

Traditional Food of the Khoisan People in Vite Vivali, Huila, Angola

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Abstract

With the aim of identifying the foods consumed by the Khoisan people and in a preliminary way relating the consumption of these foods to the presentation of imbalance in blood glucose, blood pressure and body mass index, a study was carried out consisting of field visits in the commune of Vite Vivali. Through a community guide, 35 Khoisans were contacted to perform anthropometric measurements such as weight, height, body mass index, blood pressure measurement, and direct observation of the foods on their menu. Various foods were identified among meat, fish, vegetables, tubers, fruits and honey, acquired through hunting, gathering and fishing. In relation to the body index, 94.2% of individuals had normal weight, 71.4% had values of 70/100mg/dl, in relation to blood pressure 73.3% had normal parameters (100-120/70-80 mmHg). The study suggests that the dietary habits and lifestyle of the Khoisan people are recommended for good health.

Keywords

Khoisan, Traditional Food, Health

1. Introduction

Traditional and ethnic foods are now becoming increasingly important in multicultural societies, for wisdom, traditional practices and the preservation of food through knowledge of food culture and civilization, combined with experience in food science, they provide a unique opportunity to understand the benefits of these foods based on their bromatological composition and bioactive composition more than in bygone times [1]. Food is directly linked to individual health, public health and global environmental sustainability [2]. Various food-related analysis models reveal potential benefits in changing diet to reduce the exploitation of natural resources in an irrational way with high environmental damage, premature human mortality, disease risk factors and costs in healthcare [3, 4]. A study carried out by Unesco [5] shows that food is a basic requirement for the promotion and protection of health and therefore enables the full affirmation of the potential of human development with quality of life and citizenship. The production of food by ethnic peoples has been through practices such as hunting, fishing, gathering fruits, roots, insects, mushrooms and eggs [6]. For example, the Ashenikas people located in Amazonia are hunters, fishermen, farmers and collectors, so the food coming from these activities and that integrates the recipes of their traditional cuisine is fundamental to ensure Food and Nutrition Security [7]. The same authors also state that products acquired in the wild are varied, whether it be fruit, meat, fish or those produced by these peoples by the practice of traditional agriculture and that it constitutes their ethnic identity, as well as the choice and rejection of certain foods taught by the culture. This work aims to identify the foods consumed by the Khoisan peoples of the commune of Vite Vivali, influences their health and the way they acquire them.

2. Material and Methods

The work was carried out from May to September 2021 in the commune Vite Vivali in the Province of Huila, 178 km from the capital Lubango. To this end, three field visits were made for contact with the Khoisan peoples which, through a guide responsible for the community, allowed direct contact and direct observation of the food products consumed by this ethnic group. In this village were contacted 35 individuals of both sexes, with ages between 05-75 years, to which they were taken weight by means of a mechanical scale brand G-Tech with scale up to 150 kg, the individuals were without shoes and with light clothes. To measure the height, an inelastic measuring tape with 150 cm of extension and 0.1 cm of precision was used, fixed to the wall at 1 meter of the floor, at an angle of 90 degrees. The individuals remained with their feet together and the soles of their feet fully resting on the ground, their heels, buttocks, shoulders and head, leaning on the vertical plane, with their gaze towards the horizon, as described by Bordignon et al. [8]. With the measurements of weight and height, the BMI was calculated, which consists of the measurement of body weight (kg), divided by height (m) squared (kg/m^2), and therefore the cutoff points Screening Nutrition were adopted for the classification of nutritional status (malnourished BMI $< 22 \text{ kg}/\text{m}^2$, eutrophics BMI between 22 and $27 \text{ kg}/\text{m}^2$, overweight BMI between 27 and $29.9 \text{ kg}/\text{m}^2$ and obesity with BMI $> 30 \text{ kg}/\text{m}^2$) [9, 10].

The arm circumference measure (CB) was measured with an inextensible tape measure at the midpoint between the scapula acromion and the ulna olecranon, with an accuracy of 1mm and the cutaneous fold measurement of the triceps (PCT) was performed with the use of a brand adipómetro Sanny®, on the back of the forearm, on the tricipital muscle, at the midpoint between the acromion and olecranon, in the posterior region of the arm. With the arm relaxed the fold was clamped with the thumb and forefinger and the adipómetro was applied 1 cm below the fingers that started the fold.

Blood glucose was obtained by fasting for three consecutive days in the morning by means of a G-Tech glycometer, of which the means were obtained, while the blood pressure was obtained by if with the help of a brand sphygmomanometer three times in the morning and calculated the average of each individual and then the total average. The population studied was accompanied by a multiprofessional group (nutritionist, psychologist and nurses) during the three visits.

3. Statistical Analysis

Data on percentage results of weight, blood glucose and blood pressure were treated based on frequency analysis using Microsoft Excel 2016 dynamic tables and graphs.

4. Results and Discussion

After several visits in the field, which was associated with the identification and careful observation of the food consumed by the Khoisans, various types of food were found, including fruits, meat, tubers, vegetables, roots and honey. The meats most consumed and found in their menus to obtain animal protein were rabbit meats (*Oryctolagus cuniculus*), partridge (*Alectoris rufa* L), monkey (*Cercopithecus lomamienses*), rat (*Rattus norvegicus*), gecko (*Hemidactylus mabouia*), capotas (*Numida meleagris*), grasshoppers (*Chorthippus paralellus*) and giboia (*Boa constrictor*). Also found were bagres (*Clarias gariepinus*), tilapia (*Oreochromis niloticus*), snails (*Lissachatina Fulica*) and crabs (*Trichodactylus fluviatilis*). These foods are obtained by activities such as hunting and fishing as they are available in the wild, so they have to travel sometimes to remote areas to find them depending on the time of year. Vaz and Bennemann [11] stated that, there are lifestyle habits and eating practices that are harmful to health, on the other hand, there are those that help in the prevention of various pathologies, thus providing quality of life, well-being and several benefits to man. In the present study, the relationship that may exist between the type of food consumed by these ethnic peoples and the imbalance of weight, blood pressure and blood glucose was first observed.

Regarding fruit consumption, several were identified, among them the muke (*Adansonia digitata*), wild fig (*Ficus carica*), loengo (*Anisophyllea boehmii*), Maboque (*Strychnos spinosa*), tamarind (*Tamarindus indica*), among other fruits that have also been found whose names are found in the language of the peoples of the Khoisan ethnicity, such as nombé, Ngongo, nonhandi, nonja, nonama, nombolebole, nombio among others.

The common names, especially those of the language of the ethnic peoples themselves, are keys to the interpretation of botanical diversity, since these names represent an information-rich component of the culture of the country and of the peoples, as they describe and indicate the various forms of use of these same plants [12].

Fruits and vegetables are part of regulatory foods according to the food pyramid of Brazil and also the USA. For, these people even without literacy are aware of consuming varied fruits and vegetables in order to benefit the organism from a nutritional point of view, which in turn brings health benefits. Nor can we omit the fact that this ethnic people consumes what they find in nature and the consumption of one type or another of food depends on its availability and abundance because vegetable foods are the most popular and easy to acquire.

The scientific evidence produced in recent decades suggests that plant-based diets are best suited to prevent needy

diseases, reduce the risk of chronic non-communicable diseases and promote health, because vegetarians have a lower risk of developing overweight and/or obesity, cardiovascular diseases, hypertension, diabetes, neoplasms, among other conditions, which compromise quality of life and longevity [13]. These same authors state that the vegetarian diet is typically low in fat and especially those of saturated type and with high fiber content.

The fruits are sources of various nutritive and bioactive substances, as shown by the study carried out by Silva et al. [14] in *Lycium barbarum* and reveal the existence of mineral contents such as calcium, potassium, magnesium, folic acid, phosphorus, boron, sulfur, Lipids, protein, vitamins A, E, C, D, and vitamins of the B complex, so it can vary depending on each type of fruit. It also claims to be rich in phytochemical compounds, such as polyphenols, B-glycans, flavonoids, carotenoids, quercetin, among others, that are necessary for the maintenance of human life. For example, flavonoids play an anti-inflammatory and antioxidant action as it is used in the treatment and prevention of chronic degenerative diseases [15]. A study by Silva et al. [14] in *Syzygium cumini* demonstrates the existence of compounds such as ash, lipids, proteins and carbohydrates, as well as bioactive compounds such as phenolic compounds. According to Shenkin [16], minerals should be constantly supplied in a balanced diet and suitable for all ages nutrient deficiency, such as vitamins and minerals, is of particular concern in pregnant women and children up to five years of age because of their vulnerability.

In this study it was also possible to reveal the type of tubers, roots and rhizomes consumed by this ethnic group, in which were found the mbovo, machunga, ngamba and nonhangã that constitute a great source of obtaining energy, as other conventional tubers such as cassava, sweet potatoes and yams have been used.

Carbohydrates are the fuels of life, because they store the energy in living beings, in the form of starch and glycogen and release it to metabolic reactions when they are degraded, in addition, they act as carbon donors for the synthesis of other constituents of cells, act with receptors, signalers, aged red blood cells removers and others [17].

Machunga is a tuber consumed by Khoisans after cooking, which resembles taro (*Colocasia esculenta* L.) and both can be confused, so it could have the same nutritional properties and effects as taro.

Mbovo is an unconventional food root and resembles cassava, so it constitutes an energy source. This root has different characteristics depending on the season, since in rainy season and when fresh the root is mealy and sweet, at this time they are consumed, because in dry time it becomes woody unlike the cassava that rots. The similarity that this root presents in relation to cassava both in its general characteristics and even the taste could extrapolate the benefits of cassava to this root.

Cassava is widely consumed in developing countries because it has great nutritional value, this tuber contains calcium, magnesium, phosphorus, potassium and vitamin C. It is a rich source of calories and carbohydrates; it also has therapeutic properties such as improving the functioning of the intestine, reducing inflammation, strengthening the immune system, regulating fluids and relieving blood vessel pressure, preventing arthritis and diabetes [18].

Nonhangã is another vegetable widely used by the Khoisans, this one looks in its shape like the white onion, but the mode of consumption is different, because it is consumed in natura mainly to obtain liquid when they are in field activity or to travel great distances. Several vegetables have also been identified in which some of them are described here in names in the language of ethnic peoples such as uhilily (*Boletus edulis*), tyapata (*Amaranthus viridis*), swanga (*Manihot sculenta*), losuwa (*Solanum nigrum*) and holocosso (*Bidens pilosa*) which are consumed in order to obtain proteins, minerals and vitamins of plant origin, and which may contain bioactive substances which have various properties with extraordinary benefits for the health of the body, in some of them well demonstrated scientifically as are for example the gimboa (*Amaranthus viridis*), swanga (*Manihot sculenta*) and mushroom (*Boletus edulis*). Umar et al. [19], found that *Amaranthus viridis* is a rich source of minerals such as cobalt (0.3mg), manganese (19.5mg), zinc (1.3mg), iron (419mg), sodium (26.6mg), magnesium (403mg), potassium (434mg) and phosphorus (17mg).

The animal protein is obtained by hunting, and therefore they acquire various types of animals for consumption. Game meat has historically been a prime source of protein, particularly for the indigenous peoples of the world's rainforests [20].

Game meat can generally be considered as a nutritious food as it is a relevant source of proteins (with levels generally exceeding 20%), minerals and vitamins. On the contrary, the lipid content is generally low, ranging between 0.3 g and 4.6 g per 100 g of muscle, according to the species [21]. These same authors further state that game meat has a favorable fatty acid profile due to a relatively low level of saturated fatty acids in some species, such as quail (*Coturnix Coturnix*). Amaral et al. [22] state that in addition to the benefits that game meats offer, it is necessary to take into account the risks that these can bring such as animal health, the type of microorganisms present in the skin and viscera of the animal (microbiological risks) the conditions of evisceration in the field and the hunter's practice to which the risk of exposure to lead or another substance used in cocoa may be associated.

Wild boar (*Sus scrofa*), deer (*Oсотoceros besoarticus*), rabbit (*Oryctolagus cuniculus*) and partridge (*Alectoris rufa* L.), are some of the most consumed species by the Khoisan group in Vite Vivali.

The Khoisan Group is a consumer and lover of honey, which is found sporadically and those that are produced by them artisanal. In this product they obtain several nutrients with emphasis on energy, as it is rich in carbohydrates, be-

sides containing levels of vitamins, amino acids, proteins, mineral salts, essential oils and enzymes [23, 24]. In this study honey was found as a basic food product and also as a remedy in several morbid states. The usefulness given by this ethnic people is also highlighted by Pita-Calvo and Vasquez [25]. Honey has been used since antiquity as a remedy for various organic disorders such as wounds, gastroenteritis, ear pain, throat and also for antimicrobial, anti-inflammatory and anticancer properties [26], these therapeutic properties bring various health benefits, which in turn reinforces the use that has been given to the Khoisans.

As a function of the food found and consumed by the Khoisans, a pyramid similar to the existing ones was built, so the actual food used by this ethnic group was introduced as shown in Figure 1.



Figure 1. Khoisan food pyramid. Source: proper (2021).

The delimited levels for the Khoisan pyramid resemble the pyramid described and presented by Mendes-Neto *et al.* [27], in which it was based on the energy and nutritional needs of adult individuals. This pyramid allows us to understand the value of food in Khoisan ethnic peoples that does not differ from those found in other pyramids in terms of nutritional value, but in terms of the types of food that are constant in the pyramid.

As a function of their eating habits, a preliminary relationship was obtained with body weight, blood glucose imbalance and blood pressure disorder, to which it was observed that 94.2% of individuals had weight within the normal parameters, while 2.90% had low weight and 2.90% of overweight individuals, so it could be said that their eating habits will be the basis of these values presented as shown in Figure 2.

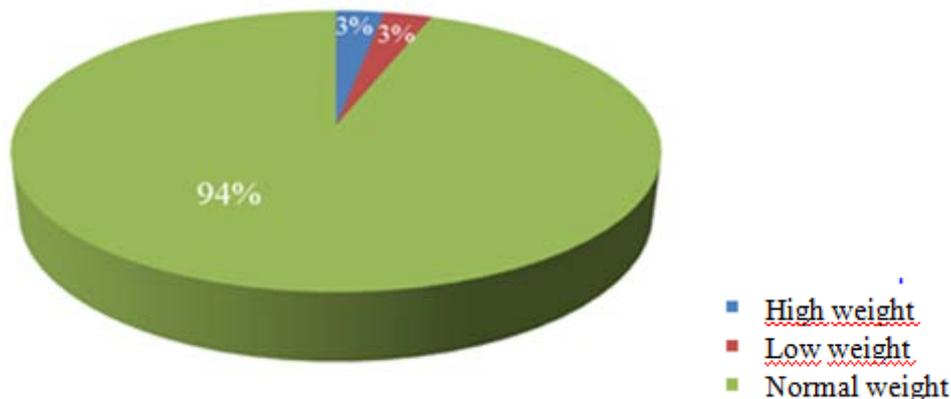


Figure 2. body mass index in individuals studied.

The result found in this study differs from the study carried out by Schmidt [28] in the Akwen Xerente Indians of Brazil in the region of Goiás, where the author found BMI alterations among the studied population and related the findings to the fact that there were changes in their diet. Because in the region they consume the industrialized foods due to the abandonment of the eating habits that characterized the Indians. This phenomenon to which the author refers is not far from happening to the Khoisans due to the same factors and also the prohibition of their ancestral practices that attempts to obtain their food, of these one cannot omit the occupation of the lands by the Bantu peoples.

Of the 35 individuals evaluated, 71.4% had blood glucose values considered as normal parameters (70/100mg/dl), 20% had 100/120mg/dl of blood glucose and 8.6% had blood glucose values of 60/70mg/dl. There are several risk factors related to the onset of diabetes mellitus, including age, lifestyle, biological sex, overweight and obesity, metabolic variations, among others [29]. Figure 3 shows the graph about the glycemic imbalance.

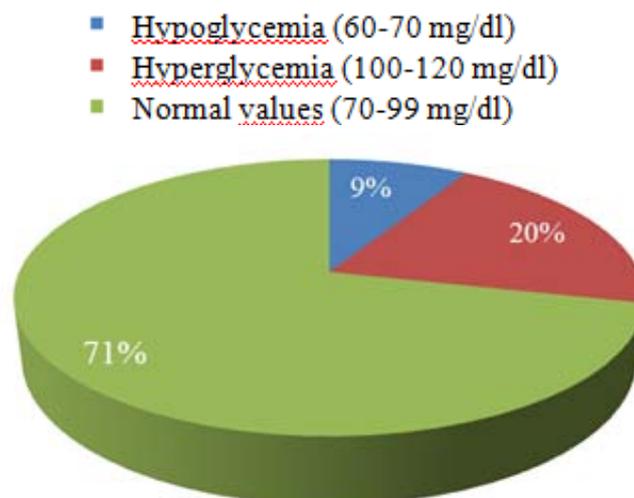


Figure 3. Blood glucose levels of subjects investigated.

Currently, the relationship between overweight and type 2 diabetes mellitus is consensual, since a study by Pelegrini et al. [30] revealed a prevalence of 92% with a close relationship to overweight. The data obtained when measured the body mass index to the Khoisans, were found 94.2% of individuals within the normal parameters, already in terms of glycemia 71.4% presented values within the normal parameters, although there are other factors to which they should be related, these data could be a good indicator for further studies. It can also be said that their eating habits may be at the base of little appearance of glycemic imbalance, because as observed in the food pyramid of this ethnic group the foods are natural and low caloric, consumption of wild fruits and other vegetables rich in bioactive, not forgetting the habit of nomadism.

Regarding the presentation of systolic and diastolic pressure, 73.3% of the individuals had parameters within those considered normal (100-120/70-80 mmHg), 3.3% had low values (90/50 mmHg), 6.6% of individuals had values between 180-190/90, while 16.6% had values between 130-140/80-90 mmHg, considered prehypertensive, since these values may depend on several other factors.

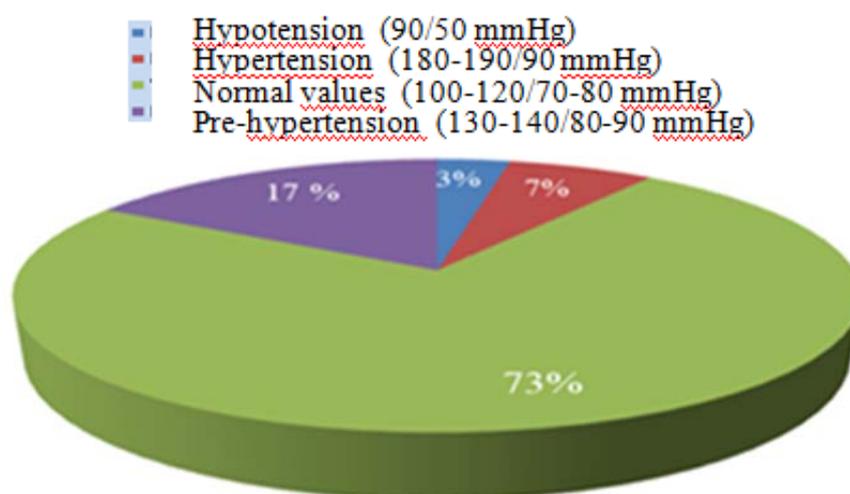


Figure 4. Blood pressure values of persons studied.

Figure 4 shows the values obtained in the measurement of blood pressure to the individuals studied. The fact that the Khoisans are always on the move or their nomadic style, food practices and ethnicity could justify the appearance of few individuals with blood pressure imbalance, although there are several factors related as referred to SBC [31]. Factors such as overweight and obesity, high salt intake, age, gender, ethnicity, excessive alcohol intake, individual genetics, socioeconomic factors and sedentary lifestyle are at the basis of the emergence of several chronic non-communicable diseases [31].

5. Conclusion

These ethnic people obtain their varied foods directly from nature, from which tubers, roots, fruits, bulbs, meat and honey can be found. Initially, most of the individuals studied did not reveal imbalance in body mass index, blood glucose and blood pressure, which could be related to the consumption of these foods.

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