



# Migrants on the Move and Food (In)security: A Call for Research

Manuela Orjuela-Grimm<sup>1,2</sup> · C. Deschak<sup>3</sup> · C. A. Aragon Gama<sup>3</sup> · Silvia Bhatt Carreño<sup>1</sup> · Leslie Hoyos<sup>1</sup> · Veronica Mundo<sup>3</sup> · Ietza Bojorquez<sup>4</sup> · Karen Carpio<sup>5</sup> · Yolice Quero<sup>6</sup> · Alberto Xicotencatl<sup>7</sup> · Cesar Infante<sup>3</sup>

Accepted: 9 September 2021 / Published online: 20 September 2021

© The Author(s), under exclusive licence to Springer Science+Business Media, LLC, part of Springer Nature 2021

## Abstract

Food insecurity contributes to negative outcomes for health and wellbeing, and its impact may be exacerbated during periods of vulnerability. While food insecurity is both a driver and a consequence of migration, anecdotal evidence indicates that it is also common during migration when people are ‘on the move’, although its prevalence and severity during these periods are largely undocumented. Food security monitoring is critical to ensuring the universal right to food for migrants, and instruments must be designed which capture the unique challenges faced during these ‘extra-ordinary’ periods of mobility, including in the context of emergencies such as the COVID-19 pandemic. This paper reviews knowledge on food security in migrants on the move and examines how active mobility intersects with food security and its measurement. Considering the potential consequences on health and wellbeing, we call for interdisciplinary research using standard instruments to document food insecurity in migrants on the move.

**Keywords** Overland migration · Migrants on the move · Migrant food security · Migrant health · Migrant psychosocial wellbeing

## Introduction

Globally, human mobility and particularly forced displacement is on the rise [1]. International migration, a term encompassing all people who change their place of residence

to a country outside their place of birth, is frequent [2]; in 2019, 272 million people were international migrants, with approximately 25.9 million refugees [1]. At the same time, an estimated 41.3 million were internally displaced due to natural disasters, conflict, or violence: the highest number in recorded history [1]. Depending on the circumstances, migrants may spend shorter or longer periods ‘on the move’ between their places of origin and their intended destination. Migrants may encounter numerous difficulties during these periods of active mobility, increasing their risk for multiple health issues [3].

Independently of location or migratory status, migrants are entitled to the same universal human rights which form the ideological and legal framework of equitable governance worldwide. Chief among these rights is an adequate standard of living, including the right to safe and nutritious food [4, 5]. Food insecurity, understood as the lack of steady availability, access, or utilization of adequate food [5, 6], is a key determinant of current and future health [7] and a key driver of migration [8, 9]. The ongoing SARS-CoV-2 (COVID-19) pandemic has served to highlight the role of food insecurity in provoking both migration and poor health outcomes [9, 10]. Food insecurity is anecdotally recognized as a problem during active migratory transit; however, little

---

Manuela Orjuela-Grimm, C. Deschak, and C. A. Aragon Gama have contributed equally to this study.

✉ Manuela Orjuela-Grimm  
mao5@columbia.edu

<sup>1</sup> Department of Epidemiology, Mailman School of Public Health, Columbia University Medical Center, 722 West 168th St., Room 730, New York, NY 10032, USA

<sup>2</sup> Department of Pediatrics, Columbia University Medical Center, New York, NY, USA

<sup>3</sup> Instituto Nacional de Salud Pública, Cuernavaca, Mexico

<sup>4</sup> Colegio de La Frontera Norte, Tijuana, Mexico

<sup>5</sup> Regional Office for Central and North America and the Caribbean, International Organization for Migration of the United Nations (IOM), San Jose, Costa Rica

<sup>6</sup> International Organization for Migration of the United Nations (IOM), Mexico City, Mexico

<sup>7</sup> Casa del Migrante Saltillo, Saltillo, Mexico

is known about its magnitude and severity in this setting. While some studies have reported diminished food intake during this migratory stage [11, 12], published research is limited in quantity and scope, and standardized indicators of food security have not been validated in this population group. Effective monitoring of food security in migrants on the move is critical to ensuring the universal right to food, and to understanding the unique vulnerabilities of the active mobility phase of the migratory process.

The objective of this document is to invite the migration and health research community to consider food security within research related to the health and psychosocial well-being of migrants in active mobility, or ‘on the move’. We use the conceptual framework of the Food and Agriculture Organization’s definition of food security [13] to describe the unique context of food security experienced by migrants in active mobility, and explore relevant methodologies and results within the existing literature. This approach allows for the identification of knowledge gaps and opportunities for interdisciplinary research and collaboration.

## Migration and Mobility

Human migration takes many forms, each of which deserves consideration of its specific causes and effects. The act of migration, though not inherently harmful, removes layers of social protection [14] especially among individuals affected by social inequalities. Types of migration may be categorized in numerous ways, such as by migration status (regular or irregular), temporality (temporary, permanent, or circular) or motive (forced/displaced or voluntary). However, independently of these factors, movement between an origin and a destination must involve a period of active mobility. The duration and overall experience of this mobile stage is determined by both the individual’s resources and the external resources available in the local area.

Certain areas of the world concentrate the highest volumes of migrant transit by land or water, including North Africa and the Mediterranean, and North and Central America [1]. Mexico serves as a useful case study of active mobility migration, as home to a diverse and historic migratory flow consisting of emigration, immigration, internal migration, and transit principally towards the United States (US). Recent years have seen an increase in the migration of international (non-Mexican) migrants transiting Mexico with the goal of reaching the US. In 2014, the duration of transit through Mexico, for international migrants, lasted on average three months [15]. However, regional politics have contributed to greater variability with protracted transit periods for some migrants even before the COVID-19 pandemic, and for many, recent border closures in response to the latter have further extended the transit period.

When traveling in a clandestine or irregular manner as is common for many migrants, migratory transit by land or water can present extreme risks including exposure to harsh weather conditions or to organized or petty crime, as well as risks of human trafficking, kidnapping, sexual abuse or even death [16, 17]. Clandestine or irregular travel affects access to and eligibility for public services such as healthcare and compounds the ‘invisibility’ of the migratory experience. The inherent insecurity and lack of predictability of clandestine migration also limit planning and resource leveraging.

Lack of access to livelihoods, material resources, shelter, and familiar social networks are common features of active mobility migration for some populations, and all may contribute to food insecurity. The mode of transportation used can also impact the types of vulnerabilities that migrants face as vehicular specifics and geographic area can both contribute to food insecurity (e.g. overcrowding in a boat or choppy water). Modes of transportation may also reflect differing material resources of migrants but result in varying risks for food security (e.g., migrants relying on walking may have different relative economic solvency compared with those riding long-distance buses). The geography of certain high-transit areas such as the Mediterranean Sea, the desert of northern Mexico and the Darién Gap further isolates migrants from basic resources and emergency assistance [1, 16]. In addition, migrants on the move often include priority groups such as women, LGBTQ+ persons, minors, and those in need of international protection.

Currently, no consensus exists on the precise definition of “migrant in transit”. The concept of “transit” is understood as the temporary presence in an area which is neither origin or destination. This definition is often framed using international borders, such that a “migrant in transit” may be considered an individual currently within a country which is neither their country of origin, nor their manifested destination country. In this sense, in order to define “migrant in transit” it is critical to consider temporal aspects, such as: ‘How long may a period of “transit” last?’ Or ‘At what point may a prolonged transit be considered settlement?’ [16]. By definition, migrants in transit are moving towards a third destination; however, some may resettle temporarily, often to gather resources or to await legal processes, or may even resettle permanently thereby changing a region of transit to a destination. The fluidity of the transit period presents conceptual and methodological challenges to the study of migratory processes, which require constant reflection and adaptation based on context [16, 18].

In this paper, we focus on migrants in active mobility, which we subsequently refer to as ‘migrants on the move’. This subcategory of migrants in transit includes those who are in a period of active (physical) mobility during their transit through a region which is neither their origin or planned destination; this mobility may be by foot, land or

water transportation (such as buses, cars, trains or boats) or any mixture of these modalities. [12, 14–18] Notably, although such migrants may pause their transit briefly, the active mobility period does not include periods of settlement longer than that necessary to satisfy basic necessities. During active mobility, migrants face conditions which modify the availability of internal and external resources, therefore, this specific migratory condition implies unique research and policy considerations. Nevertheless, the lack of a common definition of migrants on the move, and the scarcity of empirical data on their wellbeing during active mobility, is a barrier to ensuring fulfillment of basic rights.

## Food Security and Migration

Food security, impacts health and psychosocial wellbeing and is a key component of the universal human right to an adequate standard of living (UN Sustainable Development Goals 2.1) [19]. It implies adequate and sufficient food across four distinct dimensions: availability, access, utilization and stability [20]. Figure 1 depicts the relationship of the four dimensions of food security as defined by the UN FAO [13, 21]. When any of these dimensions are affected, an individual or household experiences food insecurity.

Food accessibility is considered to include three subdimensions: physical, economic and social access [13, 21]. Social access has been recognized within the FAO definition of food security since 2009, however, it lacks both a clear standardized definition and an instrument permitting its measurement, and is therefore currently not reported globally. Lack of social access refers to situations where, despite adequate physical and economic access, individuals are deprived of food due to their membership in a particular group or social role [22, 23]. Such deprivation may stem

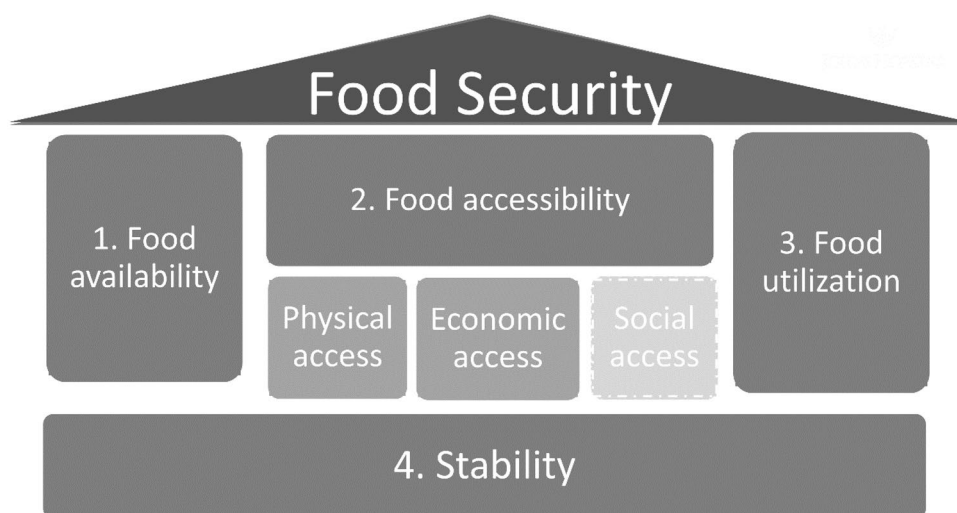
from gender or age hierarchies within the household, caste or apartheid systems, or generalized conflict or war.

Migrants on the move face challenges to achieving food security in all four food security dimensions, however, food access is especially susceptible to variations during active mobility due to its heavy dependence on external resources. Table 1 shows potential barriers and facilitators which may impact the four dimensions of food security during the active mobility stage of migration [24, 25].

Though not explicitly included in Table 1, social access may also be a highly relevant determinant of food access for actively mobile migrants given the dearth of evidence on discrimination, organized crime and violence which frequently plague high-volume transit routes [16, 26]. It is also a subdimension which may serve to structure the exploration of factors which differentiate food security experiences of migrants belonging to priority groups, the LGBTQ+ community, (especially those identifying as transgender) or others with multiple layers of social vulnerability.

Documenting food insecurity is critical to informing effective strategies to promote basic rights to health and psychosocial wellbeing among migrants in active mobility. The multi-faceted nature of food security requires a wide variety of measurements, and no single indicator encompasses all dimensions. A series of indicators and tools have been designed for use in population-based studies. Indicators of the food access dimension of food security are highly relevant to understanding the direct individual or household experience of food insecurity, and efficient for their relatively rapid, cost-effective and non-invasive instruments. These instruments may be international, such as the US Department of Agriculture (USDA) Food Security Survey Module (for adults at the household or individual level, or youth) [6], the Food and Nutrition Technical Assistance (FANTA) Household Food Security Access Scale [27], the Latin American and Caribbean

**Fig. 1** Food security dimensions and subdimensions. Adaptation based on UN FAO [13, 21]



**Table 1** Food security dimensions and examples of potential barriers and facilitators for migrants on the move

Dimension	Sub dimension	Potential Barriers and Facilitators to Food Security	Barrier	Facilitator
Food availability “Whether or not food is actually or potentially physically present, including production, food reserves, markets and transportation, and wild foods” Food accessibility “Access to adequate resources (set of commodities over which a person can establish command given the legal, political, economic and social arrangements of the community) for acquiring appropriate foods for a nutritious diet”		Limited availability of foods consistent with habitual dietary patterns, restrictions or cultural needs		Sufficient national and state-level food supply Presence of humanitarian assistance Understanding (by humanitarian actors) of need for culturally adequate food
	<i>Physical access</i>	Travel through unpopulated areas Travel in confined or clandestine transport spaces (e.g., trains, boats, buses) Lack of autonomy in food selection and preparation (e.g., when kidnapped or trafficked) Poor reception within temporary host community (e.g., discrimination)		Availability of humanitarian assistance (through organizations or individuals) Potential for multiple daily meals Access to hot meals Access to portable/packaged food items for easy storage during travel (e.g., backpack kits) Awareness of culturally appropriate food distribution methods (e.g., not requiring public queues if this is considered shameful in the culture of recipients) Use of psychosocially informed approaches to food assistance (i.e., promoting empowerment by providing cash or kitchen ingredients/ facilities, as opposed to prepared or packaged food)
Food utilization “Usage, and biological maximization of the consumption of adequate nutrition and energy”	<i>Economic access</i>	Lack of financial solvency High food prices Organized crime (e.g., theft, bribes, evasion strategies) Interdependence within travel unit (e.g., illness within unit affects all members)		Sufficient financial solvency Availability of humanitarian assistance offering free or reduced-price food Interdependence within travel unit (e.g., sharing food within the unit)
		Inadequate hygiene and sanitation Limited autonomy/agency in food selection/preparation/distribution Inadequate food safety Inadequate balance/variety of food Limited consideration of cultural aspects of food preparation		Presence of humanitarian assistance Adequate hygiene and sanitation Facilities which allow food safety Potential for balance/variety
Stability “Stability of all dimensions, thus ensuring food security at all times”		Weather conditions Political prioritization of anti-migrant policies (e.g., to prevent transit or temporary residence of migrants) Lack of employment opportunities Lack of economic, material or human resources in humanitarian assistance settings Relatively high food prices Specific socioeconomic complexities in areas of transit (e.g., endemic violence, poverty) Emergency situations (e.g., war, epidemic, natural disaster)		Political priorities of government (e.g., local or regional or national) of transit locations (e.g., prioritization of international accords to protect and welcome migrants) Potential for temporary migratory status Employment opportunities Relatively low food prices Stability of economic, material and human resources in humanitarian assistance settings

Created by the authors using dimensions and subdimensions as described by the FAO [13, 21], in addition to anecdotal experiences and scientific articles [12, 16, 25, 32, 34, 35, 44, 45, 53, 61, 62, 64–67]

Migrants on the move are defined as the subcategory of migrants in transit who are in active mobility (they may travel on foot, by overland or water transportation (such as buses, cars, trains or boats) or through any mixture of these modalities [12, 14–18])

Food Insecurity Scale [28] and more recently the FAO Food Insecurity Experience Scale (FIES) [29] (see Supplemental Materials for the FIES as an example of the topics commonly included in food security scales). They may also be scales developed by individual nations for application in national-level surveys.

These instruments are generally based in self-reported experiences of economic food access; all apply indicators of perceptions of quantity and quality of food consumed, including perceptions of dietary balance and variation, as well as psychological manifestations (e.g., ‘worry’) associated with limited food access and perception of variability or dietary balance. They do not specifically measure diet quality (nutritional value) or dietary variation. Portions of some standardized scales are used as screening instruments, while in population-based studies they are often used alongside other scales that measure dietary variability or intake.

### Consequences of Food Insecurity for Health and Psychosocial Wellbeing

Food security is key to physical as well as psychosocial wellbeing, and adequate access to food is among the primary targets of the UN Sustainable Development Goal 2 (“Zero hunger”) [19]. Food insecurity is recognized as having multiple negative health consequences on chronic mental and physical health outcomes, some of which vary depending on the life course stage [10]. A recent conceptual model by Leddy et al. proposes that food insecurity impacts health outcomes through three pathways: stress (including acknowledgement that food insecurity is itself a source of stress), behavior (considering food insecurity coping strategies, or actions employed in an effort to obtain or maintain food supply), and inflammation (resulting from physiologic responses to stress) [10].

The psychosocial consequences of scarcity and extreme conditions contribute to poorer emotional health (including heightened stress, poor decision making, lack of trust, risk taking behaviors). Food insecurity in mothers negatively impacts child development and behavior, while in adolescents it increases risk for mental health disorders, and in adults is associated with an increased risk for diet-associated chronic disease and decreased capacity for its management [10, 30, 31]. Food insecurity coping strategies may contribute to disordered eating habits or reliance on energy-dense foods [30]. Furthermore, individuals experiencing food insecurity are more likely to participate in activities such as sexual work or drug-trafficking to guarantee their access to food and other basic necessities [32–35] (unpublished data, Orjuela-Grimm et al.). All these risks are potentially relevant for migrants on the move, which may include individuals

in any life course stage [1], though health outcomes and impacts may not be measurable until after resettlement.

### Existing knowledge Regarding Food Insecurity in Migrant Populations

According to a report by the Office of the High Commissioner for Human Rights [16], food access is one of the most fundamental priorities for migrants in transit around the world, given that it was among the greatest unmet needs during transit across the eighteen countries studied. Humanitarian aid efforts, including through UN-linked entities such as the World Food Program (WFP), International Organization for Migration (IOM) and the Office for the Coordination of Humanitarian Affairs, recognize food access as a basic necessity lacking in situations of displacement, and often use rapid survey questions to determine immediate needs for food assistance. For example, the WFP has repeatedly emphasized the urgent need for food access for Venezuelan migrants in transit along the border of Venezuela and Colombia, which represents a key migratory corridor [36].

Empirical data on the magnitude and severity of food security among unsettled migrant populations are limited. In general, existing research has focused on food security either before or after the migration process, but not during it, and has included types of migrants who are not in active mobility. Research methodologies have tended towards the use of the household as the unit of measure as opposed to the individual, and have disproportionately represented the Western Hemisphere.

For example, some previous studies which quantitatively measured food security have focused on first-generation immigrants or refugees, who had therefore already completed a migratory process and were settled in a destination country [37–39]. Within a destination country and over time, these individuals may have had access to relatively greater resources including housing, income and social support. While research within these groups is crucial to supporting successful long-term immigration outcomes, it doesn’t consider the unique experience of mobility and its influence on food security. Notably, temporal definitions of settlement are not standardized, data is not often disaggregated between recently-arrived immigrants and those living many years in their destination.

Other studies focus on migrants, both internal and international, who are temporarily settled in a destination. Specifically, a number of studies have focused on migrant laborers, as in the case of migrant farmworker families in the US who have demonstrated magnitudes of food insecurity up to 70.9% higher than that of the general population [40, 41]. This is especially high among those who



migrate more frequently or who lack a home with cooking amenities [42]. Iqbal, Fatmi [43] measured an important magnitude of food insecurity in migrant child laborers in Pakistan, accompanied by a higher prevalence of acute malnutrition compared to non-migrant child laborers.

To our knowledge, data on the magnitude and severity of food insecurity in migrants on the move are extremely scarce. No standardized definition exists to delimit this population sector, which in turn limits the generation of specific knowledge on migrants in active mobility. Some studies include migrants on the move without defining them as such, incorporate them into other populations without disaggregating their data from that of other migrants, or without accounting for their unique characteristics when considering sampling.

Studies which have directly documented food insecurity in migrants on the move have focused on international migrants transiting Mexico towards the US. Stoesslé et al. [11] reported that 54.7% of these migrants experienced diminished food intake, while in a similar population Aragon Gama, Infante Xibille [12] found that 74% of individuals reported fewer than two meals per day, with 20% reporting two or more consecutive days without eating. A similar magnitude and severity of food insecurity was confirmed by Deschak, Infante Xibille [44] when applying a standardized instrument with minimal adaptations, while also describing the use of food insecurity coping strategies associated with humanitarian crises. These results provide evidence of extremely limited food access in migrants on the move, although within only one regional context. Nonetheless, factors associated with severe food security in the Mexican context such as poverty, exposure to crime, and dangerous transportation options, are similar to those reported in other known regions of significant migratory transit [16], supporting the hypothesis that a similar prevalence and severity of food insecurity may be present among other migrants on the move.

The health, social and economic crises accompanying the SARS-CoV-2 (COVID-19) pandemic have further complicated food access for all types of migrant populations [36, 45, 46]. A recent five-part Displacement Tracking Matrix (DTM) report from the IOM in Mexico shows that between 23 and 57% of migrants awaiting continuation of migration trajectories which were interrupted prematurely by the pandemic, reported increased difficulty in meeting their nourishment needs [47–51]. The range of difficulty varied appreciably by region in Mexico, with 23–44% in Mexicali, Ciudad Juarez, and Tijuana on the US border, 31% in Tapachula on the Guatemalan border, but 57% in Puebla (where higher proportions of migrants have chosen to resettle rather than continue north), as well as by subpopulations, with some nationalities reporting higher prevalence. The DTM also captured data on perceived changes in pandemic-associated

diet diversity, with 23–52% reporting decreased diversity, (lowest in Mexicali and Ciudad Juarez, while highest in the non-border region of Puebla) [47–51]. Although the DTMs did not directly document food security, these data suggest that the measurement of food security would be informative and actionable.

## Challenges to Measuring Food Security in Migrants on the Move

Actively mobile migration presents challenges for the use of existing metrics. The frequent fluctuations in food access that may occur during actively mobile migration by land or sea pose unique measurement challenges inherent to the ‘extra-ordinary’ nature of this migratory stage. We highlight here several measurement challenges.

### Reference Period Variability

Existing food security measures were not designed with this population in mind, and generally capture ‘ordinary’ time periods in a less dynamic setting. They generally reference a period of 12 months or 30 days assuming a relative stability across that time period, without documenting frequency within shorter sub-segments; none is designed to capture food security occurring within a shorter period. Instruments that measure based on assumptions of a steadier state of exposure may not detect the duration or severity of a short-term exposure. The heterogeneity of the actively mobile experience can result in 30-day periods that may contain multiple segments, each with different food insecurity severity levels. Alternatively, the entire duration of actively mobile migration may be less than 30 days. The complex time frames within migration in transit may affect the validity of utilizing existing metrics in such variable settings.

### Consecutive Days Without Food

Furthermore, existing instruments do not include a mechanism for capturing consecutive days without food, an experience that appears prevalent in some migration corridors [12]. Such extreme food insecurity may represent a severe physiologic stressor that may negatively impact physical and psychosocial outcomes, particularly in more vulnerable life course stages (e.g., pregnancy, childhood) or in migrants with underlying chronic disease.

### Household Unit Variability

The variability of the composition of the ‘household’ unit with which a migrant may travel (henceforth referred to as

a ‘travel unit’) also contributes to measurement challenges. Anecdotally, some migrants report multiple changes of traveling companions during the active mobility period, while others may remain alone or with the same group throughout their journey [52, 53]. These travel units may function as a household unit when considering food security dimensions and metrics. Food rations as well as complicating events such as illness within a travel unit can impact food access during active mobility migration [12, 44]. Capturing food security using only modules designed for individual access may prevent the detection of travelling unit dynamics impacting food access. The use of a standard household-level food security scale may also result in misclassification due to the dynamic nature of the travel unit, as a 30-day period may contain various configurations of a travel unit.

### Sampling Challenges

The extra-ordinary circumstances frequently experienced by migrants in active mobility render measurement or data collection particularly challenging. Points of contact for researchers to interact with migrants are limited, as migrants on the move may avoid contact with authority figures, be restricted by smugglers, or simply wish to continue their journey uninterrupted, all of which restrict spaces for dialogue. Low literacy levels can further reduce options for measurement tools in some corridors. The confluence of such circumstances have precluded the ability to perform longitudinal assessment using existing tools.

Studies with migrants, whether in active mobility or otherwise, have applied multiple instruments and approaches to measuring food insecurity through food access. During active mobility, access and stability are the food security dimensions most subject to immediate change, and food access is recognized as the dimension of choice for studying the experience of food security through rapid, cost-effective, non-invasive surveys. Some approaches have used standardized tools [27, 40, 54–56], while others have adapted existing tools in an attempt to account for particularities of active mobility migrant populations, such as by modifying language or wording [12, 57] survey length [42, 43, 58] or reference period [44].

Another approach to measuring food security in migrants is through the use of ‘ad hoc’ self-designed instruments. These may be quantitative instruments which explore only one specific indicator such as food quantity, or use only subgroups of the standard questions [11, 12]. Alternatively, studies have used qualitative tools such as semi structured interviews or focus groups. These studies have generally queried on food security indicators derived from quantitative scales and combined qualitative findings with data on individual circumstances, migration history, diet changes

between origin and destination, dietary practices and coping strategies [35, 44, 54, 57, 59, 60]. Self-designed instruments may be well-adapted to the specific population of interest but may lack the rigor of existing standardized instruments and limit external validity.

To our knowledge no instrument, quantitative or qualitative, has been methodologically evaluated or validated for use in a population of migrants on the move. This serves to limit accuracy, comparability and generalizability, thereby compromising understanding of the scope and severity of food insecurity in migrants on the move. This lack of evidence prevents an understanding of the consequences of food insecurity on health outcomes in this population group. The existing research which has specifically explored food access in active mobility migrants has demonstrated the relevance and sensitivity of this dimension [12], inviting further exploration of a reliable instrument for the measurement of food access as an indicator of food security in migrants on the move. The inability to account for food security during active mobility migration impacts the ability to understand long term consequences of migration on health and psychosocial wellbeing, and consequently, the ability to consider strategies to ameliorate impacts [3].

### Recommendations

A critical knowledge gap exists around food insecurity in migrants on the move, and this lack of data has serious implications for ensuring the universal rights to health and an adequate standard of living. The following steps outline an initial approach to address this gap:

- 1) *Recognize the importance of food security* as a building block of an adequate standard of living, and acknowledge the need to comprehend the prevalence, severity and unique characteristics of food security during active mobility migration in order to guide policy and action.
- 2) *Establish uniform measures* to capture characteristics and determinants of food insecurity during migration during active mobility migration, such as capturing consecutive days without food and a flexible reference period.
- 3) *Document the prevalence of food insecurity during active mobility migration*, recognizing that varying conditions during mobility may impact different dimensions of food security including (but not limited to) access.
- 4) *Document the main factors associated with food security during active mobility migration* in order to inform public policy aiming to protect the right to health and psychosocial wellbeing.
- 5) *Consider both the immediate consequences and the long-term impacts of food insecurity* to the health

and psychosocial wellbeing of migrants on the move, acknowledging the heterogeneity of needs depending on demographic characteristics/life stages/food practices/presence of special nutritional requirements or chronic diseases, and the need to collect information accordingly.

- 6) *Commit to applying the knowledge* gained to inform effective, efficient and evaluable strategies to promote food security and address food insecurity.

Effective action will require collaboration between and among multisector state and non-state actors, incorporating interdisciplinary research and approaches.

## Conclusions

Food insecurity is an established driver of migration, and has been documented as a common experience of immigrants and refugees resettled in a destination. Nonetheless, its extent and consequences during the crucial period of active migratory transit remain unelucidated. This deepens the invisibility of the migrant experience at its most vulnerable stage and precludes the effective guarantee of the rights to health and an adequate standard of living. Many interventions by both national and international organizations, and by State and non-State actors, provide food assistance to migrants on the move [34, 61, 62]. However, empirical data regarding the effectiveness of these interventions in addressing food insecurity in active mobility migrants are limited. Together, these large- and small-scale efforts demonstrate an acknowledgement of food insecurity as a reality for migrants on the move, and of the serious health challenges its presence indicates. Furthermore, they highlight the need for evidence to inform the development of effective and targeted interventions.

The wide-reaching consequences of food insecurity for health and psychosocial wellbeing [10], combined with the devastating impacts of the COVID-19 pandemic and the anticipated increases in both food insecurity and migration worldwide as a result [36, 45, 46], highlight the need to document food security during all phases of migration, including during active mobility. When considered from the perspective of social justice, the lack of empirical knowledge of food security in migrants on the move precludes evidence-based interventions [63]. To address this gap, urgent action is needed in order to inform public health interventions through expanding the study of food and nutrition needs in migrants on the move. As an initial step, we propose an interdisciplinary approach to constructing and standardizing an appropriate measurement tool(s) to allow monitoring of fulfilling the right to food in

the highly vulnerable context faced by this population. The information this initial step provides will be essential to informing both policies and services related to migrants on the move, while contributing to our understanding of the impact of migration on health and psychosocial wellbeing.

**Supplementary Information** The online version contains supplementary material available at <https://doi.org/10.1007/s10903-021-01276-7>.

**Acknowledgements** The authors are members of the Migrants in Transit, Food Security and Wellbeing working group (MeTIAB, for the group's name in Spanish, *Migrantes en Transito, Inseguridad Alimentaria y Bienestar*). The authors wish to acknowledge the Center for Mexican and Central American Studies (CeMeCAs) at Columbia University for their support of the formation of the working group. The working group is funded by the Institute for Latin American Studies (ILAS) at Columbia University.

## References

1. International Organization for Migration (IOM). *World Migration Report 2020*. 2019.
2. International Organization for Migration (IOM). *Glossary on Migration*. International Migration Law, 2019.
3. Matlin SA, et al. Migrants' and refugees' health: towards an agenda of solutions. *Public Health Rev*. 2018. <https://doi.org/10.1186/s40985-018-0104-9>.
4. UN General Assembly. *Universal Declaration of Human Rights*. 1948.
5. Food and Agriculture Organization of the United Nations FAO. *Report of the World Food Summit*. Rome, 1996.
6. USDA. *Food Security in the United States: Scale in Spanish*. Economic Research Publisher 1995. <https://www.ers.usda.gov/media/8285/hh2012spanish.pdf>.
7. Seligman HK, Laraia BA, Kushel MB. Food insecurity is associated with chronic disease among low-income NHANES participants. *J Nutr*. 2010;140(2):304–10.
8. Sadiddin A, et al. Food insecurity as a determinant of international migration: evidence from Sub-Saharan Africa. *Food Sec*. 2019;11(3):515–30.
9. Smith MD, Wesselbaum D. COVID-19, food insecurity, and migration. *J Nutr*. 2020;150(11):2855–8.
10. Leddy AM, et al. A conceptual model for understanding the rapid COVID-19-related increase in food insecurity and its impact on health and healthcare. *Am J Clin Nutr*. 2020;112(5):1162–9.
11. Stoessle P, et al. Risk factors and current health-seeking patterns of migrants in Northeastern Mexico: healthcare needs for a socially vulnerable population. *Front Public Health*. 2015;3:191.
12. Aragon Gama AC, et al. Relative severity of food insecurity during overland migration in transit through Mexico. *J Immigr Minor Health*. 2020;22(6):1118–25.
13. FAO et al. *In Brief to The State of Food Security and Nutrition in the World 2020. Transforming food systems for affordable healthy diets*. Rome: FAO, 2020.
14. Salgado de Snyder N, et al. Simposio I. Vulnerabilidad social, salud y migración México-Estados Unidos. *Salud Públ México*. 2007;49(1):8–10.
15. Servan-Mori E, et al. Migrants suffering violence while in transit through Mexico: factors associated with the decision to continue or turn back. *J Immigr Minor Health*. 2014;16(1):53–9.



16. Office of the High Commissioner for Human Rights (OHCHR). *Report on the situation of migrants in transit*. Office of the United Nations High Commissioner for Human Rights, 2016.
17. Leyva-Flores R, et al. Migrants in transit through Mexico to the US: Experiences with violence and related factors, 2009–2015. *PLoS ONE*. 2019;14(8):e220775.
18. Digidiki V, et al. *See migration like water - An Analysis of Flow Monitoring Survey Data on Migration Flows in and Through West and Central Africa*. 2021, Geneva: FXB Center for Health and Human Rights at Harvard University and International Organization for Migration.
19. United Nations. *Sustainable Development Goal 2*. <https://sdgs.un.org/goals/goal2>.
20. FAO et al. *Transforming food systems for affordable healthy diets, in The State of Food Security and Nutrition in the World 2020*. Rome, Italy, 2020.
21. FAO. *Policy Brief: Food Security*. 2006.
22. Kavishe FP. *Nutrition-Relevant Actions in Tanzania*. UNSSCN, 1993.
23. Napoli M, Muro P, Mazziotta M. Towards a food insecurity multidimensional index (FIMI). Geneva: FAO; 2011.
24. Leyva Flores R, Infante Xibillé C, Quintino Pérez F. *Migrantes en tránsito por México: situación de salud, riesgos y acceso a servicios de salud*. 1st ed. Cuernavaca: Instituto Nacional de Salud Pública; 2016.
25. Red de Documentación de las Organizaciones Defensoras de Migrantes (REDODEM). *Migraciones en México: fronteras, omisiones y transgresiones*. Ciudad de México, Mexico, 2019.
26. Red de Documentación de las Organizaciones Defensoras de Migrantes (REDODEM). *Migrantes en México: recorriendo un camino de violencia*. Ciudad de México, México, 2017.
27. Crush J. Linking food security, migration and development. *Int Migr*. 2013;51(5):61–75.
28. FAO. *Escala Latinoamericana y Caribeña de Seguridad Alimentaria: Manual de Uso y Aplicaciones (ELCSA)*. FAO (UN Food and Agriculture organization for Latin America), 2012.
29. FAO. *FIES Survey Modules: Módulos de la encuesta*. Open data from webpage: Voices of the Hungry Project. <http://www.fao.org/in-action/voices-of-the-hungry/using-fies/en/>.
30. Chilton M, Breen A, Rabinowitch J. Public health implications of household food insecurity. In: Neff R, editor. *Introduction to the U.S. food system: public health, environment, and equity*. Somerset: Wiley, Incorporated; 2014.
31. McLaughlin KA, et al. Food insecurity and mental disorders in a national sample of U.S. adolescents. *J Am Acad Child Adolesc Psychiatry*. 2012;51(12):1293–303.
32. BBC. *Prostituidos y explotados: la dura realidad de los niños migrantes abandonados por Europa*, in *BBC News, Mundo*. Italia, 2015.
33. Deschak C, et al. *Food insecurity and coping strategies in international migrants in transit through Mexico*. 2020.
34. Torres A. *Mochilas para migrantes: un proyecto de solidaridad, in ZonaDocs*. Mexico, 2020
35. Aragón-Gama AC. *Formulación de recomendaciones para promover un adecuado estado nutricional en adultos migrantes en tránsito en la casa del migrante de San Luis Potosí*, in *Masters in Public Health*. Mexican National Institute of Public Health (INSP): Cuernavaca, Mor., 2016.
36. WFP. *Crisis sin precedentes por la COVID-19 afecta gravemente la seguridad alimentaria de migrantes en América del Sur*. Ciudad de Panamá, 2020.
37. Mansour R, Liamputtong P, Arora A. Prevalence, determinants, and effects of food insecurity among middle eastern and North African migrants and refugees in high-income countries: a systematic review. *Int J Environ Res Public Health*. 2020;17(19):7262.
38. Hadley C, et al. Hunger and health among undocumented Mexican migrants in a US urban area. *Public Health Nutr*. 2008;11(2):151–8.
39. Bouris SS, et al. Mothering here and mothering there: international migration and postbirth mental health. *Obstet Gynecol Int*. 2012;2012:593413.
40. Weigel MM, et al. The household food insecurity and health outcomes of U.S.-Mexico border migrant and seasonal farmworkers. *J Immigr Minor Health*. 2007;9(3):157–69.
41. Nord M, Andrews MS, Carlson S. *Household Food Security in the United States, 2007*. Dept. of Agriculture, Econ. Res. Serv., 2008.
42. Hill BG, et al. Prevalence and predictors of food insecurity in migrant farmworkers in Georgia. *Am J Public Health*. 2011;101(5):831–3.
43. Iqbal M, et al. Malnutrition and food insecurity in child labourers in Sindh, Pakistan: a cross-sectional study. *East Mediterr Health J*. 2020;26(9):1087–96.
44. Deschak C, et al. *Seguridad alimentaria y estrategias de afrontamiento en migrantes internacionales en tránsito por México*. Instituto Nacional de Salud Pública de México, 2020.
45. International Organization for Migration of the United Nations (IOM) and World Food Programme (WFP). *Populations at Risk: Implications of COVID-19 for Hunger, Migration and Displacement, November 2020*. IOM, 2020.
46. World Food Programme (WFP). *WFP Global Response to COVID-19: June 2020*. Rome, 2020.
47. IOM Mexico 2020a, *Impacto de COVID19 en el contexto migratorio de Puebla*. 2020, Organización Internacional para las Migraciones, ONU: Mexico.
48. IOM Mexico. *Impacto de COVID19 en el contexto migratorio de Ciudad Juarez*. 2020, Organización Internacional para las Migraciones, ONU: Mexico, 2020b.
49. IOM Mexico. *Impacto de COVID19 en el contexto migratorio de Mexicali*. 2020, Organización Internacional para las Migraciones, ONU: Mexico, 2020c.
50. IOM Mexico. *Impacto de COVID19 en el contexto migratorio de Tapachula*. 2020, Organización Internacional para las Migraciones, ONU: Mexico, 2020d.
51. IOM Mexico. *Impacto de COVID19 en el contexto migratorio de Tijuana*. 2020, Organización Internacional para las Migraciones, ONU: Mexico, 2020e.
52. Holmes S. *Fresh fruit, broken bodies: migrant farmworkers in the United States*. Berkeley, CA: University of California Press; 2013.
53. BBC. *US Border: Risking everything for an American dream*. 2021, BBC News: US & Canada.
54. Borre K, Ertle L, Graff M. Working to eat: vulnerability, food insecurity, and obesity among migrant and seasonal farmworker families. *Am J Ind Med*. 2010;53(4):443–62.
55. Ip EH, et al. Profiles of food security for US farmworker households and factors related to dynamic of change. *Am J Public Health*. 2015;105(10):e42–7.
56. Fernández-Niño JA, et al. Situación de salud de gestantes migrantes venezolanas en el Caribe colombiano: primer reporte para una respuesta rápida en Salud Pública. *Rev de la Univ Ind de Santander. Salud*, 2019;51(3):208–219.
57. Quandt SA, et al. Household food security among migrant and seasonal latino farmworkers in North Carolina. *Public Health Rep*. 2004;119(6):568–76.
58. Kilanowski JF, Lin L. Rasch analysis of US household food security survey module in Latino migrant farmworkers. *J Hunger Environ Nutr*. 2012;7(2–3):178–91.
59. Bojorquez I, Rentería D, Unikel C. Trajectories of dietary change and the social context of migration: a qualitative study. *Appetite*. 2014;81:93–101.

60. Castaneda J, et al. Food security and obesity among Mexican agricultural migrant workers. *Int J Environ Res Public Health*. 2019;16(21):4171.
61. Lemus L. *FOTOS: ¿Qué llevan en sus mochilas los migrantes salvadoreños?*, in *El Diario De Hoy*. El Salvador, 2018.
62. Marchand MH. The caravanas de migrantes making their way north: problematising the biopolitics of mobilities in Mexico. *Third World Q*. 2021;42(1):141–61.
63. Faden R, Powers M. A social justice framework for health and science policy. *Camb Q Healthc Ethics*. 2011;20(4):596–604.
64. Daudin G et al. *Migrants did discard food in a Greek camp. But conditions were 'abhorrent', the UN reported*, in *AFP Fact Check*. 2018.
65. UN. *Hay una crisis alimentaria en la frontera entre Venezuela y Colombia*. Noticias ONU: Colombia, 2018.
66. Rojas, A.G. *Caravana de migrantes en Tijuana: "Pido perdón a México", la historia de la mujer que rechazó un plato de frijoles y desató la ira de algunos mexicanos contra hondureños*, in *BBC News, Mundo*. 2018.
67. Gallegos, Z. *Hacinamiento, sobrepoblación y falta de servicios médicos: las irregularidades en las estaciones migratorias del Gobierno de Peña Nieto*, in *EL PAÍS*. México, 2021.

**Publisher's Note** Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.