

Dietary patterns of foods consumed in urban indigenous communities of Filadelfia, Chaco Paraguayo**Patrones dietéticos de alimentos consumidos en comunidades indígenas urbanas de Filadelfia, Chaco Paraguayo**

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Resumen: Aunque la transición nutricional se ha estudiado en varios países, se sabe poco acerca de cómo este fenómeno ha afectado a las Comunidades Indígenas en Paraguay. Para analizar el patrón alimentario, el lugar de adquisición de los alimentos que consumen y los métodos de conservación, se llevó a cabo un estudio descriptivo, observacional y transversal en el que se entrevistaron un total de 82 familias indígenas. Se realizó una encuesta para obtener datos sobre los patrones alimentarios y la conservación de alimentos de los miembros de las Comunidades. El proyecto fue aprobado por el Comité de Ética del Centro Multidisciplinario de Investigaciones Tecnológicas CEMIT UNA. El tratamiento estadístico de los datos fue descriptivo, y se construyeron tablas con los resultados obtenidos. El 96.3% de las familias indicaron que obtienen sus alimentos de tiendas cercanas, y los productos más consumidos fueron carne, productos horneados, arroz y pasta. Todas las Comunidades consumen predominantemente estos alimentos, además de harina y frijoles, y conservan sus alimentos refrigerados. Los resultados indican que la variedad de alimentos consumidos por las Comunidades Indígenas consultadas es baja y que los alimentos se adquieren principalmente en centros de venta, con una baja producción en huertos familiares y productos forestales. Este es el primer estudio de este tipo realizado en Comunidades indígenas Urbanas en el Paraguay.

Palabras clave: Comunidades indígenas, patrones alimentarios, inseguridad alimentaria, Región Occidental.

Abstract: Although the nutritional transition has been studied in various countries, little is known about how this phenomenon has affected Indigenous Communities in Paraguay. To analyze the dietary pattern, the place of acquisition of the food they consume, and conservation methods, a descriptive, observational, cross-sectional study was conducted, in which a total of 82 Indigenous families were interviewed. A survey was conducted to gather data on the dietary patterns and food preservation methods of community members. The project was approved by the Ethics Committee of the Centro Multidisciplinario de Investigaciones Tecnológicas CEMIT UNA. The statistical treatment of the data was descriptive, and tables were constructed with the obtained results. 96.3% percent of families indicated that they obtain their food from nearby stores, and the most consumed products were meat, baked goods, rice, and pasta. All the Communities predominantly consume these foods, in addition to flour and beans, and they preserve their food refrigerated. The results indicate that the variety of foods consumed by the surveyed Indigenous Communities is low, and the foods are primarily acquired at sales centers, with low production in family orchards and forest products. This is the first study of its kind conducted in Urban Indigenous Communities in Paraguay.

Key words: Indigenous communities, dietary patterns, food insecurity, Occidental Region.

Introduction

Over 400 different Indigenous groups are estimated

to live in Latin America roughly 10% of the total population. Indigenous Peoples remain some of the

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most marginalized in every country in the region (Montenegro & Stephens, 2006). Nowadays the vulnerability of Indigenous Peoples is recognized since their basic needs with health, education, rights, and opportunities are often not minimally covered (Cimadamore *et al.*, 2006; V. Díaz *et al.*, 2015).

In Paraguay, the limited infrastructure, human resources, investment, and budget towards the fulfillment of the human rights of Indigenous Peoples is a trigger for social exclusion, poverty, and extreme poverty (Mendieta Miranda, 2018). This leads to their exclusion over time from the social plans implemented by governments. In addition, they are often in territorial isolation with difficulty in accessing basic services (Villalobos-Colina *et al.*, 2012).

According to the last census of Indigenous Peoples in Paraguay, carried out in 2012, a total of 112,848 Indigenous people were registered (Otazú *et al.*, 2014). Several communities, including Cacique Mayeto (Enlhet), Uj'e Lhavos (Nivaclé), Yvopey Renda (Guaraní) and Guidache (Ayoreo), have settled in the suburbs of Filadelfia (Boquerón, Paraguayan Chaco) and participate to some extent in the life of the city. The Ayoreo are the People that have been most recently integrated into urban life (Otazú *et al.*, 2014; Municipalidad de Filadelfia, 2019).

Indigenous people worldwide have been experiencing rapid urbanization, either through expansion of urban centers into Indigenous land or through migration of Indigenous people to urban centers (Stephens, 2015). Urbanization can also involve a “nutrition transition” away from traditional foods and subsistence practices and toward industrialized/processed/westernized diets. This transition is reported across rural-to-urban gradients (J. van Vliet *et al.*, 2020; N. van Vliet *et al.*, 2015), across generations (Kuhnlein *et al.*, 2004), within Indigenous populations and with an accompanying “double burden” of undernutrition and chronic disease (Damman *et al.*, 2008).

Article 25 of the Universal Declaration of Human Rights states that “[...] Everyone has the right

to a standard of living adequate for the health and well-being of himself and of his family, including food [...]” The Food and Agriculture Organization of the United Nations (FAO)’s Policy on Indigenous and Tribal Peoples mentions that because Indigenous communities have higher levels of poverty, less availability of resources, and greater dependence on cheaper food that is highly processed, it is assumed that these groups are exposed to a higher risk of food insecurity and malnutrition (Organización de las Naciones Unidas para la Agricultura y la Alimentación, 2010).

In this sense, food insecurity related to food availability, access, and use contributes to the disadvantage experienced by Indigenous communities and causes an excessive burden of preventable chronic disease (Vos *et al.*, 2009) and undernutrition (Brimblecombe *et al.*, 2014).

Little is known about how the dietary change has affected Indigenous communities in Paraguay, where there is a gap in knowledge and study of how Indigenous communities living in urban or city areas acquire and preserve the food they eat, what type of food they eat, the present study aims to analyze which foods are consumed, how these foods are acquired and preserved, in Indigenous communities living in the city of Filadelfia, Department of Boquerón, Paraguayan Chaco.

Materials and methods

Study Design and Participants

A descriptive, observational, cross-sectional study was carried out, in which a total of 82 Indigenous families were interviewed: 41 families of the Uj'e Lhavos community from the Nivaclé People, 27 families of the Cacique Mayeto Community from the Enlhet People, and 14 families of the Guidaché Community from the Ayoreo People. The project was approved by the Ethics Committees of the Centro Multidisciplinario de Investigaciones Tecnológicas CEMIT UNA.

The participants gave their informed consent to participate in the study. The research carried out was in accordance with the ethical standards established by the Nuremberg Code of 1947 (Tribunal

Internacional de Nüremberg, 2007), the Universal Declaration of Human Rights of 1948 (United Nations, 1948), the Declaration of Helsinki of 1964 (Manzini, 2000) and successive amendments, as well as regulations established by Paraguayan legislation and the *Instituto Paraguayo del Indígena*, INDI (Congreso de la Nación Paraguaya, 1981; Congreso de la Nación Paraguaya, 1996; Congreso de la Nación Paraguaya, 2015).

Consumption and Conservation of Food Surveys

A survey was conducted to obtain data on dietary patterns in January 2017 and March 2017 by the arrangement of the Caciques of the Communities that collaborated in this study. In addition, previous meetings were held between the survey team and the Community Leaders to inform and explain the objective and scope of the study. As an outcome, information was gathered about food consumption, acquisition, and preservation.

Statistical Data Treatment

The statistical treatment of the data was descriptive, and tables and graphs were constructed with the obtained results.

Results

Participants' ages ranged from 16 to 71 years, 71%

were women, and 23% were men. Our results show that families acquire food from various sources, not specific places. In the Uj'e Lhavos community, most families obtained food from nearby stores (40 of 41 families), with four families also seeking nourishment in the forest. No families from this community reported getting food from family farms.

In the Cacique Mayeto community, families also got their food mostly from nearby stores (26), with a small percentage also feeding from family farms (3) and (26) families also seeking from the forest. Guidaiché community, all families reported acquiring food from nearby stores (14) and most also fed from family farms (13), while half got food from the forest and half did not.

Four of the 82 families surveyed indicated that they obtain their food from the family farm, 80 from nearby stores and 12 from the forest. These results are summarized in Table 1.

By classifying dietary patterns by community according to foods commonly consumed at home, we observed that the three communities consume rice, the members of the Uj'e Lhavos community being the ones that consume this food the most (97.5%), as was also the case for pasta and flour (93% and 83% respectively). All families of the Cacique Mayeto community consumed beans.

Lastly, baked goods and meat were consumed by

Table 1. Place of acquisition of food from urban indigenous communities of Philadelphia, Paraguayan Chaco. **N)** number of families of the different communities.

Community -Ethnicity		Uj'e Lhavos Nivacle N*=41	Cacique Mayeto Enlhet N=27	Guidaiche Ayoreo N=14	Total of indigenous families N=(82) (%)
Family farm	No	41	24	13	78 (95)
	Yes	0	3	1	4 (5)
Store	No	1	1	0	2 (2.4)
	Yes	40	26	14	80 (97.6)
Forest	No	37	26	7	71 (86.6)
	Yes	4	1	7	11 (12.4)
Total		41	27	14	82 (100)

Table 2. Dietary patterns by families by community and ethnicity. *Total families surveyed: 82.

Community -Ethnicity		Uj'e Lhavos Nivaclé (n%)	Cacique Mayeto Enlhet (n%)	Guidaiche Ayoreo (n%)	Total of indigenous families (n%)
Rice	No	1 (2.5)	3 (11.2)	1 (7.2)	5 (6)
	Yes	40 (97.5)	24 (88.8)	13 (92.8)	75 (94)
Dry pasta	No	3 (7)	8 (29.6)	2 (14)	13 (16)
	Yes	38 (93)	19 (70.4)	12 (86)	69 (84)
Flour	No	7 (17)	8 (29.6)	5 (35.7)	20 (24.4)
	Yes	34 (83)	19 (70.4)	9 (64.3)	62 (75.6)
Beans	No	14 (34)	0	5 (35.7)	19 (23.2)
	Yes	27 (66)	27 (100)	9 (64.3)	63 (76.8)
Baked goods	No	0	0	0	0
	Yes	41 (100)	27 (100)	14 (100)	82 (100)
Meat	No	0	0	0	0
	Yes	41 (100)	27 (100)	14 (100)	82 (100)
Total		41 (100)	27 (100)	14 (100)	82 (100)

all families of the studied communities (Table 2).

Regarding how the families indicated that they preserve their food (including meat, fruits and vegetables), in the case of the Uj'e Lavos community, 75.6% of families indicated that they store their food in the refrigerator.

A similar situation occurred in the Cacique Mayeto community, where 70.4% of families do so (Fig. 1). On the other hand, in the case of the Guidaiche community, 21% stated that they keep their food at room temperature, this being the most used method of preserving food, in the open air on tables or hanging in some sector of the house.

Discussion

This work presents the first evidence of the dietary patterns and acquisition, preservation, and fungal contamination of food from urban Indigenous Communities of the Department of Boquerón.

Making a comparison of the demographic vari-

ables of this study's participants, the minimum age was 16, the maximum was 71, and the average was 36 years. A previous study on an urban indigenous community found that ages were between 15 and 65 years in Nivaclé people in the Paraguayan Chaco, with an average age of 33 (R. Díaz *et al.*, 2013).

Concerning the place of obtaining food, 96.3% obtain their food from nearby stores. The fact that these Indigenous communities live near cities influences where they acquire their food since less nutritious foods are more accessible to them than their traditional sources of food. This can be explained by the enclosure of Indigenous lands and their subsequent push into urban areas (Reed, 2015; Rudolph, 2020). For example, in Alaska, the Gwich'in children's diets bypass the traditional foods of their ancestors in favor of Western treats, dominated by sweets and fatty foods. Similarly, in the Aymara communities in Bolivia's Andean plateau, the urban environment was recently de-

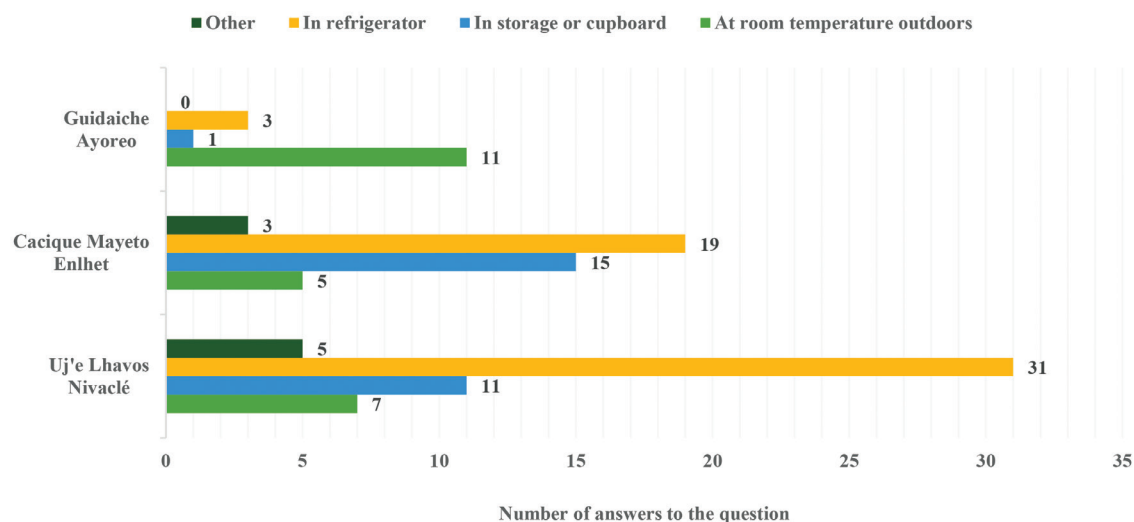


Figure 1. Food storage methods in urban Indigenous Communities of Filadelfia, Paraguayan Chaco.

scribed as problematic for nutrition, a place where unhealthy foods have replaced indigenous foods (Lipus *et al.*, 2018).

As many of their indigenous counterparts around the world, urbanization has affected the traditional diet of the urban indigenous communities in the city of Filadelfia, Paraguayan Chaco. Nevertheless, the forest was found to still remain a relatively important source of food for the Ayoreo People.

We found that the foods most consumed by the studied communities are meat, baked goods, rice, and dry pasta. All the communities mostly consume these foods in addition to flour and beans. This dietary pattern indicates that most of the indigenous communities prefer to acquire them, leaving aside the use of forest resources. However, it is necessary to note that the Filadelfia area is prone to severe droughts, and natural resources may be scarce. The introduction of industrial food production, processing, and distribution has led to the rapid westernization of food environments and dietary patterns (Kuhnlein, 2015; Kuhnlein *et al.*, 2006; Levkoe *et al.*, 2019). The transition from traditional to industrialized diets has increased the prevalence of type 2 diabetes, and other diet-related chronic diseases globally, but especially for Indigenous populations (Kuhnlein, 2015). For many Indigenous peoples, food security is undermined by

environmental degradation, loss of biodiversity, and insufficient access to healthy foods and other social and economic resources required for health, particularly in rural, remote and Arctic communities (Kshatriya & Acharya, 2016; Lee & Ride, 2018). As a result, nutrition-related health conditions disproportionately affect many Indigenous populations. Despite these inequities, Indigenous Peoples worldwide maintain valuable ecological knowledge and continue to advocate for greater control over their food systems (Kuhnlein, 2015; Levkoe *et al.*, 2019).

We observed that food was stored mainly in a refrigerator. Participants also mentioned storage at room temperature, and it is essential to consider that the temperature in the region is high all year round, with an average of 28 °C in summer (Teixeira da Silva, 2021). This type of storage can be a risk of food contamination (Fig. 1). The general effect of temperature on microbial growth on food products is well documented, but research into the effect of storage temperature on the presence of pathogens and their metabolites is still emerging. Since optimal growth temperatures vary significantly among different microorganisms, temperature changes can have profoundly diverse effects on their survival and growth, and quality deterioration occurs rapidly at elevated temperatures (Luo *et al.*, 2009).

The food literacy acquired from traditional knowledge, including agro-ecological knowledge (where and what type of food is produced), cultivation and production knowledge (how food is produced), and processing and consumption knowledge (how food is prepared and distributed) derived from people's everyday practices in home and community environments can play a vital role in the maintenance and revival of traditional food systems and safe food free of contaminants (Gartaula *et al.*, 2020).

The gradual dietary transition away from traditional foods due to factors such as the decrease in availability, quality, and safety and access to traditional foods such as hunted wild game, fish or fruits collected from the forest and this due to the expansion of the agricultural and livestock frontier, pollution, industrialization, climate change, and state policies, among others (Chan *et al.*, 2021).

Conclusions

The dietary patterns observed in the urban Indigenous communities of Filadelfia, Boquerón, Paraguayan Chaco, underscore the significance of meat, baked goods, rice, and dry pasta in their daily nutrition. Understanding the prevailing consumption habits and preferences provides valuable insights for designing targeted interventions aimed at improving the overall health and well-being of these communities. To promote healthier lifestyles and sustainable nutrition, it is recommended that community-led initiatives focus on enhancing access to fresh, locally sourced produce, while also emphasizing education on balanced diets and proper storage practices. By fostering a collaborative approach that integrates traditional knowledge with modern nutritional insights, we can strive towards fostering resilient and vibrant Indigenous communities.

Conflicts of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Contribution of the authors

All the authors contributed equally to the preparation of this paper.

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