ASSOCIATION BETWEEN SOCIO-ECONOMIC SITUATION AND UNHEALTHY EATING PATTERNS IN ZEMPOALA, HIDALGO, MEXICO.

Abstract

Introduction: The relationship between economy and nutrition is crucial for understanding the rise in chronic diseases such as obesity and diabetes, especially in low-income countries. In Mexico, the cost of healthy foods and limited economic capacity foster low-quality diets focused on unhealthy foods. In communities such as Zempoala, Hidalgo, poverty and lack of nutritional education exacerbate this issue. It is essential to implement strategies that improve access to healthy foods, considering the economic and cultural determinants that affect dietary patterns.

Methodology: This study analyzes how economic conditions influence unhealthy eating patterns in Zempoala. A sample of 70 participants was included, evaluating income, economic sufficiency, and consumption of fried foods, sugary beverages, and foods high in fats and sugars. Validated questionnaires and structured interviews were used, and data were analyzed with Stata 16, applying logistic regression to identify economic barriers and explore the impact of educational level and access to fresh foods.

Results: The participants (44% male, 56% female) had an average age of 45 years, with basic education and an average monthly income of $4,500 MXN. Sixty percent reported economic difficulties that affected their diet, leading to increased consumption of unhealthy foods. Those with poorer economic conditions were 4.6 times more likely to consume these products.

Conclusion: Economic hardship is associated with the consumption of unhealthy foods, limiting access to fresh and nutritious options. It is urgent to implement public policies that improve food security and promote healthy habits.

Keywords: Non-recommended foods, Eating patterns, Socioeconomic situation, Healthy eating.

Introduction

The relationship between the economic environment and dietary patterns has gained significant relevance in recent years due to the growing impact of socioeconomic conditions on global health [1-3]. Food systems, especially in low- and middle-income countries, have undergone significant changes in recent decades, driven by economic, social, and cultural factors [2-4]. In particular, the cost of food, the availability of healthy products, and food choices are strongly influenced by the economic capacity of households [2,5]. In this regard, individuals with lower incomes are often exposed to low-quality diets, characterized by a high consumption of foods rich in calories, saturated fats, sodium, and added sugars [6,7].

Globally, there is a clear trend towards the adoption of unhealthy diets, which has led to an increase in the prevalence of non-communicable chronic diseases, such as obesity, type 2 diabetes, and cardiovascular diseases [8-11]. Studies have shown that, in environments with lower purchasing power, people tend to choose cheaper, energy-dense foods over healthier options, which are often perceived as expensive or inaccessible [9-12]. This phenomenon, known as the "obesity paradox," suggests that obesity is more closely related to poverty than to an abundance of resources, which is reflected in an increase in diet-related diseases in the most disadvantaged sectors of the population [10,11,13].

In Mexico, the food landscape has radically changed as part of a nutritional transition, in which traditional diets rich in vegetables, fruits, and grains have been displaced by ultra-processed foods, partly due to growing urbanization and the globalization of food systems [11,14]. These

changes have been especially evident in rural and peri-urban communities, where limited income, along with the availability of low-cost foods, has contributed to a low-quality diet. In areas such as Zempoala, Hidalgo, this issue is particularly acute due to the economic disparity that characterizes the region [15-17].

Zempoala, a community located in the state of Hidalgo, faces economic challenges that directly affect the dietary patterns of its inhabitants. The region's economic structure, largely based on low-wage jobs and services, limits access to healthy food. This has resulted in an increased consumption of processed foods, which are more affordable but less nutritious [9,18]. Moreover, the lack of proper nutritional education in these areas reinforces food choices based on economic convenience rather than nutritional quality [19,20].

Recent studies have shown that households with lower incomes in Mexico have a higher prevalence of obesity and malnutrition, highlighting the need for interventions aimed at improving access to healthy foods in these communities [20-24]. Given this context, it is essential to investigate in more detail how economic factors influence unhealthy eating patterns in Zempoala, in order to implement effective intervention strategies that address both the economic and cultural determinants of food choices.

Objectives

- To describe the patterns of unhealthy food consumption among individuals over the age of 18 in the municipality of Zempoala, Hidalgo.

- To identify the relationship between economic status and the frequency of unhealthy food consumption in Zempoala, Hidalgo.
- To determine the prevalence of economic difficulties that affect the ability to access a healthy diet in the population of Zempoala, Hidalgo.
- To analyze the association between unhealthy food consumption indices and the economic impact on the diet in the community of Zempoala, Hidalgo.

Methodology

A cross-sectional analytical study was conducted to evaluate the relationship between the economic situation of households and unhealthy eating patterns in the community of Zempoala, Hidalgo.

The study population included households located in the municipality of Zempoala, Hidalgo, with individuals over the age of 18 residing in these households who agreed to participate by providing informed consent. The sample was determined using the finite population formula, assuming a 97% confidence level and a 5% margin of error. This resulted in a sample of 68 households, randomly selected from the available population registers. Households outside the municipality of Zempoala, individuals under 18 years old, and those who did not wish to participate or did not provide informed consent were excluded from the study. During the process, households that could not be contacted or those with incomplete or erroneous data were removed, allowing for an adjustment to ensure sample representativeness. A total of 70 individuals (44% men and 56% women) were successfully interviewed, ensuring the validity and representativeness of the analysis results.

Two main categories of variables were identified:

Economic Situation: This was assessed using a validated questionnaire with a Cronbach's alpha coefficient of 0.9, measuring perceptions of economic sufficiency, household income, and the degree of satisfaction with basic needs (food, health, housing, and basic services).

Unhealthy Eating Patterns: The dependent variable included the frequency of consumption of unhealthy food groups, ultra-processed foods, foods with saturated fats, added sugars, high sodium content (480 mg per serving), trans fats, fried foods, processed meats, and sugary beverages. Consumption frequency was measured using the consumption frequency from the 2023 ENSANUT survey, which allowed determining whether respondents consumed these foods on a daily, weekly, bi-weekly, or monthly basis.

Data collection took place between September and October 2024 through structured interviews conducted in person at the selected households. The interviewers were trained in advance to ensure proper administration of the questionnaires and to avoid response bias. A two-part questionnaire was employed:

An economic module to capture information on household income and perceptions of economic sufficiency.

A food module to assess the frequency of unhealthy food consumption and perceived difficulties in accessing nutritious foods.

To ensure data quality, periodic reviews and quality control were conducted during the data collection phase.

Data analysis was carried out using Stata 16 software. Descriptive analysis of the sociodemographic characteristics of the sample, including age, gender, educational level, and economic situation, was performed. Logistic regression analysis was conducted to examine whether economic situation was a significant predictor of unhealthy food consumption. Other variables, such as educational level, access to fresh foods, and cultural preferences, were also controlled for. The statistical significance level was set at $p < 0.05$. Finally, frequency analysis was used to study consumption patterns of different types of unhealthy foods, as well as perceived barriers to consuming healthy foods.

The study was conducted in accordance with the ethical principles of human research. Informed consent was obtained from all participants, who were informed of the nature of the study, its objectives, and their right to withdraw at any time.

Results

Characteristics of the Population

A total of 70 individuals from the community of Zempoala, Hidalgo, were surveyed, of whom 44% were men and 56% were women. The average age of the participants was 45 years (±12 years). The majority of respondents had an educational level of primary or secondary school, and the average monthly household income was MXN 4,500 (±MXN 1,000). Twenty-five percent of households reported significant difficulties in meeting their basic needs, while 60% indicated that their food intake was affected by recent economic challenges – see Table 1.

Tabla 1. Characteristics of the Population.

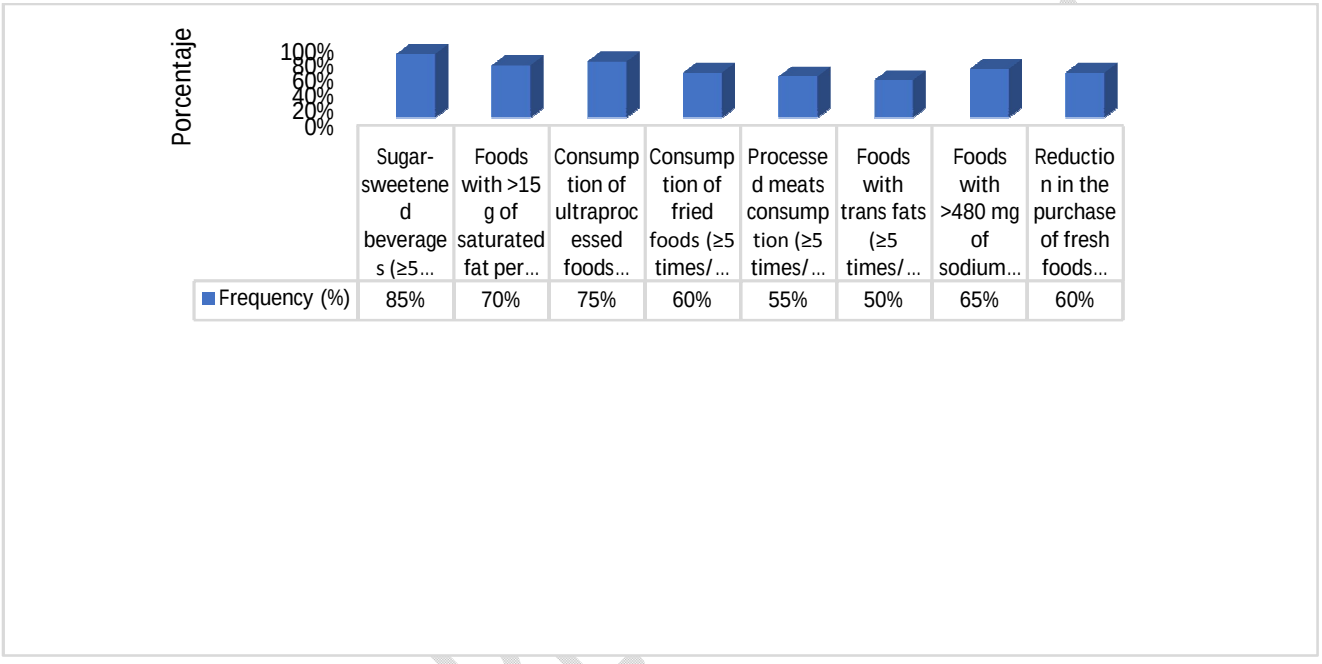
Characteristic	n (%)
Total Participants	70 (100)
Sex	
Male	31 (44)
Female	39 (56)
Average Age (±SD)	45 (±12)
Educational Level	
Primary School	25 (36)
Secondary School	30 (43)
High School or Higher	15 (21)
Average Monthly Income (±SD)	$4,500 (±$1,000)
Difficulty Covering Basic Needs	18 (25)
Diet Affected by Economic Problems	42 (60)

Frequency of Consumption of Unhealthy Foods

Eighty-five percent of the respondents reported consuming sugary beverages at least five times per week, reflecting a high prevalence of this unhealthy habit. Additionally, seventy percent indicated they consumed foods rich in saturated fats with the same frequency. Furthermore, seventy-five percent of participants stated that they consumed ultra-processed foods, and sixty percent opted for fried foods at the same frequency. Regarding processed meats, fifty-five percent of the respondents reported including them in their diet at least five times per week. Moreover, sixty-five percent of the participants indicated they frequently consumed foods with

high sodium levels (>480 mg per serving). On the other hand, sixty percent of the respondents highlighted that recent economic problems had affected their ability to purchase fresh and nutritious foods, leading to an increase in the consumption of unhealthy foods. – See Graph 1. –

Graph1.Frequency of Consumption of Unhealthy Foods.

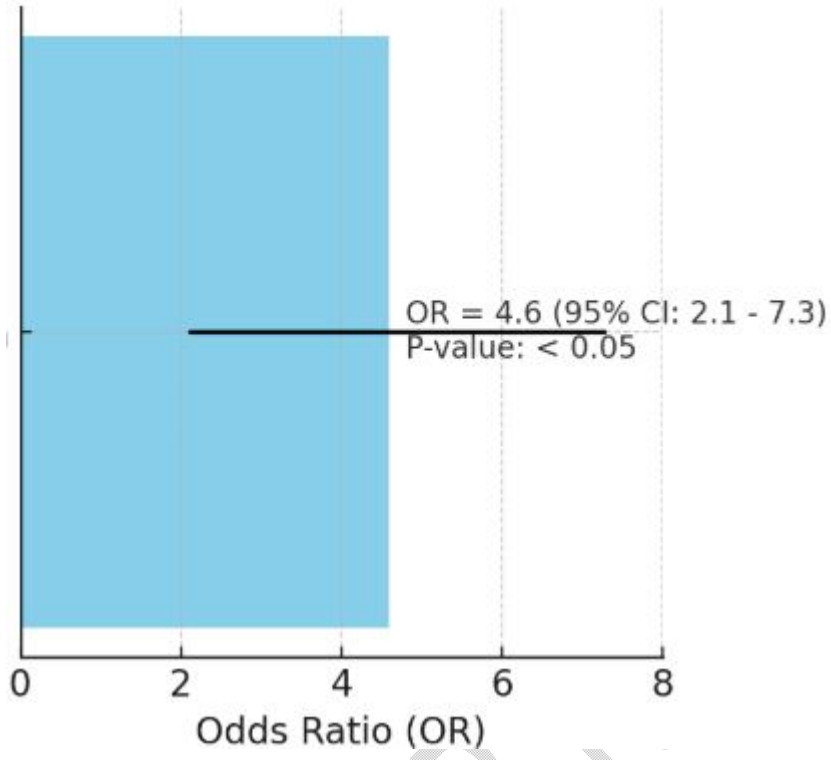


Association Between Economic Impact on Diet (EID) and Consumption of Unhealthy Foods (UHF)

To assess the relationship between the Economic Impact on Diet (EID) index and the consumption of Unhealthy Foods (UHF), a logistic regression analysis was conducted. The UHF index was constructed based on the frequency of unhealthy food consumption, while the EID was based on the respondents' ability to meet their dietary needs according to their economic situation.

The results indicated a significant association between a negative EID index (indicating a worse economic situation) and increased consumption of unhealthy foods. The analysis revealed an odds ratio (OR) of 4.6 (95% confidence interval: 2.1-7.3), with a p-value of <0.05, meaning that individuals with a more negative economic index are 4.6 times more likely to consume unhealthy foods compared to those with a better EID. – See Graph 2. –

Graph2. Association Between Economic Impact on Diet (EID) and Consumption of Unhealthy Foods (UHF).



These findings demonstrate a clear relationship between economic status and unhealthy eating habits in the population of Zempoala. The limited ability of households to meet their basic needs directly influences the quality of the food they consume.

Discussion

The results obtained in this study reinforce the well-documented relationship between economic status and unhealthy eating patterns, aligning with previous research that shows how economic hardship drives the consumption of nutritionally poor and highly processed foods [25,26]. The significant association between the Economic Impact on Diet (IED) and the consumption of Unrecommended Foods (ANR) highlights how financial limitations affect dietary decisions, leading the population to opt for more accessible yet nutritionally deficient products, a phenomenon observed in various contexts [9-12].

The high frequency of unhealthy food consumption may be linked to the reduced ability of households to purchase fresh and nutritious foods, a trend noted in similar studies of populations facing economic difficulties [27,28]. This situation appears to be particularly prevalent in rural and semi-rural areas such as Zempoala, where the prices of fresh foods tend to be higher compared to urban areas, and access to higher-quality products is more limited [29,30].

The findings also emphasize the crucial role that perceptions of economic problems play in food decision-making. Previous studies have shown that subjective perceptions of financial situations may be even more influential on eating behaviors than objective income levels [13,16,31]. In this context, individuals who perceive greater economic instability may be more prone to consuming low-cost foods as a strategy to cope with financial stress [32,33].

Furthermore, this research supports the need for political and social interventions that go beyond dietary recommendations and address the structural determinants of poor nutrition [34,35]. To promote healthier eating in communities like Zempoala, it is essential to implement strategies that improve economic access to fresh and nutritious foods, such as food subsidy programs or farmers' markets, which have proven effective in improving diet quality in low-income communities [36,37].

It is important to note that food insecurity in such contexts has long-term implications for public health, contributing to the rise of chronic diseases such as obesity, diabetes, and cardiovascular diseases [27,38-43].

Conclusions

This study confirmed a significant association between economic status and unhealthy eating patterns in the community of Zempoala, Hidalgo. The frequency of consumption of non-recommended foods was higher among individuals with a negative perception of their economic situation, which reinforces the importance of socio-economic factors in food-related decision-making.

Economic hardship directly impacts the ability to acquire healthy foods, which in turn increases the risk of developing unhealthy eating habits. It is essential to design comprehensive strategies that not only promote better nutrition but also consider the economic context of communities, in order to improve the quality of life and public health of these populations.

Finally, the findings of this study suggest that the implementation of public policies aimed at reducing economic insecurity could be an effective approach to promoting healthier eating patterns, particularly in rural and semi-rural areas such as Zempoala. Furthermore, future research should focus on expanding knowledge regarding interventions that can help alleviate food disparities in vulnerable communities.

Disclaimer artificial intelligence

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

Conflict of interest. The authors declare that there is no conflict of interest for the publication of this article.

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