oranges (*Citrus sinensis*)



Figure 4. Showing the health benefits of oranges [17–19]

Majority (53.33%) of the respondents were married, and 43.33% (13) were unskilled. Table 2, 100% (30) of the respondents stated that the pictographs design ful fill its educational purpose of highlighting medicinal value, giving a high perception score of 100(good level of perception). Furthermore, 93% with a high perception score of 86, and 90% with a high perception score of 80 stated that the graphic informative and the message easy to understand respectively (good level of perception).

Bananas (*Musa Acuminata*)



Figure 5. Showing the health benefits of banana [20, 21]

Mango (*Mangifera indica*)



Figure VI. Showing the health benefits of mango [22, 23]

Meanwhile, 70% of the respondents has poor perception of the textual scientific information of the graphic design with a perception score of 40.

DISCUSSION

There is a need for an increase in the consumption of African indigenous fruits because they play a pivotal role in health promotion, increasing the immunity of people, managing diseases/conditions, promoting healing, and preventing chronic diseases. South America is the tropical birthplace of the pineapple, where it has been cultivated for many thousands of years. The pineapple gained status as a symbol of luxury upon its arrival in Europe in the 17th century, commercially farmed in greenhouses and on tropical farms throughout the 1820s and is currently grown in Nigeria (24). Pineapple is a tropical African fruit that is not only delicious but also offers a variety of health benefits (9, 10). The exact timing of the avocado's arrival in Africa is uncertain. One theory is that avocados were brought into the nation by immigrants from the West Indies and other Dutch possessions around 1652. Most of the older species were seedlings of the West Indian race, which supports this argument (11). Avocados are a nutrient-dense fruit that is rich in healthy fats, vitamins, and minerals. Avocados are a great source of monounsaturated fats, specifically oleic acid, which is beneficial for heart health. These healthy fats can help lower bad cholesterol levels and reduce the risk of heart disease (11, 12).

Table 1. Sociodemographic Characteristics of participants

Variables	Options	Frequency (N=30)	Percentage (%)
Gender	male	15	50.00
	Female	15	50.00
Age	<30	7	23.33
	31 - 40	8	26.67
	41 - 50	6	20.00
Education	>50	9	30.00
	Primary	3	10.00
	Secondary	11	36.67
Marital	Diploma	5	16.67
	University	11	36.67
	Single	6	20.00
Occupation	Divorced	4	13.33
	Widow	4	13.33
	Married	16	53.33
	Unskilled	13	43.33
	Skilled	7	23.33
	Managerial	2	6.67
Professional	8	26.67	

Avocados are high in fiber, essential for digestive health, promoting regular bowel movements, and reducing the risk of chronic diseases like heart disease and diabetes. Avocados are rich in vitamins and minerals, including vitamin K, vitamin E, vitamin C, potassium, and folate, which are important for various bodily functions, such as bone health, immune function, and cell growth as well as source of antioxidants, such as lutein and zeaxanthin, which are important for eye health and reducing the risk of age-related macular degeneration (13).

Northeastern Africa is identified as the birthplace of the desert watermelon, where it was cultivated for water and food around 4000 years ago. Sweet dessert watermelons appeared in Mediterranean regions around 2000 years ago and it has become an African indigenous fruit (15). Watermelon is a low-calorie fruit that is high in vitamins, minerals, and antioxidants. It is also a good source of hydration because it is made up of about 92% water. Watermelon is a good source of vitamin C, which is important for the growth and repair of body tissues and immune system function; vitamin A, which is essential for eye health, skin health; lycopene, a powerful antioxidant that has been linked to a reduced risk of diabetes, certain types of cancer, and heart disease (14). Watermelon is one of the richest sources of Potassium: Watermelon is a good source of potassium, which is important for maintaining healthy blood pressure and proper muscle function as well as citrulline, an amino acid that has been shown to have potential benefits for heart health and reducing muscle soreness (16). Oranges are African endemic fruits that is widely consumed by humans. In folk medicine, different parts of *S. spinosa* are widely used for the management of the health and well-being of humans and livestock (17). Oranges are known for their high vitamin C content, which is essential for boosting the immune system, promoting collagen synthesis, protecting cells from damage, enhance iron absorption and may reduce the risk of chronic diseases like heart disease and cancer (18, 19). Oranges are a good source of dietary fiber, including soluble fiber, which helps promote healthy digestion, regulate blood sugar levels, lower cholesterol and help with weight management. Oranges are naturally high in water content, making them a hydrating fruit that can help maintain fluid balance in the body (25, 26). Bananas are grown all over Africa and has been an indigenous fruit and the economic backbone of some African kingdoms, even before Africa was colonized by the Europeans (21).

Table 2. Level of Perception of African Indigenous Fruits Graphics Designs

	Survey Questions	Frequency of Yes(%)	Frequency of No (%)	Perception Score (%Yes - % No)	Level of Perception (Poor ≤ 50%; Moderate, 51-75%; Good, > 75%)
Quality Factor Responses	Does the design fulfill its educational purpose of highlighting medicinal value?	30(100)	0(0)	100	Good
	Does it tell <i>Why</i> the image is made?	23(77)	7 (23)	54	Moderate
	Is it aesthetically pleasing(good innovation)?	26(87)	4(13)	74	Moderate
	Is the graphic informative?	28(93)	2 (7)	86	Good
	Is the textual information not argumentative?	20(67)	10 (33)	34	Poor
	Is the textual information not fictitious?	17(57)	13 (43)	14	Poor
	Is the textual information scientific?	21(70)	9 (30)	40	Poor
	Is the message easy to understand?	27(90)	3 (10)	80	Good
	Is the style memorable?	24(80)	6 (20)	60	Moderate
Is the style broad enough to reach your family and friends?	19(63)	11 (37)	26	Poor	

Bananas are a popular and nutritious fruit that offer a variety of nutritional values and health benefits. Bananas are high in potassium for maintaining healthy blood pressure, heart function, and muscle function; vitamin C to supports the immune system and skin health; dietary fiber which promotes digestive health and helps regulate blood sugar levels, vitamin B6 for brain development and function; and manganese essential for bone health, wound healing, and metabolism (20, 21, 27). Mangoes from tropical Asia were brought to East Africa by Arab and Persian traders between the ninth and eleventh century. Ibn Battuta, a Moroccan traveller from the 14th century, documented it in Mogadishu. It expanded to various regions worldwide throughout the Colonial Era including Africa (22). Mangoes are not only delicious but also packed with nutrients that offer several health benefits. Mangoes are a rich source of vitamins A and C, both of which are essential for maintaining healthy skin, vision, and immune function. They also contain a good amount of vitamins E and K, as well as potassium, magnesium, and folate (22, 23). Mangoes are high in antioxidants such as quercetin, fisetin, isoquercetin, astragal in, gallic acid methyl gallate, beta-carotene, lutein, and zeaxanthin, which help protect cells from damage caused by free radicals and potentially reduce the risk of chronic diseases such as cancer and heart disease and promote skin health as well (28, 29). The use of the pictographs among the target audience showed that the audience reported that the textual information on the pictographs was easy to understand, giving a good perception level with a perception score of 80. This showed that the pictures and design are attractive, and the design can be used to pass messages to different categories of audiences from different socio-economic strata. This agrees with the findings of Gilbert *et al.* that the use of graphics can promote health education and improve the adoption of positive health behaviours because people understand concepts better when they are depicted in pictorial form (30). This is also in tandem with the report of Hashemian *et al.* (31) that the use of pictographs for the purpose of health education is hinged on social cognition theory which implies that human brains process information in a way that promotes understanding when learning is supported with pictures. Hashemian *et al.* therefore proposed that pictographs should be incorporated into community-based and school-based health education programs to promote an understanding of the concept and the adoption of positive behaviour. Phulkerd *et al.*, (2022) opined that in addition to community-based health education, the implementation of population-wide mass media campaigns using pictures have served as key drivers to meet global recommendations on fruit and vegetable consumption (32).

However, some of the research respondents observed that the use of some scientific words can make the pictographs difficult for laypeople to understand. Our results showed that 70% of the respondents has poor perception of the textual scientific information of the graphic design with a perception score of 40. This corroborates the findings from previous research that the interpretation of pictorial messages can be subjective depending on the perception of the interpreter (33). Similarly, Frazier (2023) submitted that to increase the knowledge of fruit consumption and promote positive attitudes towards the consumption of fruit among pre-school children and adults, a multi-level intervention which should include the use of pictures for demonstration is required (34). Behavioral change can be achieved through good pictograph design. Poelman *et al.*, (2019) described the use of pictographs as a sensory education program that can be used to achieved significant levels of positive behaviour change especially when it is used to educate target populations (35).

CONCLUSION

This study developed pictorial images of African indigenous fruits to investigate the perception of adult population in Mgbouba community, Obio-Akpor Local Government Area Rivers State of the use of pictograph as health education tool to promote the consumption of fruits. Pictographs of six fruits illustrating the micronutrient content and their health benefits were presented in this study. Majority of the respondents stated that the pictographs design fulfill its educational purpose of highlighting medicinal value, and that the graphics were informative and the messages were easy to understand, thereby, giving a high perception score ≥ 75(good level of perception). Therefore, the consumption of adequate levels of fruits should be promoted using appropriate health education resources including the use of pictures in health promotion.

ETHICAL CONSIDERATIONS

Ethical approval was obtained from the ethical committee of the Department of Public and Community Health, Novena University, Ogume, Delta State. Informed consent were obtained from each respondent before participating in the pilot study. The privacy and confidentiality of the respondents were maintained and there was no infringement of human rights in the study.

Conflict of Interests: There are no conflicts of interest to be declared in this study.

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