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Nutritional Status and Food Insecurity in Migrant Populations at the Mexico–Guatemala Border: A Case Study in Tenosique, Tabasco

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Abstract

Objective: To analyze food insecurity and malnutrition among migrants in transit through the Mexico-Guatemala border.

Methods: A cross-sectional, observational study was conducted from February to June 2024 in Tenosique, Tabasco, Mexico, using a sample of 366 migrants selected through simple random sampling. Data were collected via structured surveys addressing sociodemographic characteristics. Food insecurity was assessed using the FAO Food Insecurity Experience Scale, and nutrional status was determined by the weight-to-ideal weight ratio for malnutrition classification.

Results: The majority of participants were male (67.5%) with a mean age of 32 years. Severe food insecurity was observed in 80.1% of the migrants, while only 3.3% experienced mild food insecurity. Regarding nutritional status, 21% of the participants were classified as having normal weight, and 20.2% as overweight. Obesity was also prevalent, with 17.8% categorized as grade I, 10.4% as grade II, and 11.7% as grade III.

Conclusions: A substantial proportion of migrants experienced severe food insecurity, yet a significant number exhibited normal or elevated body weight. These findings underscore the complex relationship between food insecurity and dietary transitions in migratory contexts and highlight the urgent need for targeted interventions to improve both food access and nutritional outcomes among vulnerable populations.

New Contribution to the Literature

By establishing a robust foundation for future research, this study provides actionable data and methodological insights that can drive innovative interventions and policy frameworks. Strengthening food and nutrition surveillance systems in collaboration with the Ministry of Health is imperative to addressing these challenges. A real-time, adaptive surveillance model tailored to mobile populations could revolutionize public health strategies, ensuring that humanitarian efforts and policy responses align with the lived realities of migrants.

This research challenges traditional narratives and proposes a data-driven approach that is not only crucial for academic inquiry but also instrumental in shaping international policies on migration, food security, and public health. The integration of interdisciplinary methodologies and cross-sectoral collaborations will be essential in mitigating food insecurity and improving health outcomes for migrant populations worldwide.

Theoretical Framework

This study is grounded in the Social Determinants of Health paradigm and the “syndemic” framework that conceptualises FI, forced migration and malnutrition as mutually reinforcing processes. From January to November 2023, Mexico reported 686,732 irregular migrants, a significant proportion of

whom were either seeking refuge in the country or using it as a transit point to the United States (USA) [1, 2]. Food insecurity (FI) is a critical challenge for this population, with many experiencing severe food deprivation during their journey [3, 4]. In the state of Tabasco, 236,808 migrants were recorded during this period, yet only 10% were accommodated in shelters. As a key entry point into Mexico, Tabasco shares a 111-kilometer border with Guatemala, making it a primary corridor for Central and South American migrants. Many follow the Tabasco-Veracruz-Tamaulipas route, the shortest path to the USA. Within this region, the municipality of Tenosique has been identified as a strategic migration hub, with seven known entry points facilitating irregular transit [1, 3, 5, 6].

Migrants endure precarious conditions during their journey, including prolonged travel periods, inadequate shelter, and limited food access, compounded by environmental and psychosocial stressors. These conditions not only increase their vulnerability to acute illnesses but also restrict their access to medical care [1, 7–9]. Despite the presence of humanitarian programs and foundations aimed at addressing these needs, the scale of migration far exceeds available resources. The lack of adequate shelter leaves most migrants without a secure place to stay and, more critically, without reliable access to food. Moreover, there is a notable scarcity of empirical data on the prevalence and impact of FI and malnutrition among migrants in transit through Mexico. Existing studies predominantly focus on the broader phenomenon of migration, neglecting its direct consequences on the health and nutrition of displaced individuals [5, 10].

Food insecurity often predates migration, serving as one of the driving forces behind individuals leaving their home countries in search of better living conditions. However, once in transit, migrants face unpredictable food availability and economic hardships, often going days without adequate nourishment. This prolonged deprivation exacerbates health risks and contributes to different forms of malnutrition [11, 12].

Evidence indicates that 54.7% of migrants traveling through Mexico experience a reduction in food consumption, which may result in migrants' dietary patterns changing in a disorderly or non-nutritional manner.

[8, 13, 14]. Despite the mounting concern regarding FI among migrants, there is a paucity of research examining its effects during transit, and the correlation between FI and malnutrition remains largely unexplored.

The objective of this study is to analyze the prevalence of food insecurity and malnutrition among migrants in transit through Tabasco, Mexico.

Methodology

An observational, cross-sectional and analytical study was conducted with the purpose of analyzing the prevalence of food insecurity and malnutrition in the period from February to June 2024 in the

Guatemala-Mexico border, in the region of the municipality of Tenosique in the state of Tabasco, Mexico, an area of high migratory flow.

The study included migrants in transit in Tenosique, Tabasco who met the established age range of 18 to 70 years and who gave their informed consent and approval to participate in the study; those who did not meet the aforementioned criteria did not participate in the research.

During the study period, data from the Mexican Commission for Refugee Aid (COMAR) in Tenosique, Tabasco, were used as the basis for a registry of 7,344 migrant refugees. Based on the data, a sample with a reliability of 95% and a margin of error of 5% was calculated, resulting in a sample of 366 migrants. The interviews were conducted directly with migrants traveling on foot, without the support of any institution, and the selection process was simple random sampling within the possibilities of the fieldwork [15].

The population was assessed through a survey that included items related to sociodemographic aspects (age, gender, nationality, educational levei), socioeconomic status was measured (high, middle and low), pre-migration illnesses, height and weight, as well as instruments for evaluating FI and malnutrition.

The scale to measure FI is based on individual experience and we use the instrument proposed by the Food and Agriculture Organization of the United Nations (FAO), which consists of eight item (appendix 1), with two possible answers for each question: “yes” or “no”. The items not only consider whether individuals consume nutritious food but also whether they have stopped consuming it due to a lack of financial resources. Each “yes” answer is valued with 1 point and each “no” with 0 points. The total sum of the items is used to determine the range of severity of food insecurity over a period of 30 days to 12 months, classifying it as: 1) Mild: 1–3 points; 2) Moderate: 4–6 points; and 3) Severe: 7–8 points [16]

The instrument for measuring malnutrition considers numerical values such as the ideal weight/weight ratio (W/IW). To determine the ideal weight, the method was adapted to include the measurement of height and using the BMI table provided by the Mexican Social Security Institute for classification. The results were classified as follows: 1) Obesity grade III > 130%; 2) Obesity grade II: 121–130%; 3) Obesity grade I = 111–120%; 4) Overweight: P/PI = 101–110%; 5) Normal: P/P = 91–100%; 6) Mild malnutrition: P/PI = 80–90%; 7) Moderate malnutrition: P/PI = 60–79%; and 8) Severe undernutrition: P/PI < 60%.

The Mel-CYTED Network group was utilized in the review, in accordance with the malnutrition diagnosis protocol [17].

Descriptive measures were implemented, resulting in the acquisition of frequencies and percentages, alongside measures of central tendency and dispersion. This analysis was conducted utilizing SPSS version 25.

The research complied with the ethical considerations established in the Declaration of Helsinki. Likewise, the guidelines of the Mexican Official Standard, which establishes the criteria for conducting health research projects on human subjects, were followed. The study was approved by the Research

Committee of the Academic Division of Health Sciences, Juárez Autonomous University of Tabasco, Mexico with folio JI-LCT-173 [18, 19, 20].

Results

This study included 366 migrants in transit through the municipality of Tenosique, Tabasco, Mexico. Table 1 summarizes the participants' characteristics. Most participants were male (67.5%), while females accounted for 32.5%. The mean age was 32 years, with the most represented age groups being 18–25 years (30.1%) and 26–30 years (23%). Regarding nationality, 87.2% of the migrants were from Honduras, 6.6% from El Salvador and 4.9% from Guatemala. A low socioeconomic status was predominant in 79.5% of participants, and primary education was the most common educational level (50%).

Table 1. Sociodemographic factors		*f*	%
Ages	18 to 25	110	30.1
	26 to 30	84	23.0
	31 to 35	63	17.2
	36 to 40	35	9.6
	41 to 45	31	8.5
	Ages 45 and up	43	11.7
Sex	Male	247	67.5
	Female	119	32.5
Nationality	Honduras	319	87.2
	El Salvador	24	6.6
	Venezuela	4	1.1
	Guatemala	18	4.9
	Colombia	1	.3
Socioeconomic level	Low	291	79.5
	Middle	74	20.2
	High	1	.3
Educational level	None	45	12.3
	Preschool	1	.3
	Primary	183	50.0
	High school	101	27.6
	Bachelor's Degree	25	6.8
	Technical High School	2	.5
	Degree	9	2.5

As demonstrated in Table 2, the assessment of FI, conducted using the scale proposed by FAO, revealed that 80.1% of the participants experienced severe food insecurity, 16.7% moderate food insecurity, and 3.3% mild food insecurity. Among the items in the FI instrument, the most relevant results were that 90.7% did not eat healthy and nutritious food due to lack of money or other resources, 70.8% stopped eating for a whole day due to lack of money or other resources, 94.5% mentioned that they had ever

eaten a small variety of food due to lack of money or other resources, and 88.8% reported having worried about not having enough food to eat due to lack of money or other resources.

Table 2
Food Insecurity Assessment

		f	%
Degree	Lightweight	12	3.3
	Moderate	61	16.7
	Severe	293	80.1
	Total	366	100.0

Nutritional status (Table 3), determined through the weight-to-ideal weight ratio, showed that 21% of the migrants were classified as having a normal nutritional status, followed by 20.2% who were overweight. Additionally, significant rates of obesity were identified: 17.8% in grade I, 10.4% in grade II, and 11.7% in grade III. On the other hand, 12% of the participants were classified as having mild malnutrition, 6.3% as moderately malnourished, and 0.5% as severely malnourished.

Table 3
P/IP ratio to determine malnutrition

		f	%
Degree	Severe undernutrition	2	.5
	Moderate undernutrition	23	6.3
	Lightweight undernutrition	44	12.0
	Normal	77	21.0
	Overweight	74	20.2
	Grade I obesity	65	17.8
	Grade II obesity	38	10.4
	Grade III obesity	43	11.7
	Total	366	100.0

Discussion

A significant proportion of the migrant population experiences severe food insecurity, reaching 80.1%. This finding aligns with the research of Montes [21], who reported an even higher prevalence of food insecurity (98.8%) among migrants.

The study population is predominantly male, is within the productive age range (18 to 25 years) and is characterized by a low socioeconomic level and a basic educational level (primary or secondary education). This pattern is consistent with the results of Riquelme [22], who mentions the same traits in this population, suggesting a possible migratory tendency in search of better opportunities. This same situation of economic vulnerability shows that migrants abstain from consuming varied or nutritious foods and even stop eating for an entire day due to lack of monetary resources. This is consistent with Montezuma's [23], who also points out that there is a restriction in food consumption due to lack of money, which could explain the high levels of severe food insecurity in this population.

A large proportion of the population surveyed stated that they were from Honduras, suggesting a regional migration pattern toward Mexico. Although most participants were within the normal weight range, there was significant concern about food shortages due to a lack of money or other resources. This uncertainty reflects limited access to economic resources and a possible lack of knowledge about the food environment in the host country, which manifests itself in severe food insecurity, according to the study's findings. According to Deschak [24], migrants in transit through Mexico face similar situations, resorting to strategies such as skipping meals or reducing portions, which shows a constant concern about food availability during the journey.

One of the study’s key limitations was the scarcity of comparable research, largely due to methodological differences and the diversity of the regions studied. Additionally, challenges arose in accessing both relevant information and the migrant population itself. Collecting real-time, high-quality data on migrants in transit remains a significant challenge for researchers. This methodological effort underscores the importance of studying mobile populations to inform the development of public policies tailored to their specific needs.

Conclusion

The study reveals an alarming prevalence of severe food insecurity among migrants transiting Tenosique, Tabasco. Contrary to the prevailing assumption that food insecurity is associated with acute malnutrition, our findings demonstrate that underweight and overweight individuals are more prevalent. Consequently, food insecurity frequently manifests not in altered anthropometric indicators but in persistent uncertainty over food availability and access. In addition to considering nutritional status, it is vital to identify the factors that exacerbate migration-related food insecurity. These include limited schooling, pronounced gender disparities and precarious socioeconomic conditions. Collectively, these results underscore an imperative for a paradigm shift in research on migration and food security, transcending static associations to interrogate how interacting structural vulnerabilities influence health outcomes in highly transient populations across contemporary migration corridors.

Declarations

Author Contribution

Following the CRediT taxonomy, BJGL, JCGL and SQG conceived the study. SQG, CIX, and VMR developed the methodology, while JCGL, CIX, VMR, and VPR validated the procedures and findings. Formal analyses were carried out by BJGL, JCGL, SQG, and CIX. Field investigation was undertaken by BJGL and JCGL. JCGL, VMR, and VPR secured the necessary resources, and data were curated by BJGL together with JCGL. The original draft was written by BJG-L and JCGL, with critical review and editing provided by SQG, CIX, VMR, and VPR. Visualizations were produced by BJG-L and VPR. SQG supervised the entire project, managed its administration. All authors have reviewed and approved the final manuscript and take full responsibility for its content.

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References

1. Martínez Caballero G. Migration Statistics [Internet]. 2023rd ed. Migration Policy, Registration and Identity of Persons Unit. Mexico City: Ministry of the Interior; 2023. Available in: http://www.politicamigratoria.gob.mx/
2. UN Report: 131 million people in Latin America and the Caribbean cannot access a healthy diet - PAHO/WHO | Pan American Health Organization [Internet]. [cited 2024 Feb 15]. Available in: https://www.paho.org/es/noticias/19-1-2023-informe-onu-131-millones-personas-america-latina-caribe-no-pueden-acceder-dieta
3. PAHO/WHO. Increased migration in the Americas in 2023: challenges to ensure the health of migrants and the response of the Pan American Health Organization. Pan American Health Organization [Internet]. 2023 [cited 2024 Feb 11]. Available in: https://www.paho.org/es/noticias/18-12-2023-aumento-migracion-americas-2023-retos-para-garantizar-salud-personas-migrantes
4. Montes-Micker AP, Mundo-Rosas V, Infante-Xibillé C. Food insecurity and water consumption in migrants in transit through Mexico during the Covid-19 pandemic. Salud Publica Mex [Internet]. 26 January 2024 [cited 25 April 2024]; 66(2, Mar-Apr):154–64. Available in: https://saludpublica.mx/index.php/spm/article/view/14873
5. Pineda G, Bermúdez J. Diagnosis of human mobility in Tabasco. Government of Mexico [Internet]. November 2022; Available in: www.politicamigratoria.gob.mx
6. Galviz A, Rodríguez N. Support Networks in Migrant Population in Malnutrition [Internet]. [Bogotá]: Corporación Universitaria Minuto de Dios; 2022 [cited 2024 Apr 21]. Available in:

https://repository.uniminuto.edu/bitstream/10656/14355/1/TE.FIA_GalvizAstrid-RodriguezNubia_2022.pdf

7. FAO. Food and nutrition security for the most backward territories [Internet]. Overview of Food and Nutrition Security in Latin America and the Caribbean 2020. Santiago de Chile: FAO, PAHO, WFP and UNICEF; 2020 [cited 21 Apr 2024]. Available in: https://www.unicef.org/lac/media/19361/file/panorama-seguridad-alimentaria-y-nutricional-alc-2020.pdf
8. Gutiérrez Silva, J, Romero Borré, J, Arias Montero, S, Briones Mendoza, X Migration: Context, impact and challenge. A theoretical reflection. [Internet]. Universidad del Zulia; 2020 [citado: 2025, mayo] . Available in: https://doi.org/10.31876/rcs.v26i2.32443
9. Aragón Gama AC, Infante Xibille C, Mundo Rosas V, Liu X, Orjuela-Grimm M. Relative severity of food insecurity during land migration in transit through Mexico. J Immigr Minor Health [Internet]. 2020;22(6):1118-25. Available at: http://dx.doi.org/10.1007/s10903-020-01063-w
10. Barreneche A. Characterization of coping strategies against food insecurity applied by Venezuelan migrants [Internet]. [Bogotá]: Pontificia Universidad Javeriana; 2020 [cited 21 Apr 2024]. Available in: https://repository.javer
11. Hun N, Urzúa A, Espinoza AL. Global food quality in the migrant population residing in chile. Nutr Hosp [Internet]. 2021; 38(6):1232–7. Available in: https://scielo.isciii.es/scielo.php?script=sci_arttext&pid=S0212-16112021000700018
12. Hun N, Urzúa A, López-Espinoza A. Food and migration: A descriptive-comparative analysis of food behavior between Chileans and Colombians residing in the North and Center of Chile. Nutr Hosp [Internet]. 2020; 37(4):823–9. Available in: https://scielo.isciii.es/scielo.php?script=sci_arttext&pid=S0212-16112020000500025
13. Orjuela-Grimm M, Deschak C, Aragon Gama CA, Bhatt Carreño S, Hoyos L, Mundo V, et al. Migrantes en movimiento e (in)seguridad alimentaria: Un llamado a la investigación. J Immigr Minor Health [Internet]. 2022;24(5):1318–27. Disponible en: http://dx.doi.org/10.1007/s10903-021-01276-7
14. Fundamentals in migration management. Essential knowledge about the Global Context of International Migration. 2024 [cited 2024 Apr 21]. Factors that promote international migration. Available in: https://emm.iom.int/es/handbooks/contexto-global-de-la-migracion-internacional/factores-que-propician-la-migracion
15. Mexican Commission for Refugee Assistance. COMAR in numbers [Internet]. 2024 Jan [cited 2024 Jul 3]. Available in: https://www.gob.mx/comar/es/articulos/la-comar-en-numeros-355058?idiom=es
16. Ballard T. The Food Insecurity Experience Scale Development of a Global Standard for Monitoring Hunger Worldwide [Internet]. Rome; 2013. Available at: https://www.fao.org/fileadmin/user_upload/esa/docs/FIES_Technical_Paper_new%20and%20final%
17. Ravasco P, Anderson H, Mardones F. Methods of assessing nutritional status. SciELO [Internet]. 2010;23. Available in: https://scielo.isciii.es/scielo.php?script=sci_arttext&pid=S0212-

16112010000900009
18. World Medical Association. WMA. 2024 [cited 24 April 2024]. WMA Helsinki declaration – ethical principles for medical research on human subjects. Available in: https://www.wma.net/es/policies-post/declaracion-de-helsinki-de-la-amm-principios-eticos-para-las-investigaciones-medicas-en-seres-humanos/
19. Fajardo G. SEGOB. 2012. Official Gazette of the Federation. Available in: https://dof.gob.mx/nota_detalle.php?codigo=5284148&fecha=04/01/2013#gsc.tab=0
20. The 72/Pies Descalzos AC. The 72. 2024 [cited 2024 Apr 22]. La 72, Home-Shelter for Migrants. Available in: https://www.la72tenosique.org/
21. Montes-Micker AP, Mundo-Rosas V, Infante-Xibillé C, Deschak C, Aragón-Gama AC, Dolores-Maldonado G, et al. Food insecurity and water consumption in migrants transiting through Mexico during the Covid-19 pandemic. Salud Publica Mex [Internet].2024; 66(2, Mar-Apr):157–64. Available in: https://saludpublica.mx/index.php/spm/article/view/14873
22. Riquelme Q, Fernández Romero GD. El impacto socioeconómico y cultural de la migración rural en dos asentamientos urbanos de los municipios de Limpio y Villa Hayes, período 2008-2017. Kera Yvoty [Internet]. 30 de noviembre de 2021 [citado 31 de mayo de 2025];6:77-88. Disponible en: https://revistascientificas.una.py/index.php/kerayvoty/article/view/2174
23. Montezuma Julie. Food and nutritional security and survival strategies for Venezuelan migrants in Colombia. [Internet]. [Barranquilla]: Universidad del Norte; 2020. Available in: https://manglar.uninorte.edu.co/bitstream/handle/10584/9824/tesis.pdf?sequence=1
24. Deschak CI, Infante C, Mundo-Rosas V, Aragón-Gama AC, Orjuela-Grimm M. Food insecurity and coping strategies in international migrants in transit through Mexico. J Migr Health [Internet]. 2022;5(100099):100099. Disponible en: http://dx.doi.org/10.1016/j.jmh.2022.100099

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