

**PJN**

ISSN 1680-5194

PAKISTAN JOURNAL OF  
**NUTRITION**

**ANSI***net*

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## Nutritional Aspects of Street Foods in Botswana

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**Abstract:** Street foods provide a source of affordable nutrients to the majority of the people especially the low-income group in the developing countries. Street foods are ready-to-eat food items retailed by vendors and can be snacks, main meals, or beverages. They are usually sold from pushcarts or baskets, or stalls or shops. Urban Street food vending provides employment and income for many people, and can provide economic support to small farmers as an outlet for rural produce. In Botswana the majority of street food vendors are women, while in Bangladesh the opposite occurs with women-primarily the vendors' wives and female children-are involved in food preparation. Examples of street foods in Botswana are Fat cakes (magwinya) doughnuts; corn-on-the-cob (mmidi) crisp (madubula) extruded products, roasted beef and chicken, apples, bananas, pears, oranges, grapes and mangoes. Dried mophane worms-a high protein larvae of the emperor moth, imbrasis belina (Westwood), soft drinks, juices, and ice pop, Rice served with chicken or beef with gravy and salads, Maize meal with meat served with beef or chicken with gravy, "Samp" (broken maize corns) served with beef or chicken with gravy, "Dikgobe" "Samp" cooked with beans, "Bogobe" sorghum meal served with meat. Street foods are also prepared in a variety of ways including frying, roasting, boiling, baking and steaming, as well as served raw. Some populations, such as students and the homeless, are almost totally reliant on street foods, whereas other population groups buy them occasionally. Further an EU study in Botswana showed that the consumers of street foods in Gaborone and Francistown included both the working class and professionals. The number of customers served per day varied from 20 to 40 people. The vendors reported that the most food sold was maize-meal porridge, followed by rice, "Samp" and sorghum porridge in that order. Also dumplings, plain "Samp", "Samp" and beans were sold in smaller quantities. Due to lack of transportation, the street food vendors in this study reported that the frequency of buying raw materials was high. Finally the paper reviews the importance of the nutritional issues of street foods due to the fact that most villages in Botswana today are urbanizing and more street foods are likely to be consumed. Also the improvement of the health of the population must be of paramount concern to every one as it had been shown that HIV/AIDS has a relationship with nutrition.

**Key words:** Street food, fat cakes, nutrition, sanitation

### Introduction

In developing countries, drinks, meals, and snacks sold by street vendors are widely consumed by millions of people. These 'street foods' provide an affordable source of nutrients to many sectors of the population, including the urban poor. Street foods include commercially provided snacks that are retailed by street food vendors, as well as food items made by vendors on-site or in nearby kitchens. Some street foods can substitute for nutritionally balance meals, but many cannot. In many countries (e.g. Philippines) studies on dietary trends have shown an increase in the consumption of street foods in urban areas. In response, the food trade has evolved into a large and complex food sector that provides both an important means of income to the vendors and an affordable source of food to millions of people around the world.

Street foods are ready-to-eat foods and beverages prepared and/or sold by vendors and hawkers on the street from pushcarts or baskets or balance pole, or from stalls or shops having fewer than four permanent

walls (FAO, 1989; Tinker, 1987). Further street foods may be centrally processed made by the formal sector food industry, or they may be processed within the street food trade either by the vendor her/himself or another small-scale processor.

Urban Street food vending provides employment and income for many people, and can provide economic support to small farmers as an outlet for rural produce. In some cities, for example Iloilo City, the Philippines, and Bogor, Indonesia, up to 25 percent of the labour force is involved in street food vending (EPOC, 1984). Most street food enterprises are made up of a single person or are household-based, with family members helping to make or sell the product. Some vendors also employ one or two paid assistants.

In some countries (e.g. Bangladesh), the majority of street food vendors are men, while women-primarily the vendors' wives and female children-are involved in food preparation (OMNI, 1996). In other countries (e.g. Nigeria, Ghana, Uganda and Kenya) including Botswana, the opposite occurs, and the majority of

## Omo Ohiokpehai: Nutritional Aspects of Street Foods in Botswana

vendors are women who balance the income-generating opportunities of street vending with traditional household and child care duties (Mwangi, 2002; Akinyele, 1987). Some of the foods sold on the street are: noodle-or rice-based meals, fried snacks, cakes and pastries, soups, porridges, drinks, fruits, vegetables, meat, poultry, seafood, eggs, cereal and soy products. These foods compares well with those sold in Botswana (Mpuchane *et al.*, 2001; Mpuchane and Baatshwana, 1992). Street foods are also prepared in a variety of ways including frying, roasting, boiling, baking and steaming, as well as served raw. Street foods can be categorized as meal components, by ingredients, or by processing method. There are regional differences in the patterns and consumption of street foods. In some countries, street foods are an integral or substantial part of the whole diet, while in others they serve as supplemental foods. Some populations, such as students and the homeless, are almost totally reliant on street foods, whereas other population groups buy them occasionally (EPOC, 1998). Another factor that makes street foods a potentially cost effective food is time. Equity Policy Center (EPOC, 1998) reported that many traditional foods involve lengthy preparation and the purchase of street food allows women to substitute time spent in food preparation for income generating activities.

International organizations have paid particular attention to the safety of street foods and many less to the composition and preservation of their nutritional quality. The street food trade in Botswana is evolving and complex. However it provides an important means of generating income, particularly for women. Therefore street foods have been considered as a way of reducing problems of urban food insecurity and a possible vehicle for micronutrient supplementation.

**Case Studies:** i) In Botswana little information is available about street food vending. The sector is not officially permitted and vendors are often harassed. However there was an EU funded project, which was carried out as part of the Life Sciences and Technologies for Developing Countries, entitled "Collaborative project to investigate consumer preferences for selected sorghum and millet products in the SADC region of Africa" (Ohiokpehai *et al.*, 1999). Within this programme Gaborone and Francistown were surveyed to determine what types of foods were sold in the different sectors of the cities. Street food trade was one of them. In Gaborone, the street foods on sale were mostly cereal based. However, because most cereal foods were served with meat and salad, there could be an improvement in the nutrient content due to presence of meat and salad. The salads were usually made of beetroot, tomatoes, lettuce, green pepper, carrots and mayonnaise. The nutrient composition was not calculated nor determined.

ii) In the study carried out in Nairobi, Kenya (Mwangi, 2002), reported that street food vending was wide spread especially among the urban poor. Mwangi found out that most vendors were one-food group sellers with cereals as the prominent group. Further, major meal servings especially in working areas are able to provide more than adequate protein and iron. But their ability to provide adequate energy was limited. Also meals were poor in vitamin A. Female vendors sold foods of better nutritional quality than their male counterparts. The Nairobi street food vendors had basic hygiene knowledge, but were unable to translate this basic hygiene knowledge into safe food practices. Vendors are of varied ages, diverse personalities vending food without any formal training in food preparation for business or hygiene and sanitation issues.

Diverse people consume street foods and the increase of street food in Gaborone in particular could be associated with the proliferation of the construction industry and urbanization.

In Botswana one can successfully categorize street foods into three major groups of snacks, beverages and complete meals (Mpuchane *et al.*, 2001). Further the breakdown of the different categories showed that in Botswana like for other countries fruits, vegetables and grain meals were eaten. Therefore proper processing and/or preparation of these foods must be looked at in greater details because the availability of these nutrients is important.

What is needed is to officially recognize the sector, reconstruct and organize it with provision of sanitation amenities and put in place vendor training and consumer sensitization programmes to ensure food security and nutritional quality at all levels.

**Source and Quality of Raw Materials:** In street food vending, the raw material source is very important as their contamination could persist through preparation and/or processing or cooking. Firstly vendors must purchase top quality raw materials as preparation and/or processing does not quantitatively increase the nutrient content. However, the awareness of this need can be taught through training and education. Raw materials should be bought from reliable sources. In Botswana the likelihood of a vendor cooking with poor quality raw materials is low. However, over cooking could be wide spread. In recent times also the use of wastewater in horticultural production pose other problems (Ohiokpehai, 2000).

There is a common rule used in the transportation and storage of raw materials, namely raw and cooked food should be transported and/or stored separately to reduce cross contamination.

Care must be taken that the raw materials consumed in the raw state (e.g. salads, vegetables, fruits) grown with wastewater are cleaned properly. In the first place the

## Omo Ohiokpehai: Nutritional Aspects of Street Foods in Botswana

materials must be irrigated correctly in the root and irrigation stopped several days before harvesting depending on the vegetable. Also the raw material should be observed for visible deterioration, temperature, off-odours and presence of additives. Food colours and additives play an important role in street foods (Table 1, Ohiokpehai, 1992).

There are two groups of preservatives: Natural preservative: e.g. alcohol, vinegar and sugar and Chemical preservative: e.g. Sodium benzoate, sulphur dioxide and other sulphites, ascorbic acid and primaricin. Sulphur dioxide and other sulphite have more effect on the asthmatic patient, as they can cause bronchospasm and coughing. Sulphur dioxide is found in dried fruits, soft drinks, wine, beer and biltong. Sodium benzoate- this is used to preserve fruit juices and fruit products. Adults are more prone to react adversely than children when ingested in high doses. The reactions are similar to those of sulphur dioxide.

Nitrites and nitrates-These are used in corned beef, cold meats, cooked pork and pate. Nitrates were shown to react with amines in processed meat to give rise to nitrosoamines. Nitrosoamines are implicated in the formation of cancer i.e. they are carcinogenic. Also nitrates are capable of being converted to nitrites in our stomachs. This reaction causes the removal of oxygen from the blood especially in babies. Therefore, they are not used in baby foods. The asthmatic patients also suffer more with high doses.

While the consumption of additives can harm the asthmatic or allergic patients more, the long-term effects in a normal person must be looked into. Also, their use allows us to eat our "food-processed", whenever we want. Therefore, a compromise must be reached to help both the food manufacturers and the consumers.

The biggest threat is the new nutrition problems of high sugar and salt content of processed foods. The sugars and salt are used as preservatives. The fat content is also high because fat is often used as the cooking medium. Over consumption of these nutrients may cause chronic diseases, such as obesity, hypertension, coronary heart diseases and cancer. Vendors should take nutrition labeling more seriously. We must know what is added to our foods to enable us decide whether we want to eat them or not.

**Children and street foods:** Rapid urbanization as the case in Botswana, is breaking down traditional family ties everywhere. The risks of contamination and infection arising from practices of food preparation, storage and sale also have a bearing on consumer health, morbidity and even mortality, particularly among children (EPOC, 1984).

The implications of the street food trade for urban children can be considered on two key levels. Children can be involved as workers, preparing food (often in the

home), selling food at fixed stalls, peddling in the streets or working for an employer. Children are also involved as consumers. Their mothers usually determine the street foods consumed by younger children. Older children are of interest as autonomous consumers who choose for themselves what and where to eat.

Coleman, 2002 reported that one could nourish children's brains by feeding them the right foods. There are some foods that are better than others for stimulating the brain cells of the child. Eating plenty of whole grain cereals, fruit, vegetables, oily fish and dairy products for example, will keep the child's brain working efficiently and developing to its full potential. So, if the child is listless, lethargic, losing concentration or restless, it could be that he or she is not getting the right amount of nutrients on a regular basis. Not only this but the brain's energy stores are very small and in order to keep it functioning at peak level, it needs a constant supply of two major fuels, oxygen and glucose. Oxygen reaches the brain through breathing and glucose (sugar) is delivered to the brain after our food has been converted into energy. The first step to boosting the child's brainpower is to make sure he or she has breakfast. Missing out on breakfast could be the reason why your child is lacking concentration. This is because the child will have fasted for at least 12 hours during the night. After a long sleep the blood sugar levels are very low in the morning and the child's brain will need a kick-start.

Most street vendors plan food preparation in such a way that prepared or semi-prepared items are consumed by the end of the daily business period, but sometimes they do have leftovers. If the later is a potentially hazardous food and no cold storage (10 °C) is possible, the vendors should be encouraged to discard it. If cold storage facilities are available, the food may be kept for sale after re-heating (>70 °C) on the following day. However, it is preferable to discard leftovers, especially foods liable to support microbial growth. If cold storage refrigeration is available, large quantities of hot food should not be put into the refrigerator in one batch as bacterial growth will occur in the centre of the food which remains warm (above 10 °C). It is preferable to place food in smaller quantities in shallow containers to allow rapid cooling of all parts.

It is generally feasible to store dry, acidified and some fermented foods for varying periods in a cool dry place protected from biological, chemical and physical hazards. Storage of pre-packed sterilized milk, bottled beverage and many canned foods present few hazards provided the packages were appropriately sealed during processing and remain intact and undamaged. Vending units should be designed and constructed so that they are easily cleaned and maintained. Equipment and surfaces used for food preparation should be such that they can be cleaned easily and preferably be made or

## Omo Ohiokpehai: Nutritional Aspects of Street Foods in Botswana

Table 1: Food Colours and Additives

Anti-oxidants	e.g. vitamin C, BHA, BHT. In the presence of air, they prevent food from spoiling. They are used in margarine, crisp, etc. When this group is consumed in high quantities, it can cause skin rash and hyperactivity especially in children. So it must not be added to baby foods.
Artificial sweeteners	e.g. Saccharine, aspartase and cyclamate. Aspartase is 200 times sweeter than sugar. It has its origins from the amino acid-aspartic acid. This substance is very sweet but non-nutritive. It has been shown that high intake causes increased appetite.
Azo Dyes	e.g. Tartrazine This is a group of chemicals that add colour to food. They are used in margarine, soft drinks. Tartrazine is banned from Children's foods. Also it causes tightening of the chest, rashes hay fever symptoms and eczema in asthmatic patients
Emulsifiers and Stabilizers	e.g. Soya. They are used in salad dressing and mayonnaise. They act as binders of water to oil.
Flavour modifiers and enhancers	e.g. Monosodium glutamate (MSG) and Vitamin C. They are used to enhance or reduce the smell or flavour of a food. MSG is the flavouring additive mainly used by the Chinese in their restaurants. MSG is a component of stock cubes, packet, Soya sauces etc. also MSG occurs naturally in cheese, tomatoes and mushrooms.

Source: Ohiokpehai, 1992

covered with impervious materials. Preparation should not be carried out on or near the ground.

Utensils and other containers should allow easy cleaning and should not have pitted, grooved or sculpted surfaces. They should not be used for purposes other than cooking, processing and keeping of food. They should be kept free from contamination from the environment. For example, bowls and dishes should be stored upside-down to prevent the accumulation of dust and foreign matter. Equipment, utensils and other containers should be made of materials, which do not release toxic or hazardous material (copper, lead, cadmium etc.) into food and beverages, especially when foods are acidic. Similarly, chopping boards should be constructed and maintained so as to reduce the likelihood of contaminating foods with physical and biological hazards. If raw meats, poultry or fish are handled, their preparation (e.g. washing, cutting etc.) should be carried out using separate equipment and utensils (e.g. containers, cutting boards and knives), by sanitizing equipment and utensils between uses or by sequencing food preparation practices to minimize the opportunity for cross-contamination.

Preparation and processing of foods meant for sale on the street should be done adequately to eliminate or reduce hazards of different kinds. The hazards can be pathogens, toxic chemicals or contaminants from the farm (Ohiokpehai, 1992). Preparation/Processing can involve cleaning, winnowing and milling (grains) or washing, cutting and boiling/frying/baking/grilling. In street food vending, food can be prepared at home and/or at the point of sale. When it is prepared (boiled, fried or baked) at the point of sale in front of the customers, it inspires confidence and improves the taste and enjoyment of the food. However (WHO, 1996)

reported that this exposure does not cut down the necessity of the vendors to observe the basic rules of food safety. The basic rules of food hygiene are spelt out in the "Ten Golden Rules for Safe Food Preparation" (WHO poster) (WHO, 1996). Special attention should be observed to cleanliness through washing if the food is to be eaten raw (e.g. salads, fruits etc). In order to ensure adequate heat penetration, frozen foods used for cooking should be thawed properly, but if the manufacturer recommends the omission of thawing, then it could be omitted. Thorough cooking is recommended when boiling i.e. the temperature reaching all the parts of the food should be as high as 70 percent minimum when the food is for frying, grilling or baking. Also over-cooking (especially charring) should be avoided as this could give rise to acrylamides. The following are examples of street foods in Botswana (Mpuchane *et al.*, 2001)

**Snacks:** Fat cakes (magwinya) doughnuts; corn-on-the-cob (mmidi) crisp (madubula) extruded products, roasted beef and chicken, Fruits-apples, bananas, pears, oranges, grapes and mangoes. Dried mophane worms-a high protein larvae of the emperor moth, imbrasis belina (Westwood)

**Beverages:** Soft drinks, juices, and ice pop.

**Complete Meals:** Rice served with chicken or beef with gravy and salads. Maize meal with meat served with beef or chicken with gravy. "Samp" (broken maize corns) served with beef or chicken with gravy. "Dikgobe" "Samp" cooked with beans. "Bogobe" sorghum meal served with meat.

The EU consumer preferences study (Ohiokpehai *et al.*,

## Omo Ohiokpehai: Nutritional Aspects of Street Foods in Botswana

1999) showed that the customers included both the working class and professionals. Also that the number of customers served per day varied from 20 to 40 people. The vendors reported that the most food sold was maize-meal porridge, followed by rice, "Samp" and sorghum porridge in that order. Also dumplings, plain "Samp", "Samp" and beans were sold in smaller quantities. The street food vendors in this study reported that the frequency of buying raw materials was high due to the fact that they did not own any means of transportation.

It is important to consider another aspect of street food that is of the energy use in the processing and cooking of foods because the contribution of street foods to total nutritional intake in some countries is large. There is a specific connection between energy and health aspects of street foods, as a poor, intermittent energy source will fail to destroy bacteriological pathogens. This is especially the case for food, which is prepared at home and warmed at the point of sale (Tedd *et al.*, 2001). Therefore an improvement in the energy input of street foods coupled with knowledge dissemination on the need for adequate hygiene will result in reduced incidence of food poisoning.

Previous street food studies had not done complete analyses of the street food produced in the different countries. The EPOC studies (EPOC, 1998) showed that the nutrient content of the foods did provide enough to justify the amount paid for the foods. Also it was shown from the studies in the Philippines that meat-based dishes had the highest in terms of total energy and protein content (193 Kcals and 1kg protein per meal). The vegetable dishes contained higher iron, vitamin A and C at an average of 2.9 mg, 434 IU and 12mg respectively. Further the authors queried the bioavailability of the iron was not certain. Draper (Alizon Draper, 1996) explained that in Indonesia a modest meal was able to supply about half of the energy and protein requirement for an adult and more than half the requirements for iron, vitamin A and C.

Good health comes from within and experts agree on one point that fresh vegetables and fruits eaten regularly can boost the immune system. Apart from the change in attitude of the individual, health-boosting foods should be promoted to protect the nutritional status. The following horticultural crops are served/sold as street foods, but if they are to be eaten cooked, they should be prepared/processed correctly:

**Food Fortification:** Street foods could also serve as a means of introducing new micronutrient-rich foods to consumers in developing countries, Botswana inclusive. Street foods present two fortification opportunities: ingredient-based fortification of universal ingredients, such as flour or sugar, and food-based fortification of specific processed foods or beverages. Fortification of

universally processed ingredients such as flour would improve the nutrient content of street food prepared in small-scale or home operations made from these ingredients. Fortification of formal sector food industry products including condiments, noodles, bottled beverages, and snacks such as corn chips, would enable street food vendors to deliver important micronutrients to a wide number of people.

Ingredients such as cereals, salt, and/or sugar are the most likely vehicles for micronutrient fortification, but the form of the micronutrient must be stable in the final food matrix. For successful food-based fortification, the product must be centrally processed, and consumed regularly in uniform amounts by the target population, such as school children or the urban poor.

A fortification program will be most successful if, instead of trying to fortify all street foods, it concentrates on those foods that are sold to a target group, such as students or the homeless, and delivers the appropriate micronutrient for that population. For example, in Senegal (Canet and N' Diaye, 1996), nearly one-third of all street food consumers are children or adolescents. With advent of HIV/AIDS the well being of the populace must be paramount in our minds and fortification of street foods could be one way of improving the nutritional status of all.

The diversity of these foods implicates it for feasibility, reliability, and its efficiency in fortifying them with micronutrients. Examples of fortification in Botswana are the following: Some of the mealie meal (maize flour A 1 brand) in the market is fortified with multivitamin. Mealie meal is used in the preparation of soft or stiff porridge. However the amount of vitamins remaining after the long processing time had not been determined. Also corn chips are another example of ready-to-eat street foods that is centrally fortified. Finally salt is centrally fortified with iodine (usually potassium iodate) at BOTASH (Sua Pan) and Zutswa (Kang). Street foods are particularly suitable for fortification, because (Mpuchane *et al.*, 2001).

1. A lot of people buy and eat them,
2. They are available everywhere
3. They are produced with low level technology e.g. sour milk (madila), fat cakes (magwinya),
4. In most cases the foods are prepared with ingredients such as cereal flour or salt, which can be fortified from source,
5. Fortification can take place during preparation – on site or incorporated into the traditional recipe (e.g. gravy).

### Recommendations and Way Forward:

- 1 Public Health Officers has an important role to play in the promotion of Street Foods in Botswana.
- 2 Strategic training and educating of all stakeholders in street foods is very important.

## Omo Ohiokpehai: Nutritional Aspects of Street Foods in Botswana

- 3 Special training in the use of wastewater by all stakeholders involved in street foods is needed.
- 4 Detailed documentation of the number and types of street food vendors in Botswana.
- 5 Establishment of research sites to explore both epidemiological and nutritional issues could help in the promotion of street foods.
- 6 Need for a more precise and quantitative information on the nutrient composition of street foods to assess the nutritional quality of the different types of street foods in Botswana.
- 7 Need to have information on street foods in urban areas as compared to the rural areas.
- 8 Need to determine the contribution of street foods energy and nutrient intake of the different population groups
- 9 Need to find out in the Botswana context that is the most viable vehicle for food fortification.
- 10 Research: Carotenoids and Food Preparation – The Retention of Provitamin A Carotenoids in Prepared, Processed, and Stored Foods

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