Scoping Review

Consumption of food away from home in low- and middle-income countries: a systematic scoping review

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Context: *Consumption of food away from home represents an increasing share of people's food consumption worldwide, although the percentage of food intake that is consumed away from home varies among countries and among individuals. Previous systematic reviews have reported that, overall, consumption away from home negatively affects an individual's diet and nutritional status. However, these reviews have mainly focused on high-income countries, leaving a gap in knowledge and data for people in low- and middle-income countries (LMICs).* ***Objective:*** *The present review aimed to describe trends in the consumption of food away from home in an apparently healthy population in low- and middle-income countries (LMICs) and to investigate any associations between this behavior and diet quality, nutritional status, and health outcomes.* ***Data Sources:*** *A structured search strategy was developed for retrieving (from MEDLINE [via PubMed], Web of Science, and Scopus) peer-reviewed articles published in English from March 2011 until May 2021.* ***Data Extraction:*** *Forty studies were included, and from them information was obtained based on data from 12 different countries. A qualitative and descriptive approach was used to review the evidence.* ***Data Analysis:*** *It was found that there was large heterogeneity in the definition of food consumed away from home and the methods used to measure it, making comparisons and syntheses difficult. Consumption of food away from home in LMICs was relatively common and was positively driven by factors such as being a male, being young, having a high socio-economic status, being educated, and living in urban areas. As in high-income countries, consumption of food away from home in LMICs had unfavorable effects on an individual's diet quality, nutritional status, and health.* ***Conclusion:*** *There is a need to develop harmonized surveillance systems for better monitoring of the phenomenon of food consumption away from home in LMICs, including a*

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need for a standardized definition for food consumed away from home, to enable the design of effective regulatory policies.

INTRODUCTION

Food consumed away from home conventionally refers to food items that are obtained, although not exclusively, from restaurants, cafeterias, food trucks, street outlets, or vending machines.[1] It covers meals, as well as snacks and beverages, supplied by both commercial formal and informal food service establishments and by noncommercial institutions (eg, schools, canteens). Food consumed away from home represents an increasing share of people's food consumption in a world in which food systems are in rapid transition. In the US, the share of the food budget allocated to food consumed away from home has risen from 41% in 1984 to 50% in 2010 and continues to rise, surpassing that of food consumed at home.[2] The same trends are reported in emerging countries such as China (where this share increased from 18.2% in 2002 to 21% in 2011)[3] or India (where the percentages of households consuming meals outside over a 30-day period has increased from 23% in 1994 to 39% in 2010)[4]. This phenomenon has also been observed in a growing number of low- and middle-income countries (LMICs) such as Peru, in which country households have been reported to have spent more than one quarter of their food budget on food consumed away from home since 2010.[5]

The increase in food consumed away from home is thought to be the consequence of diverse factors, including increase in income and urbanization, greater female labor force participation in the formal economy, socio-cultural changes, and modifications of food environments.[5]

Although it can have some benefits, overall, food consumed away from home is generally considered to be associated with important negative consequences for people's diet and health. Indeed, according to 2 successive systematic reviews that included, respectively, 29 studies published between 1989 and 2010 and 26 studies published between 2010 and 2019, higher food consumption away from home was associated with higher energy intake and poorer diet.[6,7] Another systematic review, including 15 studies, reported that higher food consumption away from home was positively associated with the risk of being obese or overweight.[8] Yet, almost all of the studies included in these systematic reviews were based on data for high-income countries (HICs), highlighting the gap in knowledge regarding the consumption of food away from home, and the potential consequences for the diet and health of people in LMICs, in which a large proportion of the populations may be experiencing a high prevalence of multiple coexisting forms of malnutrition, such as micronutrient deficiencies, overweight/obesity, and diet-related noncommunicable diseases.[9]

The main objective of the present review was to explore the recent literature documenting the phenomenon of food and drinks consumed away from home in apparently healthy populations in LMICs. The secondary objectives of the review were: (i) to summarize the evidence for associations between the consumption of food away from home and diet quality, (ii) to summarize the evidence for associations between the consumption of food away from home and nutritional status (referring to the presence or absence of malnutrition, eg, obesity) and health outcomes, and (iii) to explore how these associations vary according to socioeconomic status and demographic characteristics.

METHODS

Type of review

The scoping review approach was selected to perform this review. This approach aims at identifying, mapping, and synthesizing the available evidence in a broad field of interest.[10] The guideline from the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR) statement,[11] as well as some elements of the updated guideline (eg, flowchart) from the PRISMA 2020 statement,[12] were used for the review.

Eligibility criteria

The population, interventions, comparators, outcomes, and study design (PICOS) criteria were used for inclusion and exclusion criteria in selecting titles, abstracts, and full texts. These criteria are described in Table 1. Because the intent of the present review was to present a comprehensive inventory of the phenomenon of food and drink consumption away from home in apparently healthy populations in LMICs, we did not exclude articles based on their methodological quality. Furthermore, this scoping review was not meant to assess the validity or quality of the studies.

Table 1 **PICOS criteria for inclusion and exclusion of studies**

Parameter	Inclusion criterion	Exclusion criterion
Population	Apparently healthy populations, includes adults (>18 years), adolescents (10 years–18 years), and children (2 years–9 years) in low- and middle-income countries	Apparently healthy populations in high-income countries, institutionalized elderly people, detainees and patients in hospitals, adolescents and children in day-care centers, college students, populations following a strict diet for medical conditions
Interventions	Studies using a qualitative or quantitative assessment method to estimate the phenomenon of food and drinks consumed away from home (quantity of foods and beverages, energy and nutrient contribution of food and drinks consumed away from home to diet, or frequency of away-from-home consumption)	Purely qualitative studies, studies focusing on food safety and toxicology, studies that only measured food consumed or prepared in a specific place (ie, food consumed at worksites, in school canteens, or in fast-food restaurants), and/or a during a specific meal (e.g. focusing only on breakfast or lunch) without measuring the other kinds of food and drinks consumed away from home
Comparators	Participants with a higher proportion of food and drinks consumed away from home, compared with a lower proportion of food and drinks consumed away from home, in their diet	
Outcomes	Any measure of diet quality (including but not restricted to nutrient intake, nutrient adequacy index, food intake, and food-based diet quality index) or any health outcome (including but not restricted to nutritional status, body composition, noncommunicable diseases, intermediate biomarkers of health, biomarkers of nutritional status, mental health, cognitive functions, and mortality)	
Study design	All study designs.	Reviews, expert opinion, editorials comments, letters to the editor, studies on animals, conference reports, book reviews and manuals.

Information sources and search strategy

A structured search strategy, focused on titles, abstracts, and key words, was developed to retrieve peer-reviewed articles published in English from March 2011 until May 2021. Searches were conducted in May 2021 in MEDLINE (via PubMed), Web of Science, and Scopus. The syntax of the search strategy was developed in MEDLINE (Table S1) and adapted for the other 2 databases. Additionally, reference lists in the papers retrieved from the search were examined to identify other relevant studies.

Selection process

All studies identified as suitable were exported to Endnote X7 citation management software (Clarivate Analytics) and duplicates were removed. A 2-stage screening process to select the studies to be fully reviewed was conducted. During the first stage, titles and abstracts were examined by 1 author (M.M.-P.), and irrelevant studies were excluded from further review. A random sample of 20% of the studies were simultaneously examined by 2 co-authors (E.L. and E.O.V.) for a quality check. At the second stage, a full-text screening was performed by 2 authors (M.M.-P., and E.L. or E.O.V.), and the articles were evaluated using the PICOS criteria for inclusion and exclusion.[13] Disagreements regarding eligibility were resolved by discussion. No quality or risk-of-bias assessment was undertaken.

Data collection process

Data extraction from the included studies was performed by 2 authors (M.M.-P., and E.L. or E.O.V.). A dedicated data extraction form (Excel spreadsheet) was developed, pre-tested, and used to collect the following information: (i) authors; (ii) year of publication; (iii) purpose of the study; (iv) location of the study (eg, country); (v) study design (eg, cross-sectional study); (vi) subjects and sample size; (vii) recall period (period of time for which food consumed away from home was reported, eg, previous day or previous week); (viii) definition of food consumed away from home; (ix) findings on food consumed away from home, and variation in these findings according to socio-economic and demographic characteristics; (x) findings on associations between food consumed away from home and diet quality, and variation in these findings according to socio-economic and demographic characteristics; (xi) findings on associations between food consumed away from home and nutritional status/health outcomes, and variation in these findings according to socio-economic and demographic characteristics. All disagreements regarding the data extracted were solved by discussion.

Synthesis of the results

Due to the wide heterogeneity in the methods of measuring food consumed away from home, measures of diet quality, nutritional status and health outcomes, study designs, and statistical models, a qualitative and descriptive approach to reviewing of the available evidence was used. For each paper reviewed, associations between food consumed away from home and any measure of diet quality, nutritional status, or health outcomes was categorized as "favorable" (eg, the more food consumed away from home, the higher the diet quality or the lower the risk for metabolic syndrome), "null" (no clear association), or "unfavorable" (eg, the more food consumed away from home, the lower the diet quality or the higher the risk for obesity) based on the findings reported in the paper.

As previously highlighted in the literature,[6] the definition of food consumed away from home can be based on the place of consumption and/or on the place of preparation of the food. Accordingly, the included studies were classified into 3 groups: studies with a definition based on the place of preparation (the place of preparation was clearly identified but not the place of consumption), studies with a definitioin based on the place of consumption (the place of consumption was clearly identified but not the place of preparation), and studies based on the place of preparation and the place of consumption (both were clearly identified).

RESULTS

Description of the studies

Figure 1 displays the systematic literature flowchart for selection of the articles to be reviewed.

The selection process resulted in the inclusion of 40 studies using data from 12 countries (Table 2).[14–53] The geographical distribution of the articles was unbalanced, with an over-representation of 3 countries (Brazil, n = 12[15,19–24,26,29,32,33,44]; China, n = 10[28,37,41,47–53]; and Malaysia, n = 6[14,17,30,38,42,46]) compared with other countries (Botswana, n = 1[39]; Ethiopia, n = 2[16,27]; India, n = 2[31,40]; Lebanon, n = 1[25]; Malawi, n = 1[43]; Mexico,

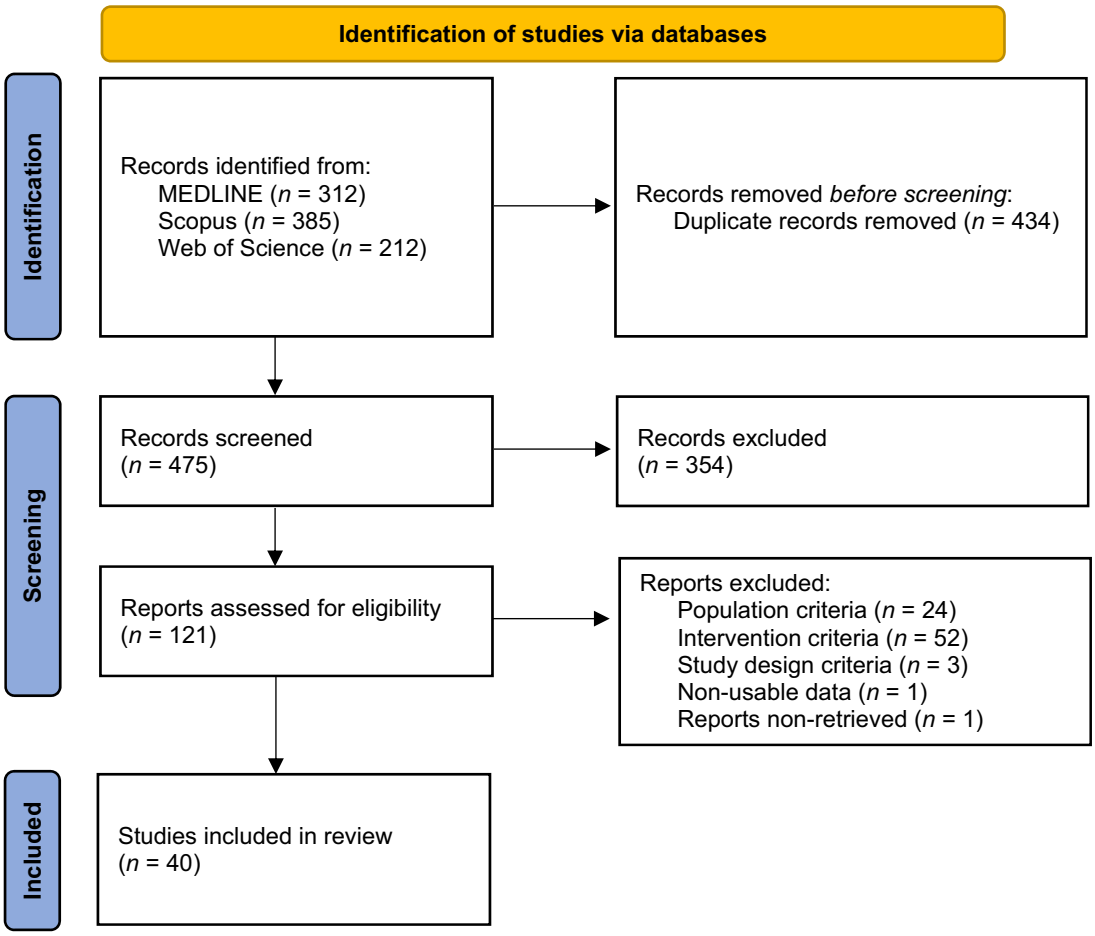

Figure 1 **Flow diagram of the literature search process.**

Table 2 **Characteristics of the studies included in the review (n = 40)**

References	Country	Year of data collection	Study design	Geographic area	Population	Sample size	Eating out definition category based on	Reference period
Maruapula et al, 2011[39]	Botswana	NR	Cross-sectional	National	Adolescents (14.9 ± 1.36 y)	704	Place of consumption	NR
Bezerra et al, 2013[22]	Brazil	2008–2009	Cross-sectional	National	Adolescents and adults (≥10 y)	34 003	Place of preparation and consumption	1 d
Bezerra et al, 2013[19]	Brazil	2008–2009	Cross-sectional	National	Adolescents and adults (≥10 y)	25 753	Place of preparation and consumption	1 d
Gorgulho et al, 2013[32]	Brazil	2009	Cross-sectional	Local: Sao Paulo	Adolescents and adults (≥12 y)	834	Place of consumption	1 d
Gorgulho et al, 2014[33]	Brazil	2008–2009	Cross-sectional	Local: Sao Paulo	Adolescents and adults (≥12 y)	834	Place of consumption	1 d
Bezerra et al, 2015[20]	Brazil	2008–2009	Cross-sectional	National	Adults (25 y–65 y)	13 736	Place of preparation and consumption	2 d
Cavalcante et al, 2017[24]	Brazil	2008–2009	Cross-sectional	Regional: northeast region	Adolescents and adults (≥10 y)	11 674	Place of preparation and consumption	2 d
Cunha et al, 2018[26]	Brazil	2008–2009	Cross-sectional	National	Adolescents (10 y–19 y)	5266	Place of preparation and consumption	2 d
Andrade et al, 2020[15]	Brazil	2008–2009	Cross-sectional	National	Adolescents and adults (≥10 y)	32 930	Place of consumption	2 d
Cattafesta et al, 2020[23]	Brazil	2016–2017	Cross-sectional	Local: Santa Maria de Jetibá	Adults (18 y–59 years old)	740	Place of consumption	NR
Fernandes Gomes et al, 2020[29]	Brazil	2006–2007	Cross-sectional	Local: Niterói	Adolescents (12 y–19 y)	232	Place of consumption	NR
Ruiz et al, 2020[44]	Brazil	2015	Cross-sectional	Local: Campinas	Adolescents and adults (≥10 y)	2574	Place of consumption	1 d
Bezerra et al, 2021[21]	Brazil	2013–2014	Cross-sectional	National	Adolescents (12 y–17 y)	71 740	Place of preparation and consumption	1 d
Wang et al, 2011[50]	China	2008	Cross-sectional	Local: Bao'an District, Shenzhen	Adolescents (11 y–18 y)	3368	Place of consumption	1 wk
Ouyang et al, 2015[41]	China	1997–2011	Longitudinal	National	Adults (18 y–45 y)	10 982	Place of consumption	3 d
Tian et al, 2016[47]	China	2004–2011	Repeated cross-sectional	National	Adults (18 y–65 y)	10 633	Place of consumption	3 d
Dong et al, 2017[28]	China	1991–2009	Longitudinal	National	Children and adolescents (7 y–17 y)	9454	Place of consumption	3 d
Zeng and Zeng, 2018[52]	China	2004–2011	Repeated cross-sectional	National	Adults (18 y–60 y)	26 244	Place of consumption	3 d
Liu et al, 2019[37]	China	2009	Cross-sectional	Regional: 9 provinces	Adults (≥18 y)	8322	Place of preparation	3 d
Wang et al, 2019[49]	China	2009	Cross-sectional	National	Adults (≥18 y)	4518	Place of consumption	3 d
Wang et al, 2020[51]	China	2016	Cross-sectional	National	Adolescents and adults (≥15 y)	18 136	Place of consumption	1 wk
Wang et al, 2020[48]	China	2015–2017	Cross-sectional	Regional: Henan province	Adults (18 y–79 y)	29 910	Place of preparation or consumption	1 wk
Zheng et al, 2021[53]	China	2015–2016–2017	Longitudinal	Local: 5 megacities	Children and adolescents (7 y–16 y)	3313	Place of consumption	3 months
Anteneh et al, 2015[16]	Ethiopia	2014	Cross-sectional	Local: Bahir Dar city	Adolescents and adults (10 y–24 y)	431	Place of consumption	1 wk

(continued)

Table 2 **Continued**

References	Country	Year of data collection	Study design	Geographic area	Population	Sample size	Eating out definition category based on	Reference period
Darebo et al, 2019[27]	Ethiopia	2015	Cross-sectional	Local: Hawassa city	Adults (≥18 y)	524	Place of consumption	1 wk
Ghosh et al, 2015[31]	India	2010–2011	Cross-sectional	Local: Katihar Municipal Area in Bihar	Adolescents (10 y–19 y)	400	Place of preparation	2 wk
Moitra et al, 2020[40]	India	2018–2019	Cross-sectional	Local: Mumbai	Adolescents (10 y–17 y)	527	Place of consumption	3 wk
Chacar et al, 2011[25]	Lebanon	2007	Cross-sectional	National	Adolescents (11 y–18 y)	2547	Place of consumption	1 wk
Prynn et al, 2018[43]	Malawi	2013–2015	Cross-sectional	Local: Karonga district and Lilongwe	Adults (≥18 y)	29 074	Place of preparation	NR
Abdullah et al, 2016[14]	Malaysia	NR	Cross-sectional	Regional: Kelatan	Adolescents (12 y–19 y)	454	Place of consumption	1 wk
Fournier et al, 2016[30]	Malaysia	2013	Cross-sectional	National	Adolescents and adults (≥15 y)	2000	Place of consumption	1 d
Pell et al, 2016[42]	Malaysia	2013	Cross-sectional	Local: Segamat District	Adolescents and adults (16 y–35 y)	5319	Place of consumption	1 wk
Tajik et al, 2016[46]	Malaysia	2013	Cross-sectional	Local: Pasir Gudang	Adolescents (13 y–14 y)	1565	Place of consumption	1 month
Balasubramanian et al, 2020[17]	Malaysia	2012–2013	Cross-sectional	Local: Kuala Lumpur and Petaling Jaya	Adults (38.1 ± 11.4 years)	562	Place of consumption	1 wk
Man et al, 2020[38]	Malaysia	2017	Cross-sectional	National	Adolescents (10 y–17 y)	2013	Place of consumption	1 wk
Batis et al, 2016[18]	Mexico	2011–2012	Cross-sectional	National	General population (≥1 y)	10 087	Place of consumption	1 d
Taillie et al, 2017[45]	Mexico	2011–2012	Cross-sectional	National	Children and adolescents (2 y–13 y)	4773	Place of consumption	1 d
Landais et al, 2014[36]	Morocco	2009–2010	Cross-sectional	Regional: area of Rabat-Salé	Adults (20 y–49 y)	894	Place of consumption	1 wk
Kolanowski et al, 2021[34]	Turkey	2018	Cross-sectional	Local: Aydin	Adults (18 y–30 y)	200	Place of consumption	1 wk
Lachat et al, 2011[35]	Vietnam	2006–2007	Cross-sectional	Local: Hanam and Hanoi	Adolescents (16.4 ± .4 years)	502	Place of preparation	1 wk

Abbreviation: NR, not reported.

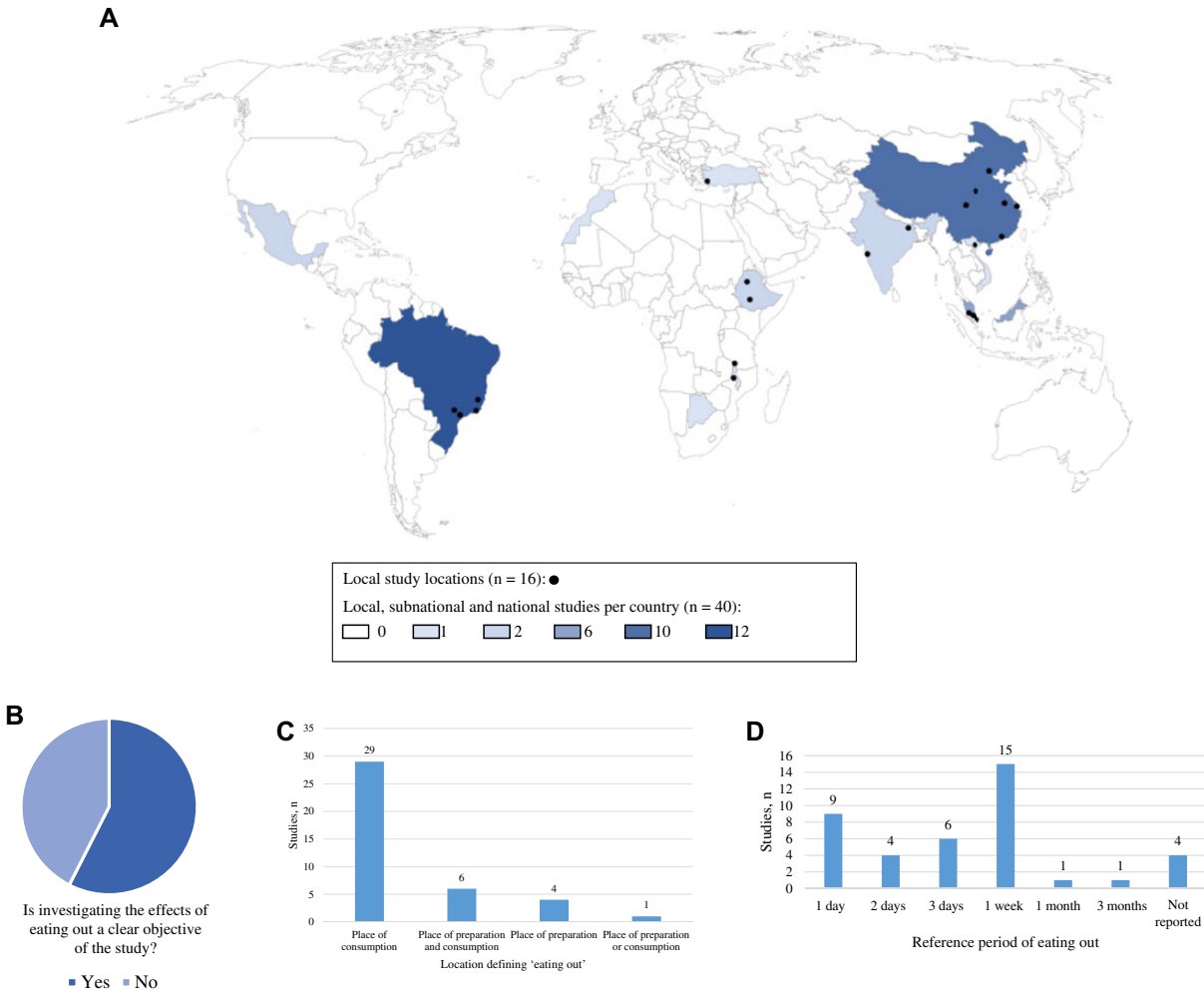

Figure 2 **Characteristics of the 40 articles included in the review.** (A) Map of study locations. Black circles represent the locations of local studies (n = 16). (B) Portion of studies in which learning about associations between eating out and health impacts are clearly an objective of the study. (C) Number of studies per type of definition of eating out (eg, for 1 study, the definition was according to place of preparation or place of consumption). (D) Number of studies per reference period of eating out.

n = 2[18,45]; Morocco, n = 1[36]; Turkey, n = 1[34]; and Vietnam, n = 1[35]; Figure 2A). In addition, in 5 of the 12 countries, the studies were conducted at the local level, ie, at the city level (Ethiopia,[16,27] India,[31,40] Malawi,[43] Turkey,[34] and Vietnam[35]).

Concerning the methods used to measure food consumed away from home, there was great heterogeneity among the studies. First, 23 of the 40 studies clearly mentioned food consumed away from home in the studies' objectives (Figure 2B).[15,18–22,24,26,28,32–35,37,42,44–49,52,53] In total, the definition for food consumed away from home referred to the place of consumption in 29 studies,[14–18,23,25,27–30,32–34,36,38–42,44–47,49–52] to both the place of preparation and consumption in 6 studies,[19–22,24,26] to the place of preparation in 4 studies,[31,35,37,43] and to the place of preparation or consumption in 1 study (Figure 2C).[48] Twelve studies did not clearly provide any definition for food consumed away from home.[14–18,23,25,27,39,41,46,53] If not stated, food consumed away from home was based on the place of consumption.

The reference period (ie, the period of time for which food consumed away from home was reported) varied from 1 day to 3 months, with 1 week and 1 day being the most reported reference periods (n = 15[14,16,17,25,27,31,34–36,38,40,42,48,50,51] and n = 9,[18,19,21,22,30,32,33,44,45] respectively) (Figure 2D).

The method used for measuring food consumed away from home was directly linked to the reference period: detailed assessment of food and drinks

consumed away from home based on 24-hour dietary recall(s) or food record(s), with the reference period ranging from 1 to 3 days, versus a single question to assess the frequency of food consumed away from home over a reference period equal or greater than 1 week.

The majority of the studies focused on adults (n = 13),[17,20,23,27,34,36,37,41,43,47–49,52] adolescents (n = 12),[14,21,25,26,29,31,35,38–40,46,50] or both (n = 11),[15,16,19,22,24,30,32,33,42,44,51] while 3 studies focused on children and adolescents (from 2 years to 17 years of age)[28,45,53] and 1 focused on the general population.[18] Although all studies were published between 2011 and 2021, 20 studies reported data that were collected between 1991 and 2011.[15,17,19,20,22,24,25,28,29,31–33,35–37,41,47,49,50,52] Most studies were cross-sectional (n = 35),[14–27,29–40,42–46,48–51] 2 studies were repeated cross-sectional,[47,52] and 3 were longitudinal.[28,41,53] Sample sizes varied greatly, from 200[34] to 71 740[21] participants.

Food consumed away from home

Thirty-six studies reported descriptive values of the food consumed away from home while 4 did not.[17,39,48,51] The prevalence of food consumed away from home greatly varied according to the reference period, the population under investigation, and the location in which the studies were conducted (Table 3).[14–16,18–53] In particular, for studies recording the food consumption over 1 day, the prevalence ranged from 8.4% among Brazilian seniors from Campinas[44] to 52.1% among Brazilian adolescents (12 y–17 y).[21] For studies recording food consumption over 2 days or 3 days, the prevalence ranged from 13.9% among Chinese adults (18 y–60 y)[52] to 66.8%, also among Chinese adults (18 y–45 y).[41] For studies investigating the consumption over 1 week, the prevalence of food consumed away from home ranged from 6.9% in Chinese adolescents (11 y–18 y) from Bao'an District, Shenzhen,[50] to 97.2% in Indian adolescents (10 y–19 y) from Katihar Municipal Area in Bihar.[31] For studies recording consumption over a longer period of time (1 month to 3 months), the prevalence varied from 80.1% in Chinese children and adolescents (7 y–16 y) from 5 megacities[53] to 88.2% in Malaysian adolescents (13 y–14 y) living in Pasir Gudang.[46] In addition, 5 studies reported the frequency of food consumption away from home instead of the prevalence. Similarly to prevalence, frequency varied considerably according to the reference period[14,25,35,42,47] (Table 3).

Of the 40 studies, 22 investigated potential determinants of food consumed away from home[14,15,19–21,23,24,28,33,35,39,42,43,45–53] (Table 2). The most commonly reported factors correlated with food consumed away from home were gender, age, marital status, socio-economic status, education, and living place.

Overall, for studies investigating gender as a potential driver of food being consumed away from home, the large majority (n = 12) reported that, compared with females, males consumed foods away from home more frequently.[15,20,22–24,28,43,46–48,51,53] Two studies showed no association between gender and food consumed away from home,[21,33] and 1 study reported a higher median away-from-home food consumption frequency among females.[35]

Most of the studies investigating age as a potential driver reported that, among adults, younger individuals were more likely to eat away from home more frequently.[15,20,22,24,28,47,49,51] In contrast, among children, younger children were more likely to eat away from home less frequently,[28,45] although 1 study found that junior high school students were less likely to eat away from home than primary school students.[53] One study showed no association between age and food consumed away from home.[33]

Only 1 of the 22 studies investigated the associations between marital status and eating away from home and showed that individuals who were married were less likely to eat away from home.[51]

Among the 11 studies that investigated the association between socio-economic status and food consumed away from home, 10 studies found that individuals from a higher socio-economic group were more likely to eat away from home.[15,20,22,24,28,39,45,47,49,51] One study reported no association.[33]

Additionally, all 6 studies that assessed the relationship between educational and food consumed away from home, reported a positive association, ie, individuals with higher education were more likely to eat away from home.[15,20,24,47,49,51]

Finally, all of the studies looking at living place reported that individuals living in urban areas were more likely to eat away from home compared with individuals living in rural areas.[15,19,24,28,35,39,43,47,49,51,52]

Food consumed away from home and diet quality

Twenty-two studies assessed the daily energy contribution of food consumed away from home and/or the association between consumption of food away from home and a measure of diet quality, using data from 5 countries (Table 4).[14,15,17–24,26,28,32,33,35–38,44,45,49,52] Half of these studies were conducted in Brazil,[15,19–24,26,32,33,44] and the majority used 24-hour dietary recall(s) or food record(s) to provide measures of diet quality. Among these studies, 16 used also 24-hour recall(s) or food record(s) to assess in detail the food

Table 3 **Description of consumption of food away from home behavior and its determinants in low- and-middle-income countries**

Reference	Country	Reference period	Main outcome	Determinants
Bezerra et al, 2013[22]	Brazil	1 d	Prevalence of eating out: 40.0%	Gender: men 44.5% vs women 36.3% ($P < .0001$) Age: 10 y–19 y: 48.1%; 20 y–59 y: 42.6% ($P < .0001$); ≥60 y: 16.1% SES: 1st quartile: 32.1% vs 4th quartile: 51.9% ($P < .0001$) Living place: urban: 42.8% vs rural: 27.4% ($P < .0001$)
Bezerra et al, 2013[19]	Brazil	1 d	Prevalence of eating out: 43.0% consumed at least 1 food item/d away from home	NR
Gorgulho et al, 2013[32]	Brazil	1 d	Prevalence of eating out: 32.0% ate out for at least 1 of the 3 main meals	NR
Gorgulho et al, 2014[33]	Brazil	1 d	Prevalence of eating out: 24.0% ate out at for least 1 meal	Gender: no association Age: no association SES status: no association
Bezerra et al, 2015[20]	Brazil	2 d	Prevalence of eating out: 42.70%	Gender: men 48.8% vs women 37.1% Age: *men*: mean age of consumers = 38.7 vs 43.1 for nonconsumers; *women*: mean age of consumers = 39.5 vs 44.0 for nonconsumers SES: m*en*: 1411.4 (R$) for consumers vs 846.9 (R$) for nonconsumers; *women*: 1223.2 (R$) for consumers vs 872.1 (R$) for nonconsumers Education: *men ≥13 y*: 18.3% of consumers vs 9.3% of nonconsumers; *women ≥13 y*: 23.2% of consumers vs 8.2% of nonconsumers
Cavalcante et al, 2017[24]	Brazil	2 d	Prevalence of eating out: 42.00%	Gender: men 45.7% vs women 38.5% ($P < .0001$) Age: mean age for nonconsumers = 39.9 y vs 30.4 y for consumers ($P < .0001$) SES: mean household income = 459.3 R$ for nonconsumers vs 686.4 R$ for consumers ($P < .0001$) Education: mean schooling years for nonconsumers = 5.9 y vs 7.6 y for consumers ($P = .0003$) Living place: urban area 45.3% (43.1–47.5) vs rural area 33.7% (30.1–37.3)
Cunha et al, 2018[26]	Brazil	2 d	Prevalence of eating out: 47.9%	NR
Andrade et al, 2020[15]	Brazil	2 d	Prevalence of eating out: 51.3% did not eat out 20.6% ate out 1 of the 2 record days 28.2% ate at least 1 food item away from home on both data collection days	Gender: The percentage of individuals who ate away from home on both days was higher among men. Age: The percentage of individuals who ate away from home on both days was higher in the age group of 20 y–39 y. Education: The percentage of individuals who ate away from home on both days was higher among more highly educated people. SES: The percentage of individuals who ate away from home on both days was higher among people with higher SES. Living place: The percentage of individuals who ate away from home on both days was higher in people living in the urban area.
Cattafesta et al, 2020[23]	Brazil	NR	Prevalence of eating out: 33.20%	Gender: eating out often: men 44.4% vs women 21.4% ($P < .001$)
Fernandes Gomes et al, 2020[29]	Brazil	NR	Frequency of meals eaten out: Breakfast: 6.5% Lunch: 8.9% Dinner: 2.2%	NR

(continued)

Table 3 **Continued**

Reference	Country	Reference period	Main outcome	Determinants
Ruiz et al, 2020[44]	Brazil	1 d	Prevalence of eating out: 24.34% of adolescents ate out once/d 23.12% of adults ate out once/d 8.45% of seniors ate out once/d 11.58% of adolescents ate out ≥2 times/d 20.19% of adults ate out ≥2 times/d 3.79% of seniors ate out ≥2 times/d	NR
Bezerra et al, 2021[21]	Brazil	1 d	Prevalence of eating out: 52.1% ate out at least one item/d (22.5% when foods consumed at school were excluded)	Gender: There were no differences between the genders when comparing at-school consumption with that in other places.
Wang et al, 2011[50]	China	1 wk	Prevalence of eating out: From 6.9% to 41.0% according to the type of meal and depending on whether local or migrant	Migration status: Compared with local adolescents, migrant adolescents showed a significantly higher percentage of having 3 meals away from home. *Breakfast:* 41.0% vs 30.3; AOR = 1.60 (1.36–1.89] *Lunch*: 34.7% vs 13.7%; AOR = 3.64 (2.98–4.46) *Dinner*: 13.2% vs 6.9%; AOR = 2.14 (1.62–2.83)
Ouyang et al, 2015[41]	China	3 d	Prevalence of eating out: 1997: 41.4% of men; 35.8% of women 2000: 50.9% of men; 45.6% of women 2004: 53.2% of men; 49.1% of women 2006: 55.5% of men; 54.9% of women 2009: 64.1% of men; 60.4% of women 2011: 66.8% of men; 62.2% of women	NR
Tian et al, 2016[47]	China	3 d	Frequency of eating out: Mean frequency over 3 d: 1.14 ± 1.98 Prevalence of eating out: 2004 vs 2011 Never ate out: 72.8% vs 57.00% Ate breakfast out: 13.65% vs 25.46% Ate lunch out: 17.72% vs 28.87% Ate dinner out: 10.01% vs 13.21%	Gender: Males were more likely to eat away from home more frequently. Age: Younger individuals (≤45 y) were more likely to eat away from home more frequently. Education: Individuals with tertiary education were more likely to eat away from home more frequently. SES: Employed individuals were more likely to eat away from home more frequently. Living place: Individuals living in urban area were more likely to eat away from home more frequently.
Dong et al, 2017[28]	China	3 d	Prevalence of eating out: 57.3% of the parents did not eat out 20.1% of the parents ate out once or twice 22.6% ate out every day 59.6% of the children did not eat out	Gender: Compared with women, males consumed foods away from home more frequently ($P < .001$). Age: *Parents*: Compared with nonconsumers, parents who consumed away-from-home foods were younger ($P < .001$); *Children*: Compared with nonconsumers, children who consumed away-from-home foods were slightly older ($P < .001$). SES: Compared with nonconsumers, parents who consumed away-from-home foods had higher household SES status ($P < .001$). Living place: Compared with nonconsumers, parents who consumed away-from-home foods lived in more urban areas ($P < .001$).

(continued)

Table 3 **Continued**

Reference	Country	Reference period	Main outcome	Determinants
			16.6% of the children ate out once or twice 23.8% ate out every day	
Zeng and Zeng, 2018[52]	China	3 d	Prevalence of eating out: 2004: 9.40% 2011: 13.95%	Living place: *2004*: 16.03% of urban people vs 6.05% of rural people ($P < .01$); *2011*: 18.30% of urban people vs 11.09% of rural people ($P < .01$)
Liu et al, 2019[37]	China	3 d	Prevalence of eating out: 62.6% never 19.5% ate >0 and < 1 meal/d 17.9% ate ≥1 meal/d	NR
Wang et al, 2019[49]	China	3 d	Prevalence of eating out: 71.9% never ate out meals/3 d 20.1% ate out up to 3 meals/3 d 8.0% ate out >3 meals/3 d	Age: *women*: mean age of frequent consumers 40.4 y vs 50.2 y for nonconsumers ($P < .001$); *men*: mean age of frequent consumers 42.9 y vs 50.9 y for nonconsumers ($P < .001$) SES: (expressed in logarithm): *women*: 10.3 for frequent consumers vs 10.0 for nonconsumers ($P < .001$); *men*: 10.3 for frequent consumers vs 10.0 for nonconsumers ($P < .001$) Education: *women*: 52.1% with primary school education never ate out vs 3.3% with higher education ($P < .001$); *men*: 24.6% with primary education never ate out vs 5.2% with high school education ($P < .001$) Living place: *women's rurality*: 47.9% for frequent consumers vs 75.3% for nonconsumers ($P < .001$); *men's rurality*: 50.8% for frequent consumers vs 76.9% for nonconsumers ($P < .001$)
Wang et al, 2020[51]	China	1 wk	NR	Gender: Frequency of respondents eating out increased with being a male (coeff = .292 [.035]) Age: Frequency of respondents eating out decreased with age (coeff=-.027 [.001]) Marital status: Frequency of respondents eating out decreased with being married (coeff = –.117 [.042]) SES status: Frequency of respondents eating out increased with being employed (coeff = .091 [.038]) Education: Frequency of respondents eating out increased with higher education (coeff = .918 [.059]) Living place: Frequency of respondents eating out increased with urbanization rates (coeff= .909 [.205]) and living in an urban area (coeff = .437 [.076])
Wang et al, 2020[48]	China	1 wk	NR	Gender: Males tended to eat out more frequently ($P < .001$)
Zheng et al, 2021[53]	China	3 months	Prevalence of eating out: 19.9% never ate out 37.8% ate out 1–2 times/wk 42.3% ate out ≥ 3 times/wk	Gender: Boys were more likely to eat out than girls, OR = 1.25 (1.04–1.51) Age: Middle schoolers were less likely to eat out than primary schoolers, OR = .58 (.40–.83) Living place: Children in Shanghai, Nanjing, and Chengdu were more likely to eat out than those in Beijing, OR = 1.67 (1.23–2.29); OR = 1.51 (1.12–2.04); OR = 1.50 (1.10–2.03), respectively Parental characteristics: children whose parents ate out were more likely to eat out than those whose parents never ate in a restaurant,

(continued)

Table 3 **Continued**

Reference	Country	Reference period	Main outcome	Determinants
				OR = 1.62 (1.19–2.21) for eating out 1–2/wk; OR = 1.60 (1.13–2.29) for eating out ≥3 times/wk; children whose parents ate out with their families at least once/wk were more likely to eat out compared with those whose parents never ate in a restaurant, OR = 1.56 (1.16–2.10) for eating out 1–2 times/week; OR = 2.27 (1.40–3.66) for eating out ≥3 times/wk
Abdullah et al, 2016[14]	Malaysia	1 wk	Frequency of eating out: Mean frequency from 2.8 to 3.2 times/wk	Ethnicity: 2.8 ± 1.8 times/wk for Malay vs 3.2 ± 2.2 times/wk for Chinese ($P = .03$)
Fournier et al, 2016[30]	Malaysia	1 d	Prevalence of eating out: 28.7% ate out 1 meal/d 28.1% ate out 2 meals/d 7.2% ate out 3 meals/d	NR
Man et al, 2020[38]	Malaysia	1 wk	Prevalence of eating out: 11.9% never ate out 72.3% ate out 1–3 times/wk 15.9% ate out ≥4 times/wk	NR
Pell et al, 2016[42]	Malaysia	1 wk	Mean frequency of eating out meals: From .8 to 9.0/wk	Ethnicity: The Orang Asli population ate out around once/week; the Indian population ate out 6–9 times/week
Tajik et al, 2016[46]	Malaysia	1 month	Prevalence of eating out: 11.8% ate out never/less than once/month 30.0% ate out 1–3 times/month 32.2% ate out 1–3 d/wk 13.1% ate out 4–6 d/wk 12.9% ate out every day	Gender: Girls were more likely to have a lower prevalence of eating out than boys
Maruapula et al, 2011[39]	Other	NR	NR	SES: The proportion of students who ate out of home was significantly greater in the higher socio-economic group compared with the lower socio-economic groups ($P < .01$). Living place: The proportion of students who ate out of home was significantly greater in cities compared with those living in rural villages ($P < .05$).
Anteneh et al, 2015[16]	Other	1 wk	Prevalence of eating out: 45.0% ate out 1–2 times/wk 12.5% ate out 3–5 times/wk 9.7% ate out >5 times/wk	NR
Darebo et al, 2019[27]	Other	1 wk	Prevalence of eating out: 40.4% never ate out 24.9% ate out once a wk 34.7% ate out 2–6 times per wk	NR
Ghosh et al, 2015[31]	Other	1 wk	Prevalence of eating out: 2.75% did not eat out For 69.75% of the sample, <25% of weekly meals consisted of food cooked outside the home For 27.5% of the sample, >25% of weekly meals consisted of food cooked outside the home	NR

(continued)

Table 3 **Continued**

Reference	Country	Reference period	Main outcome	Determinants
Moitra et al, 2020[40]	Other	1 wk	Prevalence of eating out: 70.2% ate out <3 times/wk 29.8% ate out ≥3 times/wk	NR
Chacar et al, 2011[25]	Other	1 wk	Frequency of eating out: Mean frequency 2.96 (3.50) per wk	NR
Prynn et al, 2018[43]	Other	NR	Prevalence of eating out: From 5.7% to 19.3% depending on age, gender, and area of living	Gender: 19.3% (18.3–20.3) of urban men vs 11.0% (10.5–11.7) of urban women; 6.7% (6.1–7.5) of rural men vs 5.7% (5.2–6.3) of rural women Living place: 19.3% (18.3–20.3) of urban men vs 6.7% (6.1–7.5) of rural men; 11.0% (10.5–11.7) of urban women vs 5.7% (5.2–6.3) of rural women
Batis et al, 2016[18]	Other	1 d	Prevalence of eating out: 31.8% had at least 1 meal or snack outside home 22.8% had at least 1 meal at work or school	NR
Taillie et al, 2017[45]	Other	1 d	Prevalence of eating out: *at school* 22% of 2–5-year-olds 43% of 6–13-year-olds *at street vendors* 14% of 2–5-year-olds 13% of 6–13-year-olds	Age: The proportion of away-from-home eaters was greater among the older children (37% for 2 y–5 y vs 56% for 6 y–13 y, $P < .05$) SES: The proportion of away-from-home eaters was greater among the wealthier people (37% for low SES vs 60% for high SES, $P < .05$)
Landais et al, 2014[36]	Other	1 wk	Prevalence of eating out: 66.3% did not eat out 16.6% ate out once/wk 17.1% ate out ≥ 2 times/wk	NR
Kolanowski et al, 2021[34]	Other	1 wk	Prevalence of eating out on weekdays: 22.0% hardly ever 24.0% once 26.0% twice 19.0% more than 3 times 9.5% every day Prevalence of eating out on weekend days: 14.0% hardly ever 40.0% sometimes 19.0% once 18.0% twice 8.0% more than 3 times	NR
Lachat et al, 2011[35]	Other	1 wk	Prevalence of eating out: 27.3% did not eat out Frequency of eating out: Median frequency 3 times/wk (IQR = 0–7)	Gender: Females: median = 3/week, IQR = 1–8 vs median = 2/wk, IQR = 0–7 for males ($P = .07$) Living place: Urban children: median = 5 times/wk, IQR = 1–9 vs median = 1/wk, IQR = 0–3 for rural children

Abbreviations: IQR, interquartile range; NR, not reported; SES, socio-economic status.

Table 4 **Association between food consumed away from home and nutrition outcomes and determinants (n = 22) in low- and-middle-income countries**

Reference	Country	Dietary assessment	Dietary outcome	Nutrition outcome	Determinants
Bezerra et al, 2013[19]	Brazil	1-d food records	Food intakes	**Unfavorable association**: The food groups most frequently consumed outside of the home were alcoholic drinks, fried and roast snacks, pizza, soft drinks, and sandwiches.	Gender: The contribution of eating out to the consumption of all food groups was greater among men than women for all of the groups except sugar and sweets. Age: The contribution of eating out to consumption was more frequent among adults than in the other age groups for most of the food groups. Living place: The contribution of eating out according to percentage of food consumed away from home in the urban area was greater than that in the rural area for the majority of groups.
Bezerra et al, 2013[22]	Brazil	1-d food records	Food and energy intakes	Energy in cals or in % of total daily energy from eating out: mean energy intake = 337 kcal 18% of total energy intake **Unfavorable association**: Alcoholic beverages and baked and deep-fried snacks were more often consumed away from home than at home (>50% of the energy consumed from these groups came from away-from-home sources). Away-from-home energy sources were also high for pizza, soft drinks, sandwiches, and sweets and desserts. Of the energy consumed away from home, 50% came from rice/rice dishes, meat/meat dishes, beans/legumes, sweets and desserts, fruit juices, and baked and deep-fried snacks. **Unfavorable association**: Individuals who reported consuming foods away from home presented higher energy intake than individuals who did not eat away from home (2072 vs 1802 kcal; $P < .0001$)	NR
Gorgulho et al, 2013[32]	Brazil	One 24-h recall	Diet quality indices	**Unfavorable association**: Lunch consumed away from home has led to an average reduction of 6 points in the B-HEIR, independent of gender, income per capita, nutritional status, and age. Variability of the menu for breakfast increased when breakfast was consumed out of home ($P < .001$). Consumption of total fat and saturated fat for lunch increased when lunch was consumed out of home ($P = .009$ and $P < .001$, respectively). Mean DQI for lunch eaten outside the home was lower (48.96 [1.15] vs 42.54 [2.42], $P = .008$)	NR

(continued)

Table 4 **Continued**

Reference	Country	Dietary assessment	Dietary outcome	Nutrition outcome	Determinants
Gorgulho et al, 2014[33]	Brazil	One 24-h recall	Food and nutrient intakes	Energy in cals or in % of total daily energy from eating out: 628 kcal (±101 kcal) 35% of the average daily intake **Null association**: Meals contained both healthy foods (such as rice, beans, and fish) and unhealthy foods (such as soft drinks, snacks, sandwiches, and pizza).	NR
Bezerra et al, 2015[20]	Brazil	2 nonconsecutive days' food records	Food and nutrient intakes	**Unfavorable association**: Individuals who consumed food away from home had lower intakes of protein and higher intakes of total fat, saturated fat, and free sugars than nonconsumers. Considering only individuals who consumed foods away from home, the percentage of energy from protein, as well as from fat and saturated fat, was lower away from home than at home, but the contribution of free sugars to energy intake was higher in food consumed away from home. Individuals who consumed food away from home had lower total intakes of rice, beans, and milk, and higher total intakes of energy-dense foods such as deep-fried and baked snacks, sweets and sugar, and soft drinks than nonconsumers. The total consumption of alcoholic beverages was also higher among consumers of food away from home than among nonconsumers.	NR
Cavalcante et al, 2017[24]	Brazil	2 nonconsecutive days' food records	Nutrient intakes	**Unfavorable association**: Away-from-home food consumers had a total calorie intake significantly higher than at-home consumers (2137 kcal vs 1730 kcal, $P < .0001$). With respect to macronutrients, away-from-home food consumers presented a higher intake of total, saturated and trans-fats and free sugars than at-home consumers ($P < .05$). On the other hand, the intake of protein, fiber, and iron was significantly lower among away-from-home consumers, when compared with at-home consumers ($P < .05$)	NR
Cunha et al, 2018[26]	Brazil	2 nonconsecutive days' food records	Food intakes	**Unfavorable association:** Mean at-home food intake was greater than away-from-home food intake, but the ratio of away-from-home/at-home was greater than 30% for baked and deep-fried snacks, soft drinks, sandwiches, pizza, and desserts. (Although there were not large differences between food items found in at-home and away-	NR

(continued)

Table 4 **Continued**

Reference	Country	Dietary assessment	Dietary outcome	Nutrition outcome	Determinants
				from-home dietary patterns, it was evident that fresh and minimally processed foods such as rice, beans, vegetables, and fruits were more frequently consumed at home, whereas deep-fried snacks and beer were more frequently consumed away from home.)	
Andrade et al, 2020[15]	Brazil	2 nonconsecutive days' food records	Food and energy intakes	Energy in % of total daily energy from eating out: 15.1% **Unfavorable association**: As the frequency of out-of-home consumption increased, a decrease in the percentage of culinary preparations (from 73.3% to 63.4%) was observed, but an increase in the percentage of ultraprocessed foods (from 16.0% to 26.2%). Regarding the subgroups of culinary preparations, only the consumption of natural juices increased as out-of-home food consumption frequency increased, while the opposite was observed for rice, beans and other legumes, roots and tubers, corn and other cereal-based dishes, fish and seafood, eggs, milk and natural yoghurt, coffee, and tea. Among the subgroups of processed and ultraprocessed foods, an increase in energy intake from fermented alcoholic beverages, biscuits and savory snacks, sweets, bakery products, ultraprocessed breads, ultraprocessed meats, ready meals, sugar-sweetened drinks, artificial juices and other sweetened beverages, and dairy drinks was found as the frequency of out-of-home consumption increased. A multilevel model showed that eating out was positively and significantly associated with energy from ultraprocessed foods in the diet at both the within- and between-individual levels. The estimated gross effect of out-of-home consumption corresponded to an increase of .41 95% CI (.39–.43) percentage points in the contribution of ultraprocessed foods in the diet	NR
Cattafesta et al, 2020[23]	Brazil	3 nonconsecutive 24-h recalls	Dietary patterns	**Unfavorable association**: Those who had the habit of frequently eating out were more likely to adhere to an "industrialized" pattern (OR 1.62, 95% CI [1.11–2.36])	NR

(continued)

Table 4 **Continued**

Reference	Country	Dietary assessment	Dietary outcome	Nutrition outcome	Determinants
Ruiz et al, 2020[44]	Brazil	One 24-h recall	Sodium intake	**Unfavorable association**: Adolescents who consumed ≥1 meal outside the home had had higher sodium intake (*R*: .19; $P = .012$), even after the adjustment for sex **Unfavorable association**: Adults who consumed ≥1 meal outside the home had higher sodium intake (*R*: .22; $P = .005$), even after the adjustment for sex **Null association**: Seniors who consumed ≥1 meal outside the home did not have higher sodium intake (R: .19; $P = .012$), even after the adjustment for sex	NR
Bezerra et al, 2021[21]	Brazil	One 24-h recall	Food and nutrient intakes	Energy in % of total daily energy from eating out: 15.4% of total energy intake 7.5% of total energy intake when foods consumed at school were excluded **Unfavorable association**: Away-from-home energy sources showed a high intake of savory snacks (43.9%), crackers (37.4%), nuts (36.0%), desserts (35.8%), sandwiches (29.3%), pizza (27.2%), soft drinks (23.3%), and chocolate (20.0%). Food consumption at other places than home and school was associated with lower intakes of protein, fiber, and iron, and higher intakes of sodium, carbohydrates, added sugar, and fats. After taking into account consumption in both restaurants and at school, the associations remained, except for those for saturated and monounsaturated fats, carbohydrates, and iron.	Age: Adolescents aged 15 y–17 y showed higher mean energy intake from food consumed away from home and shool when compared with the younger ones.
Dong et al, 2017[28]	China	3 consecutive 24-h recalls	Food, nutrient and energy intakes	For parents **Both favorable and unfavorable associations**: The percentage of energy from fat and the percentage of energy from fruit and vegetables were higher among those who ate more frequently outside home (30.2 ± 10.9 vs 20.1 ± 10.5 and 3.0 ± 2.7 vs 2.8 ± 2.4, respectively; $P < .001$ for both associations), while mean daily energy intake was significantly lower among those who ate more frequently outside home (2362 ± 660 vs 2463 ± 689; $P < .001$)	NR

(continued)

Table 4 **Continued**

Reference	Country	Dietary assessment	Dietary outcome	Nutrition outcome	Determinants
				For children **Both favorable and unfavorable associations**: The percentage of energy from fat and the percentage of energy from fruit and vegetables were higher among those who ate more frequently outside home (30.0 ± 9.8 vs 21.7 ± 9.9 and 3.2 ± 3.1 vs 2.9 ± 2.6, respectively; $P < .001$ for both associations), and there was no association between daily energy intake and frequency of eating out ($P = .04$).	
Zeng and Zeng, 2018[52]	China	3 consecutive 24-h recalls	Food intakes	NR	Living place: Away-from-home consumption of grain was considerably higher in rural areas compared with urban areas ($P < .01$); away-from-home consumption of eggs and milk in rural areas accounted for about half of that in urban areas
Liu et al, 2019[37]	China	3 consecutive 24-h recalls	Food and nutrient intakes	**Unfavorable association**: Compared with nonconsumers, participants who consumed away-from-home food consumed more energy, fat, protein, and alcohol and less vegetables and tea	Gender: No difference Age: No difference
Wang et al, 2019[49]	China	3 consecutive 24-h recalls	Nutrient intakes	**Both favorable and unfavorable associations**: Females who ate away from home, frequently, had a significantly lower intake of total energy ($P = .008$), which could be attributed to lower intake of carbohydrates ($P < .001$); their protein intake was higher than those who never ate outside of home ($P = .024$) **Both favorable and unfavorable associations**: Males who ate frequently away from home also had a significantly lower intake of carbohydrates ($P < .001$), but a higher intake of fat and protein ($P = .020$ and $P < .001$, respectively)	NR
Abdullah et al, 2016[14]	Malaysia	124-items qualitative FFQ	Dietary patterns	**Unfavorable association**: Weekly consumption of away-from-home foods was significantly and negatively associated with a healthy-based food pattern, and significantly and positively associated with the Western-based food pattern, in both Malay and Chinese adolescents	NR
Balasubramanian et al, 2020[17]	Malaysia	3 nonconsecutive 24-h recalls	Dietary patterns	**Unfavorable association**: The frequency of eating out across tertiles comparisons indicated the highest weekly frequency was associated with the Chinese Traditional (11 ± 7 times/wk) and Sugar-sweetened Beverages (12 ± 8 times/wk) patterns, whereas the lowest frequency was associated with the Plant Foods pattern (9 ± 7 times/wk, *P* trend = .047). (Chinese Traditional and Sugar-sweetened Beverages patterns were chracterized by the auhors as less healthy than Plant Foods pattern.)	NR

(continued)

Table 4 **Continued**

Reference	Country	Dietary assessment	Dietary outcome	Nutrition outcome	Determinants
Man et al, 2020[38]	Malaysia	136-items qualitative FFQ	Dietary patterns	**Unfavorable association**: The general linear models show that an unhealthy dietary pattern was significantly associated with frequency of eating out	NR
Lachat et al, 2011[35]	Other	NR	NR	Energy in % of total daily energy from eating out: 24.6 ± 20.3% of the daily energy intake	Gender: Females' daily energy = 27.5% ± 21.5% vs 19.5% ± 16.8% for males ($P < .001$) Living place: Daily energy contribution in rural areas = 13.4 %± 15.3% vs 31.6% ± 20.0% in urban areas
Landais et al, 2014[36]	Other	One 24-h recall	Food intakes	**Null association**: No association between the frequency of eating out and fruit and vegetable intake or fruit intake **Unfavorable association**: Women who ate out of home more frequently ate significantly less vegetables (148 g/d vs 180 g/d, $P < .05$)	NR
Batis et al, 2016[18]	Other	One 24-h recall	Energy intake	Energy in % of total daily energy from eating out: 9% for children aged 1 y–5 y 18%–22% for all individuals aged ≥5 years 34% among 30-y-old to 50-y-old men living in Mexico City **Unfavorable association**: Compared with eating at home, energy intake was higher when eating at restaurants (children aged 5 y–11 y and adults during main meals; $P < .05$)	NR
Taillie et al, 2017[45]	Other	One 24-h recall	Food and energy intakes	**Both favorable and unfavorable associations**: With regard to energy contribution, wheat/rice mixed dishes, corn mixed dishes, sugar-sweetened beverages, and pastries/candy/desserts were the top contributors to away-from-home food intake for both age groups, while milk was a top 5 contributor for 2–5-y-olds, as were salty snacks for 6–13-y-olds. Away-from-home food intake was higher on weekdays (20% of daily energy) vs weekends (9% of daily energy, $P < 0{\cdot}05$)	Gender: No difference between energy coming from food consumed away from home and energy coming from food consumed at home Age: Significant difference between energy coming from food consumed away from home and energy coming from food consumed at home according to age (359 kcal for 6 y–13 y vs 161 kcal for 2 y–5 y, $P < .05$); positive association between % energy from foods consumed away from home and age (11% for 2 y–5 y vs 18% for 6 y–13 y, $P < .05$) SES status: significant difference between energy coming from food consumed away from home and energy coming from food consumed at home according to SES (212 kcal, 320 kcal, and 369 kcal for low, medium, and high SES, $P < .05$) Positive association between % energy from foods consumed away from home and SES (low SES 2 y–5 y = 8%, 6 y–13 y = 14%; high SES 2 y–5 y = 14%, 6 y–13 y = 21%; $P < .05$) Living place: No difference between energy coming from food consumed away from home and energy coming from food consumed at home

Abbreviations: DQI, diet quality index; FFQ, food frequency questionnaire; NR, not reported; SES, socio-economic status.

and drinks being consumed away from home,[15,18–20,22,24,26,28,32,33,37,44,45,49,52] whereas 2 used a single question to assess the frequency of food consumption away from home,[17,36] and 3 others did not report the method used.[23,35] Two studies used food frequency questionnaires to provide measures of diet quality, and they used a single question to assess the frequency of food consumption away from home.[14,38] The measures of diet quality were heterogeneous. Nine studies assessed diet quality using measures based on food, nutrient, and/or energy intakes: 4 studies used food and nutrient intakes[20,21,33,37]; 3 studies used food and energy intakes[15,19,45]; 1 study used food, nutrient, and energy intakes[28]; and 1 study used a diet quality index based on food and nutrient intakes.[32] Eight studies used food-based measures: 4 studies used food intakes,[22,26,36,52] and the other 4 used dietary patterns.[14,17,23,38] The last 5 studies used nutrient-based measures: 2 studies used nutrient intakes,[24,49] 2 other studies used energy intake,[18,35] and 1 used sodium intake.[44]

Six studies provided an estimation of the daily energy contribution from food consumed away from home.[15,18,19,21,33,35] In Brazil, 3 national-level studies found that between 15.1% and 18.0% of total energy intake of adults and adolescents came from food consumed away from home,[15,19,21] while a local-level study found a value of 35% for adults and adolescents.[33] In Mexico, a national study found values ranging from 9% for children aged 1 year–5 years to 34% for men aged 30 years–50 years.[18] In Vietnam, a local-level study found a daily energy contribution of 20.3% for adolescents.[35] Among these 6 studies, only 2 investigated potential differences according to socio-demographic characteristics. The first study reported a greater daily energy intake from food consumed away from home among Vietnamese adolescent girls compared with adolescent boys, and among Vietnamese urban adolescents compared with their rural counterparts.[35] The other 1 reported a positive association between the percentage of energy intake from foods consumed away from home and socio-economic status or age, but no association with gender or living place.[45]

Twenty one studies assessed the association between food consumed away from home and a measure of diet quality, and the majority found an unfavorable association (n = 15), while 4 studies found both favorable and unfavorable associations (ie, consumption of food away from home was characterized by both healthy and unhealthy foods),[28,33,45,49] and 2 studies found a null association.[36,44] Among these 21 studies, very few reported potential determinants. More specifically, among the 2 studies reporting unfavorable association, 1 found the association did not differ according to gender, or age.[37] The other 1 found the association differed according to gender (ie, when eating away from home, men consumed more unhealthy food groups compared with women), age (adults consumed more unhealthy food groups compared with other age groups), and living area (urban dwellers consumed more unhealthy food groups compared with rural ones).[19]

Food consumed away from home, nutritional status, and health outcomes

Twenty-four studies assessed the association between consumption of food away from home and a measure of nutritional status and health outcomes, using data from 9 countries (Table 5).[16,20,25–31,33,35,37,39–42,45–49,51–53] Slightly more than one third of these studies were conducted in China.[28,37,41,47–49,51–53] The majority of the studies focused on nutritional status (n = 19),[16,20,25–31,33,35,39,41,42,45,47,51–53] 3 studies reported on noncommunicable diseases and intermediate biomarkers of health,[28,48,49] 2 studies dealt with depression and stress,[40,46] and 1 study focused on hyperuricemia.[37] Most studies used a cross-sectional design (n = 19), 2 studies used a repeated cross-sectional design,[47,52] and 3 studies used a longitudinal design.[28,41,53]

Nineteen studies focused on nutritional status and among the 16 which reported analysis on the overall sample, 7 studies found unfavorable association (ie, worse nutritional status) (Table 5),[16,25,29,31,45,47,51] 7 found a null association[26,27,30,33,35,39,53] and 2 found both unfavorable association and null association.[28,42] Five studies analyzed how these associations varied according to individuals' socio-economic and demographic characteristics. Two studies found an unfavorable association (ie, worse nutritional status) in men and a null association in women,[41,47] while one found a favorable association in women and a null association in men.[20] One study found an unfavorable association in urban people and a null association in rural people,[52] and 1 study found a favorable association in younger parents compared with other parents.[28] The only 3 longitudinal studies, conducted in China, using large sample sizes and multi-adjusted regressions, reported mixed results, ie, null association,[41,53] unfavorable association,[28,41] and favorable association.[28]

Regarding the association between food consumed away from home and the other health outcomes, the results showed either a null association or an unfavorable association: 2 studies found an unfavorable association with metabolic syndrome[49] and type 2 diabetes mellitus[48] in men but not in women, and 1 found a null association with elevated blood pressure, elevated hemoglobin A1c, and high C-reactive protein[28]; 1 study

found a null association with depression,[40] while 1 found an unfavorable association with depression and stress[46]; 1 study found an unfavorable association with hyperuricemia in men but not in women, and in a middle-aged population but not among youth or an elderly population.[37]

DISCUSSION

This is the first systematic scoping review on food consumed away from home that has focused exclusively on apparently healthy populations in LMICs and summarized the evidence for associations between consumption of food away from home and diet quality, nutritional status, and health. There is little information on food consumed away from home in LMICs, with 12 countries being represented in this review. However, the phenomenon was quite common and driven by socioeconomic and demographic factors. Overall, food consumed away from home in LMICs had unfavorable consequences on people's diet quality, nutritional status, and health.

Importance of food consumption away from home

Food consumed away from home is an important phenomenon, with heterogeneity in studies in terms of the methods of measuring it, the countries investigated, and the characteristics of the populations. Only 2 studies included in the present review reported data over time, and the ones that did reported a population-level increase in food consumption away from home over time.[41,52] These trends are similar to what has been reported for HICs such as the US[2,54] or Australia.[55] Additionally, a recent study that investigated expenditure on food consumed away from home in several Latin American countries reported a large increase in food consumed away from home over the last 2 decades.[56]

Overall, food consumed away from home was found to be driven by gender (males tended to eat out more frequently compared with women), by age (younger people being more likely to eat out), by economic status (wealthier people being more likely to eat out), by education (the most educated tending to eat out more frequently), and by urbanity (urban dwellers being more likely to eat out than rural-dwelling individuals). These results are consistent with the findings of the 2 previous systematic reviews, which almost exclusively included studies from HICs.[6,7]

Consequences of food consumption away from home

Similar to the findings for HICs,[6,7,57–59] greater food consumption away from home was associated with higher energy intake and poorer diet quality. In the present review, the studies exploring association between food consumed away from home and nutritional status were mainly cross-sectional and found either an unfavorable association (ie, more consumption of food away from home being associated with poorer nutritional status) or a null association. The few studies using repeated cross-sectional or longitudinal designs conducted in China found similar results. These results suggest that there may be a long-term risk of increase in body weight in populations in LMICs associated with increased consumption of food away from home. This is consistent with a previous systematic review based on 15 prospective studies conducted in HICs, reporting that eating out-of-home frequently was positively associated with the risk of becoming overweight or obese.[8] More recently, a study conducted in the US reported that an increase in the frequency of food consumed away from home was associated with an increase in BMI.[60] Similar results have also been reported for a study conducted in the UK.[59]

When looking at the association between BMI and food consumption away from home, and the additional effect of gender, the 3 included studies investigating this reported no clear pattern.[20,41,47] However, in HICs such as the US and Korea, 2 recent cross-sectional national surveys reported that increased food consumption away from home was associated with higher odds of obesity among adult women but not among adult men.[61,62] Studies such as these and the present review (which found that increased food consumption away from home is almost always associated with poorer diet quality) indicate that there is a need for more research to better document and understand the phenomenon of food consumption away from home and its longitudinal effect on the nutritional status and noncommunicable diseases in LMICs.

Methodological challenges

As in previous systematic reviews,[6–8] a lack of homogeneity, and sometimes a lack of precision, in the way food consumed away from home was defined and measured was found. About one third of the included studies did not clearly report their definition for food consumed away from home.[14–18,23,25,27,39,41,46,53] Having a standardized definition for food consumed away from home, a cornerstone for methodological harmonization in the measurement of this consumption, would enhance the comparability of studies and the

Table 5 **Associations between food consumed away from home and health outcomes and determinants (n = 24) in low- and middle-income countries**

Reference	Country	Type of study	Health outcome	Association	Determinants
Gorgulho et al, 2014[33]	Brazil	Cross-sectional	Overweight	**Null association**: Away-from-home meals were not more prevalent in overweight participants than in non-overweight participants (OR = 1.26, 95% CI [.95–1.67])	NR
Bezerra et al, 2015[20]	Brazil	Cross-sectional	Overweight and obesity	NR	Gender: A higher percentage of energy from foods consumed away from home was associated with a lower risk of being overweight or obese among women (**favorable association**; OR = .995, 95% CI [.992–.999] for overweight; OR = .995, 95% CI [.991–.999] for obesity, in a multi-adjusted model), but not in men (**null association**; OR = 1.000, 95% CI [.997–1.003] for overweight; OR = .997, 95% CI [.992–1.002] for obesity)
Taillie et al, 2017[45]	Brazil	Cross-sectional	Overweight and obesity	**Unfavorable association**: Positive association between weight status and total calories from away-from-home eating (normal weight 251 kcal vs overweight/obese 381 kcal, $P < .05$)	NR
Cunha et al, 2018[26]	Brazil	Cross-sectional	BMI	**Null association**: No association between BMI and eating-away-from-home behavior	NR
Fernandes Gomes et al, 2020[29]	Brazil	Cross-sectional	BMI	**Unfavorable association**: Compared with adolescents who had lunch at home, a significantly higher BMI was found among those who had lunch away from home	NR
Ouyang et al, 2015[41]	China	Longitudinal	BMI	NR	Gender: There was a positive association between eating away from home and BMI for men (**unfavorable association**; $P = <.01$), but not for women (**null association**)
Liu et al, 2019[37]	China	Cross-sectional	Hyperuricemia	**Unfavorable association**: Participants who consumed more away-from-home food had a higher risk for hyperuricemia (OR = 1.09 95% CI [1.01–1.19] for each increment in grades of eating away from home in a multi-adjusted model)	Gender: Consuming more away-from-home food was associated with a higher risk for hyperuricemia in men (**unfavorable association**; OR = 1.11, 95% CI [1.00–1.24] for each increment in grades of eating away from home in a multi-adjusted model), but not in women (**null**

(continued)

Table 5 **Continued**

Reference	Country	Type of study	Health outcome	Association	Determinants
					association; OR = 1.03 95% CI [.90–1.19]) Age: Consuming more away-from-home food was associated with a higher risk for hyperuricemia in a middle-aged population (**unfavorable association**; OR = 1.15, 95% CI [1.03–1.29] for each increment in grades of eating away from home in a multi-adjusted model), but not in youth (**null association**; OR = .94 95% CI [.78–1.11]) or an elderly population (**null association**; OR = 1.09, 95% CI [.88–1.35])
Wang et al, 2019[49]	China	Cross-sectional	Metabolic syndrome	**Unfavorable association**: Participants who ate away from home frequently had a significantly higher risk of getting metabolic syndrome (OR = 1.475, 95% CI [1.121–1.942] for up to 3 times, and OR = 1.678, 95% CI [1.149–2.451] for >3 times during 3 d), in a multi-adjusted model	Gender: Eating away from home frequently was significantly associated with a higher risk of getting metabolic syndrome than those who never ate outside the home (**unfavorable association**; OR = 1.383, 95% CI [1.043–1.834] for up to 3 times, OR = 1.500, 95% CI [1.023, 2.199] when >3 times during 3 d) in men, but not in women (**null association**; OR = .962 95% CI [.727–1.274] when up to 3 times, OR = .861, 95% CI [.535–1.385] when >3 times during 3 d)
Wang et al, 2020[51]	China	Cross-sectional	Overweight	**Unfavorable association**: The odds of being overweight increased with the frequency of eating out (OR = 1.046 95% CI [1.027–1.065])	NR
Wang et al, 2020[48]	China	Cross-sectional	T2DM	**Unfavorable association**: Overall positive association between frequency of away-from-home meals and T2DM (AOR = 1.06 95% CI [1.01–1.10], $P = .017$)	Gender: There was a positive association between frequency of away from home meals and T2DM for men (**unfavorable association**; AOR = 1.06 95% CI [1.00–1.12], $P = .048$), but not for women (**null association**)
Tian et al, 2016[47]	China	Repeated cross-sectional	BMI	**Unfavorable association**: Eating away from home was associated with BMI increase ($P < .01$)	Gender: Eating away from home was associated with BMI increase for men (**unfavorable association**; $P < .001$) but not for women (**null association**; $P = .88$)

(continued)

Table 5 **Continued**

Reference	Country	Type of study	Health outcome	Association	Determinants
Zeng and Zeng, 2018[52]	China	Repeated cross-sectional	BMI	NR	Living place: The frequency of away-from-home meal consumption had a significant positive effect on BMI at the 10% level in urban China (**unfavorable association**; 1 unit increase in the frequency of away-from home meal consumption led to an increase in BMI of approximately .03) but not in rural China (**null association**)
Dong et al, 2017[28]	China	Longitudinal	Waist:hip ratio, blood pressure, HbA1c, CRP	**Null association**: No association in either parents or children between frequency of away-from-home eating and elevated blood pressure, elevated HbA1c, or high CRP **Unfavorable association**: Children who had ≥1 (compared with no) away-from-home meals/d in the previous survey were more likely to have a high waist:hip ratio at follow-up (OR = 1.46 95% CI [1.01–2.12])	Age: Younger parents (aged 20 y–39 y) who had ≥1 (compared with no) away-from-home meals/d in the previous survey were less likely to have a high waist:hip ratio at follow-up (**favorable association**; OR = .68 95% CI [.53–.89])
Zheng et al, 2021[53]	China	Longitudinal	Overweight	**Null association**: Eating out (all kinds of food) was not significantly associated with overweight risk after adjusting for child and parental factors (OR = .79 95% CI [.35–1.77] for eating out 1–2 times per wk; OR = 1.16 95% CI [.53–2.51] for eating out ≥3 times per wk)	NR
Fournier et al, 2016[30]	Malaysia	Cross-sectional	BMI	**Null association**: No association between BMI and frequency of eating out ($P = .537$)	NR
Pell et al, 2016[42]	Malaysia	Cross-sectional	Overweight and obesity	**Null association**: Participants who ate out did not have a higher probability of being overweight (RRR = .99 95% CI [.98–1.00]) **Unfavorable association**: Participants who ate out had a slightly higher probability of being obese (RRR = .97 95% CI [.95–.98])	NR
Tajik et al, 2016[46]	Malaysia	Cross-sectional	Depression symptoms, stress	**Unfavorable association**: Positive association between frequency of eating out and mild/moderate depression (OR = 1.37 95% CI [1.28–2.13] for 4 d/w –7 d/w compared with once a week or less), severe/extreme depression (OR = 1.82 95% CI [1.12–2.96] for	NR

(continued)

Table 5 **Continued**

Reference	Country	Type of study	Health outcome	Association	Determinants
				>4d/w compared with once a week or less), and mild/moderate stress (OR = 1.30 95% CI [1.01–1.69] for >4d/w compared with once a week or less)	
Chacar et al, 2011[25]	Other	Cross-sectional	BMI	**Unfavorable association**: Positive association between frequency of eating out and nutritional status, the normal BMI frequency being 2.63 (3.21) vs the overweight frequency being 3.83 (4.04) $P < .001$, and positive association between eating out and increased risk of overweight (AOR = 1.21 95% CI [1.10–1.34]; $P < .0001$)	NR
Lachat et al, 2011[35]	Other	Cross-sectional	BMI	**Null association**: Compared with normal BMI adolescents, underweight and overweight adolescents did not significantly eat out more often ($P = .39$ and $P = .24$, respectively), nor have a higher or lower daily energy contribution from out-of-home eating ($P = .78$ and $P = .055$, respectively)	NR
Maruapula et al, 2011[39]	Other	Cross-sectional	BMI	**Null association**: No association between BMI and eating-away-from-home behavior	NR
Anteneh et al, 2015[16]	Other	Cross-sectional	BMI	**Unfavorable association**: The odds of being overweight or obese increased with the frequency of eating out (AOR = 3.04 95% CI [1.97–9.49] for 3 to 5 times/wk compared with 1–2 times/wk, and AOR = 19.83 95% CI [3.96–99.23] for > 5 times/wk compared with 1–2 times/wk)	NR
Ghosh et al, 2015[31]	Other	Cross-sectional	Overweight and obesity	**Unfavorable association**: Significant association between consumption of meals cooked outside the home and overweight/obesity (chi-square = 16.32, df = 2, $P < .002$)	NR
Darebo et al, 2019[27]	Other	Cross-sectional	BMI	**Null association**: No association between BMI and eating-away-from-home behavior	NR
Moitra et al, 2020[40]	Other	Cross-sectional	Depression	**Null association**: No association between eating out with friends once or less than once a week and depression (OR = 1.437 95% CI (.497–4.159)	NR

Abbreviations: AOR, adjusted odds ratio; BMI, body mass index; CI, confidence interval; CRP, C-reactive protein; HbA1c, hemoglobin A1c; NR, not reported; OR, odds ratio; RRR, relative risk ratio; T2DM, type 2 diabetes mellitus.

construction of a robust body of evidence. When calling for such standardization, Nago et al[8] suggested that a definition based on the place of preparation rather than the place of consumption could be more relevant, since the place of preparation would enable the nutritional quality of the foods to be more easily known and controlled for.[8] However, such a definition of food consumed away from home would not include, eg, industrialized foods consumed away from home that was bought in shops, bars, or from vending machines. In the present review, the majority of studies used the definition of place of consumption, either intentionally or by default. This definition might include foods prepared at home but consumed away from home. Therefore, a standardized definition of food consumed away from home could be: any foods sourced and consumed away from home.

Beyond the challenges specific to the measurement of food consumed away from home, there are more general challenges related to the study designs than have been reported for HICs,[7,8] including (1) the need for more nationally representative studies to explore the links between food consumption away from home, diet quality, and diversity among population groups, and (2) the need for longitudinal studies to explore the links between food consumed away from home, nutritional status, and health outcomes. However, such studies require infrastructure and financial support that are often lacking in LMICs,[63] indicating the need for more international effort to provide funding and enable research in these contexts.

Limitations

Compared with the previous reviews,[6–8] this review was focused on food consumed away from home in the broad sense, which implied the exclusion of 32 studies that only measured food consumed or prepared in a specific place (eg, fast-food restaurants) and/or during a specific meal (eg, focusing only on breakfast or lunch). Nevertheless, as in the included studies, there was an overrepresentation of China (n = 11) and Brazil (n = 6) in the excluded articles; while including these articles in the present review would have provided data on 7 additional countries, it would have added further heterogeneity to the definitions and methods used in the literature. Another limitation was that no consistent quality assessment was conducted, and there was no use of quality assessment as an exclusion criterion. While the need for quality assessment of included studies in a scoping review process is still debated,[64] it would have been difficult to provide a consistent quality assessment in the present review due to the heterogeneity of the studies in terms of objectives, outcomes, designs, and statistical models. In addition, using quality assessment as an exclusion criterion would have probably diminished the number of articles included in the present review, and the main objective was to explore the literature documenting the phenomenon of food consumed away from home and to identify gaps.

CONCLUSION

Food consumed away from home represents an increasing share of people's food consumption worldwide. However, there is little information available based on individual dietary data related to the consumption of food away from home and any associated health consequences in LMICs. Nevertheless, the available information indicates that increased consumption of food away from home in LMICs is associated with poorer individual diet quality, poorer nutritional status, and poorer health. In LMICs, it would be beneficial to develop harmonized surveillance systems for monitoring the consumption of food away from home, including the development of a standardized definition for food consumed away from home. This would strengthen the capacities of practitioners and policy-makers to make evidence-based decisions in the designing of effective regulatory policies and interventions as a response to the rapidly expanding phenomenon of food consumed away from home in LMICs.

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Author contributions. The authors' responsibilities were as follows: E.L. and E.O.V. were responsible for the design of the study; E.O.V. was responsible for the development of the search syntax; E.L., E.O.V., and M.M.-P. were responsible for the screening methodology; M.M.-P. carried out the search; E.L., E.O.V., and M.M.-P. did the screening. All the authors assisted in the interpretation of the data. E.L. and E.O.V. drafted the paper, and all authors critically reviewed the manuscript and approved the final manuscript.

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Supporting Information

The following Supporting Information is available through the online version of this article at the publisher's website.

Table S1 **Syntax of the Medline search strategy**

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