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Correlates of eating behaviors in adolescence: a systematic review of qualitative studies

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Short title :



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Abstract

Context

Nutrition plays a critical role in adolescence. Adolescents are vulnerable to the impact of different factors that distance them from healthy habits, increasing their risk of chronic diseases in adulthood. Qualitative methodologies allow for a better understanding of these factors.

Objective

This systematic review aims to consolidate qualitative research evidence from the past 10 years to analyze the facilitators and barriers influencing adolescents' eating behaviors.

Data Sources

Databases searched for relevant studies were Scopus, Medline/PubMed, PsycINFO, and Web of Science.

Data Extraction

A total of 4176 records were identified. The authors used the GRADE-CERQual (Confidence in Evidence from Reviews of Qualitative Research) quality-assessment tool.

Results

Fifty articles with qualitative or mixed methodologies were finally included. The most applied techniques were focus groups and semi-structured interviews. The factors influencing adolescents' diets were classified into 4 dimensions: individual, social, community, and macrosystem factors. The most influential were the following— (1) at the individual level: gender (facilitator or barrier), taste and appearance of food (barrier), and lack of time (barrier); (2) at the social level: parents' and caregivers' influence (facilitator or barrier), peer group influence (barrier), and socioeconomic position (barrier); (3) at the community level: school food environment (facilitator or barrier), neighborhood food environment (barrier), household food environment (facilitator or barrier), food insecurity (barrier), and availability and affordability of ultra-processed foods (barrier); and (4) at the macrosystem level: digital tools (facilitator or barrier).

Conclusions

This systematic review identified several facilitators and barriers influencing eating behaviors among adolescents. Qualitative research provides a rich source of knowledge to inform interventions aimed at improving adolescents' diets. [AQ3](#)

adolescent, diet, systematic review, qualitative research



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INTRODUCTION

Adolescence is a period of essential changes in various aspects of an individual's life, including physical, mental, emotional, psychological, and social¹ aspects, which influence an individual's health. Health problems encountered during adolescence can persist into adulthood and lead to different clinical conditions.² For example, healthy eating behaviors are crucial during adolescence to support physical growth and development.³

The World Health Organization (WHO) establishes a healthy diet pattern that includes the intake of fruits, legumes, vegetables, and cereals, while recommending limits on the consumption of saturated fat, sugar, and salt. Adhering to a healthy diet is a *sine qua non* for leading a healthy lifestyle and preventing chronic diseases, such as diabetes, cholesterol, hypertension, obesity, and cardiovascular diseases.⁴ However, various studies have shown that adolescents tend to consume foods that deviate from healthy patterns.⁵ Moreover, those with low socioeconomic status (SES) tend to eat less healthfully than those with high SES.⁶

Among the reasons posited to explain these differences are the reduced accessibility to healthy foods in low-SES neighbourhoods⁷, family dynamics that do or do not promote the consumption of healthy food⁸, better nutritional knowledge among high-SES population groups,⁹ and a less sedentary lifestyle and more physical activity in adolescents of high SES. Furthermore, living in either a high-income or low- or middle-income country affects food insecurity problems that may hinder or facilitate a healthy diet.¹⁰ Although several reviews have evaluated the association between adolescence and eating behaviors,^{11,12} most of them include only quantitative publications, excluding valuable information from qualitative approaches.

Qualitative methodology allows for a deeper approach to topics.¹³ This methodology will help us understand the determining factors in adolescents' diets and the differences in how they eat or consume food according to their social class or country of origin.⁹ Therefore, our systematic review aimed to identify and synthesize qualitative data on adolescents' experiences of the barriers and facilitators of eating behaviors. The results of this review will provide more detail on the factors influencing the diets of adolescents and help improve policies to promote healthy diets in this population group.

METHODS

Information source and search strategy

The databases used for identifying relevant studies were Scopus, Medline/PubMed, PsycINFO, and Web of Science. The search strategy was developed in Scopus and adapted for Medline/PubMed, PsycINFO, and Web of Science. The search terms used were as follows: "nutrition" AND "adolescents" AND "qualitative". These search terms were applied to the titles and abstracts of the documents. The search was then limited to the past 10 years, from 2012 until June 2022, and to articles, adapting these filters in each database. In PsycINFO, results were limited to "academic journals" and "qualitative studies". One of the authors of this

manuscript identified the articles at the first round of the study selection. After removing duplicate items, the same author undertook a second selection from full texts. Furthermore, a final selection was conducted by the 3 first authors of this manuscript through a joint assessment. Articles that did not meet the inclusion criteria were excluded and discrepancies were resolved by reviewing each article. Terms relating to eating behaviors (eg, “qualitative”) were combined to search the databases ([AQ4](#) see [Appendix S1 in the Supporting Information online](#) for the search strategies used in each database). The original searches were conducted in May 2022 and updated in September 2022.

One author (R.V.) conducted the database searches and removed duplicates. After removing duplicate items, the first author undertook a second selection from full texts. In addition, all titles and abstracts were screened by R.V. and a second independent reviewer (J.R.-N.). Full texts were also double-screened independently. Discrepancies were resolved by a third reviewer (L.G.).

Study eligibility criteria

The inclusion criteria for this review were as follows (see [Table 1](#)): (1) studies using a qualitative or mixed-methods methodology, (2) descriptive studies, (3) those selecting adolescents as the study population (individuals aged 10–19 y old as defined by the WHO¹⁴), (4) studies addressing factors (including both barriers and facilitators) of eating behaviors, and (5) articles written in English and Spanish and published since 2012.

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Table 1 PICOS criteria for inclusion of studies

Parameter	Criteria
Study design	Qualitative methodology
	Descriptive study
Study population	Healthy adolescents, except those ones with obesity.
	Nonspecific or specific population.
Languages	English and Spanish
Outcomes	Factors (barriers and facilitators) that influence eating behavior in adolescents.
Participants	Adolescents, parents and caregivers, teachers

The PICOS (Population, Intervention, Comparison, Outcomes, and Study) design is [AQ24](#) a framework to formulate eligibility criteria in systematic reviews.



The exclusion criteria were as follows: (1) studies that included children or adults as the study population, (2)

studies with quantitative methodologies, (3) systematic reviews and methodological studies, (4) articles that included adolescents with a specific disease or specific condition (pregnancy) as the study population, (5) studies designed as interventions or program evaluations, (6) studies that were not focused on the eating behavior of adolescents, and (7) studies focused on only 1 kind of nutrient or food.

Data extraction and analysis

Data were extracted into a data-extraction template using Microsoft Excel (Microsoft Corporation [AQ5](#)), including title, authors, publication year, country, journal, aims, methods (study design, participants, data collection, and analysis), and main results. One member of the review team (R.V.) analyzed the extracted data following Thomas and Harden's methods¹⁵ for thematic synthesis of qualitative research. The data synthesis involved 4 steps. First, 1 author (R.V.) re-read the extracted results from each article to become familiar with the data and allow codes to emerge. This resulted in an initial bank of codes based on common barriers and facilitators of healthy diets identified across studies. In step 2, another author (J.R.-N.) read each study line-by-line, coded data relevant to the research question, updated the code bank where necessary, and re-read already coded data to check for new themes. For step 3, another author (L.G.) developed descriptive themes, which involved translating concepts from 1 study to another. During this stage, the initial codes were reviewed and organized into subthemes. The results were entered into a matrix in Microsoft Excel. Until this point, the synthesis remained close to the original findings of the included studies. For step 4, the first 3 authors used descriptive themes to develop higher-order analytical [AQ6](#) beyond the content of the original data to generate additional concepts, understanding, and hypotheses. The analysis was an iterative process.

Quality appraisal

The review used the [AQ7](#) GRADE-CERQual tool to assess the methodological quality and risk of bias of each included study.¹⁶ This tool was specifically developed to evaluate qualitative reviews; it was chosen over others, such as the standardized critical appraisal tool of the Joanna Briggs Institute Qualitative Assessment and Review Instrument (JBI-QARI),¹⁷ due to the steps used for assessing confidence, including methodological limitations, coherence, adequacy of data, and relevance.¹⁶ These steps are more concise and easier to manage in a table than those of the JBI-QARI. The review's main findings were defined, indicating their corresponding articles (ie, those that contribute to each finding).

Each finding was then evaluated based on the methodological limitations of the articles and their coherence, adequacy, and relevance. Subsequently, the degree of confidence for each finding was established (high confidence, moderate confidence, or low confidence). The first 2 authors independently evaluated the studies. Reviewers compared study component ratings and agreed on a final decision to determine the final study quality.

Theoretical framework

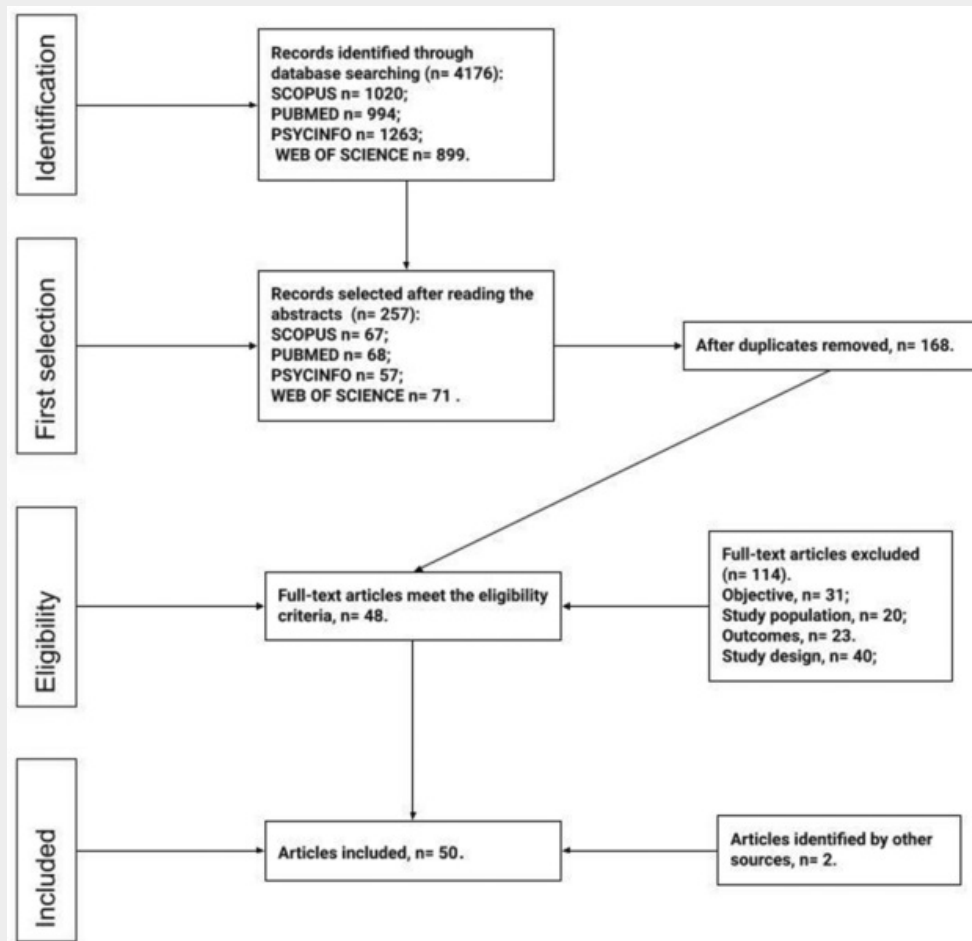
The authors selected the theoretical framework proposed by Story et al,¹⁸ which is based on social cognitive theory¹⁹ and the ecological perspective.²⁰ This model conceptualizes food choices as a function of individual and environmental influences, considering 4 levels: (1) individual factors, which differ from person to person (eg, taste preferences or age); (2) social, environmental, or interpersonal factors, which refer to the influence of social groups, such as parents or peers; (3) physical environmental or community factors, which refer to the surrounding food environment, such as the school, neighborhood, or home food environment; and (4) macrosystem factors, which refer to societal factors that can also influence eating behaviors, such as mass media. In this article, we refer to “social factors” instead of “social environmental or interpersonal factors”, and to “community” instead of “physical environmental factors”. This model was chosen because, after reviewing other possible models,^{21,22} the authors consider it to be the most comprehensive and appropriate for achieving the objective of this specific study.

RESULTS

Studies selection

Figure 1 summarizes the study selection procedure. The search strategy retrieved 4176 records. From these, 257 were selected based on the screening of titles and abstracts, and 168 full-text articles were assessed after removing duplicates. The first author excluded 88 articles and 31 articles were excluded through a joint assessment by the first 3 authors. In total, 114 articles were excluded because they did not meet 1 or more of the inclusion criteria (objective, study population, outcomes, and study design). A total of 48 publications met the inclusion criteria, and along with 2 more articles found from other sources, these were the articles included in the final selection.

Figure 1 PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) flowchart of the search results and study selection process for factors influencing adolescents' eating behaviors.



Study characteristics

Study characteristics are outlined in Table 2. Of the 50 studies, 18 were conducted in the Americas^{21,22,24,32,37,39,42,43,45,49–51,59,60,63,66,67}; 11 in [AQ8](#)North America^{22,24,37,39,43,45,49,59,63,66} and 7 in South America.^{21,32,42,50,51,60} In Asia, 15 studies were carried out,^{28,34,38,39,41,48,50,53–55,57,58,61,62} while 6 studies took place in Europe,^{23,26,36,47,52,56} 7 in Africa,^{27,30,31,33,35,46,65} and 2 in Australia.^{25,44} Additionally, 2 studies were conducted simultaneously in 2 countries on different continents: 1 study in India and sub-Saharan Africa²⁹ and the other in India and Canada.⁴⁰

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Table 2 Main characteristics of included qualitative studies (n=50)

Study number	First author, reference, year, country	Objective	Techniques	Participants	Adolescents	Study summary results
1	McNamar a, ²³ 2021, Ireland	To analyze factors influencing the health-related behaviors of adolescent girls from low socioeconomic backgrounds in Ireland	Semi-structured virtual interviews	N = 9 Teachers in low SES schools	Adolescent females from disadvantaged backgrounds in secondary schools	In Ireland, female adolescents are a group that is sensitive to being overweight and obese, in addition to the fact that obesity has been shown to follow a socioeconomic gradient.
2	Green, ²⁴ 2021, USA	To identify how early adolescent participants described food-related agency	Semi-structured interviews	N = 30 Adolescents (10–13 y) from anywhere in the USA by ethnicity, gender, place of residence	Early adolescents (10–13 y old)	The role of the family, particularly parents, in shaping adolescents' food choices is significant. Parents were found to be the main providers of structure and opportunities for participants to develop their own sense of control over their food choices in this study.

3	Buru, ²⁵ 2021, Australia	To analyze the causes of obesity in adolescents, perceived barriers to the attainment of facilitating healthy habits, and strategies for improvement	<ul style="list-style-type: none"> • Surveys • Semi-structured interviews 	<p>N = 74</p> <p>Surveys: 52 subject teachers, 3 senior teachers and 5 heads of department from state and independent secondary schools</p> <p>Interviews: 8 teachers from state public secondary schools and 6 from independent secondary schools</p>	Secondary school adolescents	The main perceived causes of obesity were poor eating habits and a sedentary lifestyle. The study highlighted several barriers, including busy schedules, shortages of trained staff, lack of robustness in the introduction and implementation of school-based interventions, and insufficiency.
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4	de la Torre-Moral, 26, Spain	To analyze elements related to conviviality in family meals in Mediterranean countries	<ul style="list-style-type: none"> • Semi-structured interviews • Food-frequency and family meal questionnaires • Photographs of meals 	N = 24 Families interviewed: 12 families, 10 interviews with mothers and 2 interviews with mothers and fathers simultaneously who had at least 1 adolescent child between 12 and 16 y old	Adolescents between 12 and 16 y old	Frequent family meals have been associated with a healthier dietary pattern.
5	Seabi, 27, South Africa	To analyze adolescents' perceptions of obesity: its causes, consequences and solutions in a rural area of South Africa	FG	N = 31 16 adolescent males and 15 adolescent females	Rural adolescents aged 14–19 y	Rural South African adolescents have a complex outlook on obesity, likely driven in part by the current ongoing nutritional transition, and do not inherently view individual behavior as a driver or mitigator of obesity.
6	Kaveh, 28, Iran	To explain the system of healthy and safe nutrition motivation among Iranian adolescent girls	In-depth interviews	N = 42 Adolescent females from schools of 4 different districts	Adolescent females aged 13–15 y	Motivational factors for healthy and safe eating: (1) maintaining health and social functions, (2) maintaining the mental and economic health of the family, and (3) achieving goals and success in life.

7	Weller, ²⁹ 2021, India and sub-Saharan Africa	To explore perceptions of how context shapes adolescent diet and physical activity in 8 low- and middle-income places at different stages of social and economic transition	Secondary qualitative analysis (from FG)	N = 491 52 FGs (303 adolescents aged 10–17 y and 188 caregivers)	Adolescents aged 10 to 17 y	Diets in rural settings were determined by tradition, seasonality, and affordability.
8	Wrottesley, ³⁰ 2021, South Africa	To understand barriers and facilitators to healthy eating and physical activity practices in younger and older South African urban adolescent boys and girls, and to understand how caregivers' views interact with and influence adolescent behaviors	FG	N = 75 8 FGs: 2 for children (10–12 y); 2 for older children (15–17 y); 2 for caregivers of young adolescents (males/females); and 2 for caregivers of older adolescents (males/females)	Early adolescents (10–12 y) and older adolescents (15–17 y)	Unlike their caregivers, the adolescents were not motivated to eat healthy and did not appreciate the need to develop consistent patterns of healthy eating and physical activity for their long-term health.
9	Trübwasser, ³¹ 2020, Ethiopia	To analyze factors influencing dietary behaviors of adolescents in Addis Ababa, Ethiopia, in relation to the food environment	<ul style="list-style-type: none"> • Photovoice • Interviews • FG 	N = 26 Adolescents from 1 public and 1 private school	Adolescents aged 14 to 19 y	Findings from the current study indicate that food safety concerns appear to be the main factors influencing adolescents' dietary choices.
10	Jansen, ³² 2020, Mexico	To explore dietary patterns in Mexican adolescents (taking into account family context, SES)	EO and questionnaires	N = 550 EO: 6 families Survey: 550 adolescents	Adolescents (age not determined)	Higher SES families ate more home-cooked meals regularly, while lower SES families had a greater reliance on processed foods.

11	Janha, ³³ 2020, Gambia	To explore, from the perspectives of adolescents and caregivers, influences on adolescent diet and physical activity in rural Gambia	FG	N = 60 4 FGs with adolescents (separated by age and gender) and 2 with caregivers	Adolescents aged 10–17 y	It is perceived that the diet of adolescents is influenced by affordability, seasonality, the receipt of remittances, gender norms, cultural ceremonies, and school holidays.
12	Ishak, ³⁴ 2020, Malaysia	To explore concepts of healthy eating and identify barriers and facilitating factors for dietary behavior change in adolescents	FG	N = 72 12 FGs with adolescents	Adolescents aged 12–13 y	Adolescents' perceptions of healthy and unhealthy eating were based on types and characteristics of food, cooking methods, and eating behaviors.
13	Abera, ³⁵ 2020, Ethiopia	To explore influences on adolescent diet and physical activity, from the perspectives of adolescents and their caregivers, in Jimma, Ethiopia	<ul style="list-style-type: none"> • FG • Questionnaire • Anthropometric measurement 	N = 63 5 FGs with adolescents aged 10–12 y and 15–17 y (n = 41) and 3 FGs with parents (n = 22)	Adolescents aged 10–17 y	Social and cultural factors were perceived to be the main drivers of adolescent diet and physical activity.
14	Garrido-Fernández, ³⁶ 2020, Spain	To discover family conceptions and their difficulties regarding healthy eating habits during the school day	FG	N = 42 Fathers and mothers of adolescents	Secondary school adolescents	Families considered lack of time, convenience, and influence of the market as the main challenges that hindered their children's ability to adopt healthy habits.

15	Spencer, ³⁷ 2019, Canada	To explore students' perspectives on school meals	Photovoice	N = 7 3 young adolescents from rural areas and 4 from an urban center	Secondary school adolescents	Adolescents emphasized the desire for more variety and quality in school feeding and the opportunity to participate in decision-making regarding school feeding.
16	Islam, ³⁸ 2019, Bangladesh	To analyze adolescents' and mothers' perceptions of sociocultural aspects that shape the food choices, eating habits, and physical activity behaviors of adolescents in the rural context of Matlab, Bangladesh	FG	N = not determined 6 FGs: 2 with mothers, 2 with adolescent males, and 2 with adolescent girls, with 6–8 participants per group	Adolescents in rural and resource-poor settings aged 14–17 y old	The diet of adolescents is determined by peer influence, community food environment, and internalization and rigidity of gender norms.
17	Beck, ³⁹ 2019, USA	To explore barriers and facilitators to healthy eating among low-income Latino adolescents with obesity using an intervention development framework	Semi-structured interviews	N = 30 Obese adolescents	Low-income Latino adolescents with obesity aged 13–17 y	Adolescents had significant misconceptions about healthy eating, equating “organic” with healthy and not recognizing sugar in several drinks and foods.
18	Correa, ⁴⁰ 2017, India, Canada	To understand the perceptions and attitudes (barriers and facilitators) of adolescents of Indian origin in India and Canada that may contribute to healthy eating behavior	FG	N = 73 13 FGs with 34 males and 39 females	Adolescents of different weights and SES in rural and urban India, and adolescents aged 11–18 y in urban Canada	All adolescents perceived homemade foods and foods rich in vitamins, minerals, and fiber as healthy. Barriers for a healthy diet were influence of peers and the availability, access, and affordability of unhealthy foods.

19	Rathi, ⁴¹ 2016, India	To investigate the perceptions of adolescents, parents, teachers, and school principals on the main influences on adolescent eating behaviors	Semi-structured interviews	N = 52 15 adolescents, 15 parents, 12 teachers, and 10 principals	Adolescents aged 14–15 y	Factors that may influence adolescent eating habits are parents, peers, home eating environments, the school, and the media.
20	Banna, ⁴² 2016, Peru	To understand the sociocultural influences on diet among adolescents in peri-urban Lima	<ul style="list-style-type: none"> • Semi-structured interviews • Food picture card sorting activities 	N = 14 Adolescents	Adolescents aged 15–17 y	Four types of influences on an adolescent's diet were considered: intrapersonal, interpersonal, community, and societal.
21	Darling, ⁴³ 2015, USA	To understand the family food ecosystem, parental modelling, and parental indulgence and their possible relationship to adolescent health and well-being	Interviews	N = 29 Parents of 25 secondary school students	High school adolescents aged approximately 15 y old from a US state where 30% of the students are obese	The results showed that the forms of parental indulgence affected eating habits, such as the lack of family structure and parental modeling, and the permissiveness of parents.
22	Stephens, ⁴⁴ 2015, Australia	To identify possible strategies that could be employed in nutrition promotion initiatives focused on improving dietary behaviors among socioeconomically disadvantaged adolescents	Semi-structured interviews	N = 22 Adolescents	Adolescents aged 12–15 y from schools in economically disadvantaged neighborhoods	The links between socioeconomic disadvantage and unhealthy eating behaviors among adolescents are well established.

23	Watts, ⁴⁵ 2015, Canada	To explore the perceived factors that prevent or facilitate healthy eating within the home environment among overweight/obese adolescents	<ul style="list-style-type: none"> • Photovoice • Semi-structured interviews 	N = 22 Overweight/obese adolescents who completed a family-based lifestyle modification intervention	Overweight/obese adolescents aged 11–16 y	Six aspects of the home environment that influenced adolescents' eating habits were pointed out: home cooking, food availability and accessibility, parenting practices, family modeling, celebrations, and screen use.
24	Sedibe, ⁴⁶ 2014, South Africa	To explore the perceptions, attitudes, barriers and facilitators related to healthy eating and physical activity among adolescent girls in rural South Africa (Agincourt rural subdistrict)	Peer interviews	N = 22 Adolescent females (11 pairs)	Adolescent urban females aged 16–19 y	The majority of participants in the study considered locally grown and traditional foods, especially fruits and vegetables, to be healthy. However, the consumption of these foods was limited by their availability.
25	Cailliez, ⁴⁷ 2014, France	To identify adolescents' representations regarding food	Semi-structured interviews	N = 46 Adolescents from 5 high schools of different age, gender, and area	Adolescents aged 14–17 y	Fast-food restaurants were perceived as a place for adolescents to experience pleasure and freedom. Gendered representations of food were present: female adolescents identified the thinness with femininity, and males associated a muscular body with a virile image.
26	Kotecha, ⁴⁸ 2013, India	To assess the dietary habits, food preferences, and dietary pattern of urban school-going adolescents in Baroda, India	<ul style="list-style-type: none"> • Survey • FG 	N (FG) = 80 10 FGs: 5 with adolescent males and females and 5 with teachers	Adolescents aged 10–19 y attending school in urban areas	Most adolescents know what healthy foods are AQ25 and that fast foods are bad for their health, nevertheless they consume this type of food for several reasons: they like it; lack of time.

27	Christian sen, ⁴⁹ 2013, USA	To understand the environmental factors that influence the food-related habits of low-income urban African-American adolescents	<ul style="list-style-type: none"> • In-depth interviews • FG • Direct observation 	N = 20 Adolescents and participated in 2 FGs	Low-income, urban African-American adolescents aged 10–16 y	Thematic categories emerged and were organized in 4 environmental contexts: (1) the neighborhood context; (2) the school context; (3) the family context; (4) the peer context.
28	Joshi-Reddy, ⁵⁰ 2019, India	To explore the perceptions of adolescents and their caregivers on the drivers of diet and physical activity in rural India in the context of ongoing economic, social and nutritional transition	FG	N = 76 8 FGs: 2 with adolescents aged 10–12 y, 2 with adolescents aged 15–17 y, and 4 with their mothers	Adolescents aged 10–17 y	Adolescent dietary behavior and physical activity were perceived to be influenced by individual and interpersonal factors, including adolescent autonomy, parental influence, and negotiations between adolescents and caregivers.
29	Ziegler, ²² 2021, USA	To identify factors that impact on adolescent food choices and autonomy	FG	N = 34 Adolescents 4 FGs	Adolescents aged 13–17 y	The current study showed that schedule and time priorities were important factors in both home and school contexts. While taste was a predominant factor when choosing snacks at school, it was not as significant at home, where the behavior of parents had more influence on adolescents' food choices.
30	Monge-Rojas, ⁵¹ 2015, Costa Rica	To identify gender stereotypes that influence the eating habits of Costa Rican adolescents	FG	N = 140 12 FGs with 92 adolescents and 6 FGs with 48 parents	Adolescents aged 14–17 y recruited from different rural and urban populations of different SES	In this study, the following themes were found: (1) Costa Rican adolescents associate the consumption of moderate amounts of healthy foods with femininity and male homosexuality; (2) body care among female adolescents is perceived as an element of femininity and body image; (3) parents reinforce their daughters' persistent concern for weight control because they perceive it as feminine behavior.

31	Jonsson, 52 2017, Suecia	To identify barriers to good habits related to food and sport in a multicultural community of low SES	FG	N = 53 Adolescents (21 males and 32 females) 3 FGs with males, 4 FGs with females, and 3 mixed FGs	Adolescents aged 12 and 13 y in a low-SE neighborhood	There are several factors that can hinder the establishment of healthy eating and physical activity habits at the individual level (eg, screen-based activities), social level (eg, lack of social support), environmental level (eg, school environment), and societal AQ26 level (ie, gender norms).
32	Banavali, 53 India, 2020	To explore adolescents' and caregivers' perspectives on dietary and physical activity habit formation in rural Konkan, India	FG	N = 64 5 FGs with adolescents (20 younger and 28 older) and 2 FGs with caregivers (16 mothers)	Young (10–12 y) and older (15–17 y) adolescents in a remote village	This study, conducted in a rural area in India, found that the available resources and infrastructure in the villages were sufficient to meet the basic dietary and physical activity needs of adolescents.


33	Blum, ⁵⁴ 2019, Bangladesh	To examine the individual, social, and environmental factors that influence the eating behaviors of adolescent girls aged 15–19 and y living in low-income families in urban and rural settings in Bangladesh	<ul style="list-style-type: none"> • Free-listing AQ 27 exercises • Interviews • In-depth interviews • Direct observations • FGs 	N = 80 33 free-listing exercises: with adolescents 11 interviews with key informants in the area of nutrition 24 in-depth interviews with in-school, out-of-school, and married adolescents 12 FGs with parents	Adolescent girls aged 15–19 y from low-income families in rural and urban settings	Adolescents living in food-insecure homes and from lower social positions are vulnerable to malnutrition, and the factors affecting food deprivation increase as they approach childbearing age.
34	Bagherniya, ⁵⁵ 2019, Iran	To explore the sources and role of stress in the development of unhealthy lifestyle practices related to diet and physical activity among overweight and obese adolescents	<ul style="list-style-type: none"> • In-depth interviews • FG 	N = 62 52 obese adolescents 10 in-depth interviews with parents	Obese adolescents aged 12–18 y from different regions and different socioeconomic backgrounds	The findings highlighted the sources and role of stress in emerging unhealthy lifestyle practices, including overeating and physical activity among adolescents, which could lead to weight gain.
35	Havdal, ⁵⁶ 2021, Norway	To explore how adolescents and their parents in high- and low socioeconomic neighborhoods perceive the social and physical environment that influences adolescent eating behaviors	<ul style="list-style-type: none"> • FG • In-depth interviews 	N = 43 6 FGs with adolescents 8 parents interviewed	Adolescents aged 13–14 y from different socioeconomic backgrounds	The results indicate that adolescents face various barriers to adopting healthy dietary behaviors: physical environment and price and availability at local fast-food stores and restaurants.

36	Mohammadi, ⁵⁷ 2020, Malaysia	To explore the perceptions, barriers, and facilitators related to healthy eating and physical activity among adolescents in Malaysia	<ul style="list-style-type: none"> • FG • In-depth interviews 	N = 88 8 FGs with 76 adolescents, 12 in-depth interviews with key informants (4 teachers and 4 canteen managers)	Adolescents aged 13–14 y from rural and urban schools	Interviewees thought that adolescent misperceptions, limited availability of healthy options, unhealthy food preferences, and affordability were significant challenges preventing healthy eating at school.
37	Rathi, ⁴¹ 2016, India	To describe the views of adolescents, their parents, nutrition educators, and school principals on the prevailing food environment and canteen policies in Indian schools	Semi-structured interviews	N = 52 Interviews with 15 adolescents, 15 parents, 12 teachers, and 10 principals of private schools	Adolescents aged 14–15 y	Current school food environments do not seem to promote healthy eating among adolescents. School canteens area mainly profit-making and this prevents them from using foods that encourage healthy eating practices.
38	Park, ⁵⁸ 2014, South Korea	To examine environmental factors affecting the eating habits of adolescents in South Korea	<ul style="list-style-type: none"> • FG • In-depth interviews 	N = 26 2 FGs 20 interviews with 17 teachers and 9 parents from 26 schools	Adolescents aged 10–16 y	The home environment and exposure to healthy foods were the most important factors influencing healthy eating habits.

39	Hawks, ⁵⁹ 2022, USA	To explore the physical activity and healthy eating beliefs and behaviors of early adolescents who attended a community-based organization in an urban cluster in the southeastern USA	<ul style="list-style-type: none"> • Ethnography • Semi-structured interviews • Participant observation 	N = 15 Adolescents	Early adolescents aged 10–14 y	This study points out 5 major influences on healthy eating and physical activity in early adolescents: recognition of the benefits of physical activity and healthy eating; family influences; community connection; peer influences; and development of a sense of identity.
40	Vio, ⁶⁰ 2020, Chile	To assess dietary behavior (detect eating habits, cooking skills, and barriers to healthy eating) among sixth- to eighth-grade students to inform nutrition education content	FG	N = 57 6 FGs with 30 adolescent males and 27 females	Adolescents aged 10–14 y of lower-middle SES	This study found no associations between nutritional knowledge and behavior among adolescents. The results highlight the importance of peers in food choices, which can be used to generate affinity and acceptance in a social group.
41	Roshita, ⁶¹ 2021, Indonesia	To explore Indonesian adolescents' eating behaviors and physical activity and their influencing factors	Ethnography	N = 302 Adolescents (115 females and 187 males) from 2 different districts, with formal and informal discussions and participant observation	Adolescents aged 12–19 y	In Indonesia, schools play a crucial role in providing nutrition to adolescents. In this study, screen time was associated with higher rates of obesity among adolescents.

42	Verstraeten, ²¹ 2014, Ecuador	To identify the factors that influence the eating behavior of Ecuadorian adolescents, from the perspective of parents, school staff, and adolescents, in order to develop a conceptual framework on adolescent eating behavior	FG	N = 144 20 FGs separately with adolescents, parents, and school staff	Adolescents aged 11–15 y	The key individual factors in Ecuadorian adolescents' food choices were financial autonomy, perceptions of food security, lack of self-control, force of habit, taste preferences, and norms perceived by peers. Environmental factors included the poor nutritional quality of the food and its easy access at school.
43	Veeck, ⁶² 2014, China	To examine the main influences on the food choices of Chinese adolescents within a changing marketing-driven food environment	Semi-structured interviews	N = 32 2 participants for each of the 16 families (1 adolescent and the parent who normally buys the food)	Secondary school adolescents	In this study, there were 4 main influences in Chinese adolescents' eating: personal, family, peer, and store. The influence of changing cultural values in adolescents' diet was emphasized.
44	Deslippe, ⁶³ 2021, Canada	To explore how changes in adolescents' school, family, and peer environments may influence dietary behaviors during the shift from primary to secondary school and the gender gap	Semi-structured interviews	N = 54 27 semi-structured interviews with parent-adolescent dyads	Adolescents aged 11–14 y	Within the context of peers, food facilitates friendship between adolescent females, while adolescent males do not report relying on their peers to influence their dietary choices. In the family, gender-based body ideals become more apparent and influential in adolescent eating behaviors.
45	Gunther, ⁶⁴ 2019, USA	To identify the practices that parents use to influence adolescents' food choices during independent eating occasions	In-depth interviews	N = 93 49 interviews with low-income parents and 44 early adolescents	Adolescents aged 10–13 y	Parents reported that setting rules and expectations and managing availability or accessibility are the most common practices used to influence healthy diet among their adolescent children. The socioeconomic position of the family plays a significant role in determining the access of adolescents to fruits and vegetables.

46	Bagherniya, ⁷⁰ 2018, Iran	To explore the role of interaction within the social network of friends on unhealthy eating behaviors of overweight and obese adolescents	<ul style="list-style-type: none"> • In-depth semi-structured interviews • FG 	N = 62 10 parents and overweight or obese adolescents	Obese or overweight adolescents aged 12–18 y	The findings of this study suggest that adolescent eating behaviors are influenced by both peer support and appropriate parenting practices, particularly when adolescents are with friends. These factors alone are not sufficient to promote healthy eating. Adolescents who are self-confident, determined, and have a high level of self-esteem are less likely to be influenced by friends and adhere to unhealthy dietary habits.
47	Brown, ⁶⁵ 2015, Botswana	To describe factors influencing adolescent and adult perceptions and attitudes towards adolescent diet in Botswana	FG	N = not determined 15 FGs (12 with adolescents and 3 with parents)	Adolescents aged 12–18 y	Adolescents and their parents report that the main drivers of adolescents' food choices are strongly influenced by the time of day and who they are with. Outside the home, adolescents report that real or perceived peer influence is determined by social status, as consuming traditional foods is sometimes considered "ridiculous".
48	De Assis Silva, ⁶⁹ 2015, Brazil	To analyze how adolescents in a school in the interior of the state of Pernambuco, Brazil, perceive healthy eating	Semi-structured interview	N = 40 Adolescents	Adolescents aged 10–14 y	Although the adolescents interviewed are familiar with healthy eating, they do not always put it into practice due to the multiple factors that interfere with their preferred eating habits. The school and the family play an important role in promoting healthy eating.
49	Kumar, ⁶⁶ 2016, USA	To enable community members to discuss their perceptions of eating habits and physical activity in sixth-, seventh-, and eighth-grade students, and to reveal facilitators and barriers to healthy eating behavior and participation in physical activity	FG	N = 61 9 FGs (6 with adolescents, 2 with parents, and 1 with teachers)	Early adolescents in sixth–eighth grades (11–14 y)	Adolescent participants had limited knowledge about healthy foods. Taste and appearance were the 2 main factors contributing to food choices.

50	Rodríguez-Pérez, 2019, Puerto Rico ⁶⁷	To identify barriers to healthy eating practices among Puerto Rican early adolescents	FG	N = 69 7 FGs (5 with early adolescents [n = 52] and 2 with parents and caregivers [n = 17])	Early adolescents aged 12–14 y	The main factors influencing participants' eating habits were the availability of stores selling fewer healthy foods at or near school and in the community, parental influence in developing unhealthy eating habits, and the low cost of unhealthy food.
<p><i>Abbreviations:</i> EO, ethnographic observation; FG, focus group; SES, socioeconomic status.</p> 						

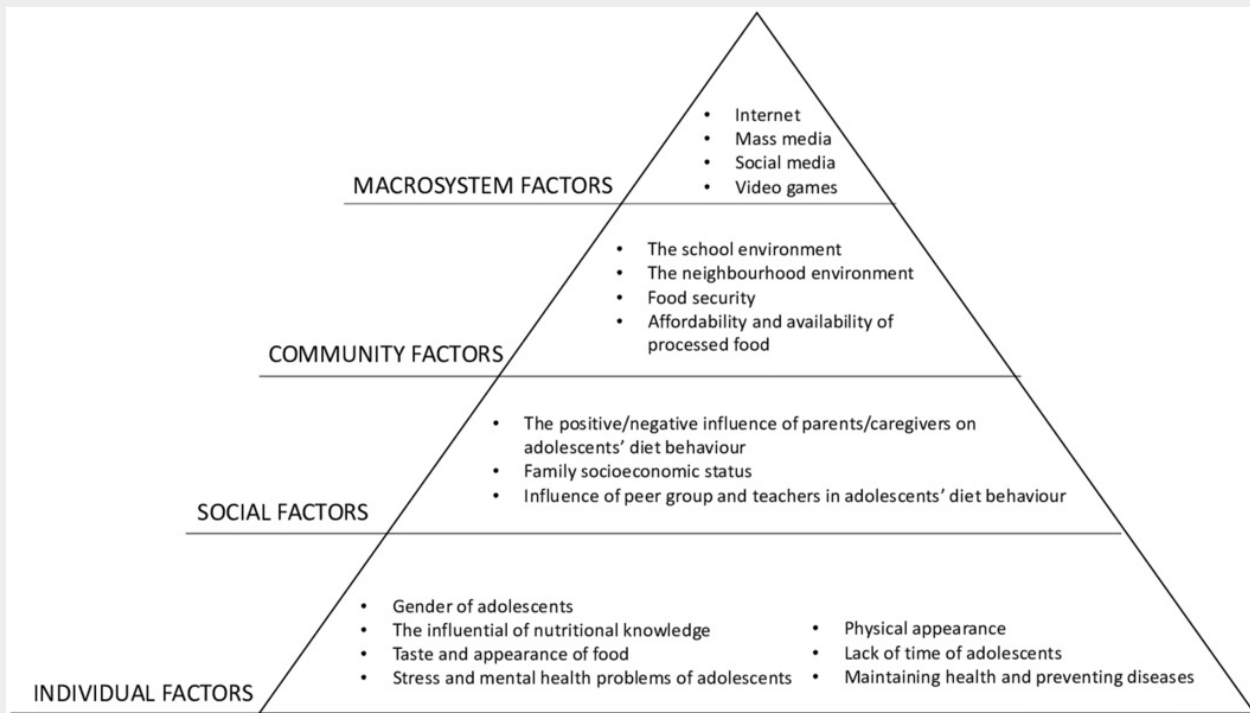
From a methodological approach, 5 studies used mixed-methods,^{25,26,32,35,48} while the rest used exclusively qualitative methodologies. For those studies with mixed-methods, only qualitative results were considered in alignment with the review's objectives.

Focus groups and in-depth interviews were the most used techniques. Five articles used ethnographic techniques, primarily participant observation.^{32,49,54,59,61} Three articles utilized Photovoice,^{31,37,45} a method that leverages photography to promote social reflection, knowledge, and action.⁶⁸ One article involved the secondary analysis of qualitative data.²⁹

Outcomes

The influences on food choices are diverse, as demonstrated in the risk-of-bias [Tables 3, 4, and 5](#), where the main findings are summarized. As mentioned earlier, these factors have been categorized into 4 levels of influence: individual, social, community, and macrosystem. [Figure 2](#) illustrates the main results.

Figure 2 Main factors influencing in adolescents’ diet according to qualitative studies.



Note: The table layout displayed in ‘Edit’ view is not how it will appear in the printed/pdf version. This html display is to enable content corrections to the table. [Please click here to view table layout.](#)

Table 3 Risk of bias: individual factors

Summary review findings	Studies contributing to the review finding (n = 50)	Methodological limitations	Coherence	Adequacy	Relevance	CERQual assessment of confidence on the evidence	Explanation of CERQual of the assessment
						AQ28	

<p>1. The gender of the adolescent influences eating behavior and the practice of physical activity. Gender stereotypes influence food choices: women usually are more concerned about body weight AQ30 and healthy eating and men usually see healthy eating as an unmasculine behavior. Men are more concerned about gaining muscle mass and are more involved in physical activity.</p>	<p>11, 13, 16, 25, 26, 30, 31, 33, 41, 44</p>	<p>Moderate methodological limitations: 2 studies with minor methodological limitations (unclear ethical considerations), 4 studies with moderate methodological limitations (insufficiently rigorous data analysis, unclear ethical considerations, insufficient explanation of technics), and 2 studies with serious methodological limitations (unclear reflexivity, inappropriate research design, insufficiently rigorous data analysis, and unclear ethical considerations)</p>	<p>Minor concerns about coherence (some concerns about the fit between the data from primary studies and the review finding)</p>	<p>No concerns about adequacy (many studies that offer rich data)</p>	<p>No concerns about relevance (studies from 4 continents and different social settings)</p>	<p>High confidence</p>	<p>Moderate methodological limitations and no concerns or minor concerns regarding coherence, adequacy, and relevance</p>
<p>2. The influence of nutritional knowledge on teen eating behavior is limited. It is a necessary condition, but it does not determine the choice adolescents make of foods.</p>	<p>7, 11, 12, 17, 18, 20, 24, 25, 26, 40, 43, 46, 48, 49</p>	<p>Moderate methodological limitations: 2 studies with minor methodological limitations (unclear ethical considerations), 6 studies with moderate methodological limitations (unclear ethical considerations and insufficiently rigorous data analysis), and 2 studies with serious methodological limitations (unclear reflexivity, insufficiently rigorous data analysis, insufficient explanation of technics, and unclear ethical considerations)</p>	<p>Serious concerns regarding coherence (several concerns about the fit between the data from primary studies and the review finding)</p>	<p>No concerns about adequacy (many studies that offer rich data)</p>	<p>Very minor concerns about relevance (studies from 4 continents and different social settings)</p>	<p>Moderate confidence</p>	<p>Moderate methodological limitations, serious concerns regarding coherence, and no concerns or minor concerns regarding adequacy and relevance</p>

<p>3. Taste and appearance, not nutritional value, motivate teens' food choices. Also, convenience and ease of preparation influence adolescents' choices.</p>	<p>12, 13, 16, 29, 36, 42, 43, 47, 49, 50</p>	<p>Moderate methodological limitations: 2 studies with minor methodological limitations (unclear ethical considerations), 1 study with moderate methodological limitations (insufficiently rigorous data analysis), and 2 studies with serious methodological limitations (unclear reflexivity, insufficiently rigorous data analysis, insufficient explanation of techniques, inappropriate research design, and unclear ethical considerations)</p>	<p>Minor concerns about coherence (some concerns about the fit between the data from primary studies and the review finding)</p>	<p>Very minor concerns about adequacy (many studies that offer moderately rich data)</p>	<p>Minor concerns about relevance (studies from 4 continents and different social settings)</p>	<p>High confidence</p>	<p>Moderate methodological limitations and minor concerns regarding coherence, adequacy, and relevance</p>
<p>4. Stress and mental health problems are barriers to healthy eating. Emotional distress can lead to emotional overeating and bad habits. Nevertheless, there may be protective factors of stress that promote better nutrition, such as self-confidence and high esteem.</p>	<p>1, 18, 34, 38</p>	<p>Moderate methodological limitations: 3 studies with moderate methodological limitations (unclear ethical considerations, insufficiently rigorous data analysis)</p>	<p>Minor concerns about coherence (some concerns about the fit between the data from primary studies and the review finding)</p>	<p>Moderate concerns about adequacy (4 studies that offer thin data)</p>	<p>Moderate concerns about relevance (a few studies but from 3 continents)</p>	<p>Moderate confidence</p>	<p>Moderate concerns regarding methodology, adequacy, and relevance and minor concerns regarding coherence</p>
<p>5. Motivational factors such as maintaining health and preventing diseases facilitate healthy eating. Also, preserving good social relationship and achieving success are other motivational factors.</p>	<p>6, 12, 18, 39</p>	<p>Minor methodological limitations: 1 study with minor methodological limitations (unclear ethical considerations) and 1 study with moderate methodological limitations (unclear ethical considerations and insufficiently rigorous data analysis)</p>	<p>Moderate concerns about coherence (some concerns about the fit between the data from primary studies and the review finding)</p>	<p>Moderate concerns about adequacy (4 studies that offer thin data)</p>	<p>Moderate concerns about relevance (a few studies from 3 continents)</p>	<p>Moderate confidence</p>	<p>Minor concerns regarding methodology and moderate concerns regarding coherence, adequacy, and relevance</p>

<p>6. Appearance, and the desire to improve it, is a facilitating factor for healthy eating. However, excessive concern or pressure for body image is a barrier.</p>	<p>6, 12, 30, 43</p>	<p>Moderate methodological limitations: 1 study with minor methodological limitations (unclear ethical considerations), 1 study with moderate methodological limitations (insufficiently rigorous data analysis and inappropriate research design), and 1 study with serious methodological limitations (unclear reflexivity, insufficiently rigorous data analysis, insufficient explanation of techniques, and unclear ethical considerations)</p>	<p>Moderate concerns about coherence (some concerns about the fit between the data from primary studies and the review finding)</p>	<p>Minor concerns about adequacy (6 studies that offer thin data)</p>	<p>Minor concerns about relevance (studies from 3 continents)</p>	<p>Moderate confidence</p>	<p>Moderate concerns regarding methodology and coherence and minor concerns regarding adequacy and relevance</p>
<p>7. Lack of time is a barrier to healthy eating and is associated with purchasing processed food.</p>	<p>3, 14, 18, 26, 29, 40, 42, 47</p>	<p>Moderate methodological limitations: 3 studies with moderate methodological limitations (insufficiently rigorous data analysis and unclear ethical considerations) and 2 studies with serious methodological limitations (unclear reflexivity, inappropriate research design, insufficiently rigorous data analysis, and unclear ethical considerations)</p>	<p>No concerns about coherence</p>	<p>Minor concerns about adequacy (the studies offer moderately rich data)</p>	<p>No concerns about relevance (studies from 4 continents and different social settings)</p>	<p>High confidence</p>	<p>Moderate methodological limitations and no concerns or minor concerns regarding coherence, adequacy and relevance</p>


Abbreviation: CERQual, Confidence in Evidence from Reviews of Qualitative Research.



Note: The table layout displayed in 'Edit' view is not how it will appear in the printed/pdf version. This html display is to enable content corrections to the table. [Please click here to view table layout.](#)

Table 4 Risk of bias: social factors

Summary of review findings	Studies contributing to the review finding	Methodological limitations	Coherence	Adequacy	Relevance	CERQual assessment of confidence on the evidence	Explanation of CERQual assessment
8. Parents/caregivers have a positive influence on teen eating behavior. Parents are role models and promote healthy eating by providing advice on food selection and controlling adolescent choices. Family meals have a protective effect on healthy habits as they provide routine, communication opportunities, and connection.	1, 2, 4, 12, 13, 14, 17, 18, 19, 20, 22, 23, 24, 27, 28, 29, 39, 45, 47, 48	Moderate methodological limitations: 2 studies with minor methodological limitations (unclear ethical considerations), 10 studies with moderate methodological limitations (unclear ethical considerations and insufficiently rigorous data analysis), and 2 studies with serious methodological limitations (unclear reflexivity, inappropriate research design, insufficiently rigorous data analysis, and unclear ethical considerations)	Minor concerns about coherence (some concerns about the fit between the data from primary studies and the review finding)	No concerns about adequacy (many studies that offer very rich data)	No concerns about relevance (studies from the 5 continents)	High confidence	Moderate methodological limitations and no concerns or minor concerns regarding coherence, adequacy, and relevance
9. Parents/caregivers can negatively influence teen eating behavior if forms of parental indulgence are given: having no rules, avoiding talking about health-related issues, having high permissiveness, and giving money for adolescents to eat outside. Parents often buy unhealthy and processed food to please teenagers.	17, 18, 21, 46, 47, 50	Moderate methodological limitations: 3 studies with moderate methodological limitations (unclear ethical considerations and insufficiently rigorous data analysis) and 1 study with serious methodological limitations (unclear reflexivity, inappropriate research design, insufficiently rigorous data analysis, and unclear ethical considerations)	Minor concerns about coherence (some concerns about the fit between the data from primary studies and the review finding)	Moderate concerns about adequacy (5 studies offering thin data)	Minor concerns about relevance (studies from 4 continents)	Moderate confidence	Moderate concerns regarding methodology and adequacy and minor concerns regarding coherence and relevance


<p>10. Family socioeconomic status is a barrier to healthy eating. The availability of healthy food is usually lower in the home of low-income families, and the availability of processed products is higher.</p>	<p>1, 10, 20, 22, 35, 42, 45</p>	<p>Moderate methodological limitations: 3 studies with moderate methodological limitations (inappropriate research design and insufficiently rigorous data analysis)</p>	<p>Very minor concerns about coherence</p>	<p>Very minor concerns about adequacy (7 studies that offer moderately rich data)</p>	<p>Minor concerns about relevance (studies from 3 continents)</p>	<p>High confidence</p>	<p>Moderate methodological limitations and no concerns or minor concerns regarding coherence, adequacy, and relevance</p>
<p>11. Peer group in adolescence is associated with consuming unhealthy foods. Schoolmates and friends often influence the purchase of low-nutrient foods at school and outside. Nevertheless, peer influence could be positive in some cases.</p>	<p>1, 18, 19, 27, 29, 32, 39, 40, 43, 44, 46, 47, 49</p>	<p>Moderate methodological limitations: 1 study with minor methodological limitations (unclear ethical considerations), 6 studies with moderate methodological limitations (unclear ethical considerations, insufficient explanation of techniques, and insufficiently rigorous data analysis), and 2 studies with serious methodological limitations (unclear reflexivity, insufficiently rigorous data analysis, and unclear ethical considerations)</p>	<p>Moderate concerns about coherence (some concerns about the fit between the data from primary studies and the review finding)</p>	<p>No concerns about adequacy (many studies that offer very rich data)</p>	<p>Very minor concerns about relevance (studies from 4 continents)</p>	<p>Moderate confidence</p>	<p>Moderate concerns regarding methodology and coherence and very minor concerns regarding adequacy and relevance</p>
<p>12. Teachers are positive influential figures in adolescent nutritional habits by providing information and teaching about healthy eating.</p>	<p>18, 27</p>	<p>Moderate methodological limitations: 1 study with moderate methodological limitations (insufficiently rigorous data analysis)</p>	<p>Very minor concerns about coherence</p>	<p>Serious concerns about adequacy (only 2 studies offering very thin data)</p>	<p>Serious concerns about relevance (only 2 studies from 2 continents)</p>	<p>Low confidence</p>	<p>Moderate methodological limitations, very minor concerns regarding coherence, and serious concerns regarding adequacy and relevance</p>
<p>Abbreviation: CERQual, Confidence in Evidence from Reviews of Qualitative Research.</p>							

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Table 5 Risk of bias: community and macrosystem factors

Summary review findings	Studies contributing to review finding	Methodological limitations	Coherence	Adequacy	Relevance	CERQual assessment of confidence on the evidence	Explanation of CERQual assessment
Community factors							
13. The school environment influences the eating behavior of adolescents. Current school food environments do not seem to promote healthy eating among adolescents. The main barriers to healthy eating at school included the lack of healthy food options, the availability of unhealthy foods, and issues around preferences and affordability.	3, 12, 14, 15, 16, 17, 19, 20, 22, 24, 31, 32, 36, 37, 38, 40, 41, 42, 43, 44, 48, 49, 50	Moderate methodological limitations: 3 studies with minor methodological limitations (unclear ethical considerations), 7 studies with moderate methodological limitations (insufficiently rigorous data analysis), and 5 studies with serious methodological limitations (unclear reflexivity, insufficiently rigorous data analysis, insufficient explanation of techniques, and unclear ethical considerations)	Moderate concerns about coherence (some concerns about the fit between the data from primary studies and the review finding)	No concerns about adequacy (many studies that offer very rich data)	No concerns about relevance (studies from the 5 continents)	High confidence	Moderate concerns regarding methodology and coherence and no concerns regarding adequacy and relevance
14. The neighborhood environment influences adolescents' eating behavior and physical activity. Unhealthy food stores are very accessible to teens, especially around schools in low-income neighborhoods. Adolescents in urban areas have more opportunities to purchase prepared foods. In rural settings, it is more difficult for adolescents to meet dietary and physical activity needs.	3, 7, 14, 15, 16, 17, 19, 23, 27, 28, 32, 35, 36, 39, 50	Moderate methodological limitations: 2 studies with minor methodological limitations (unclear ethical considerations), 4 studies with moderate methodological limitations (unclear ethical considerations, insufficient explanation of techniques, and insufficiently rigorous data analysis), and 3 studies with serious methodological limitations (inappropriate research design, unclear reflexivity, insufficiently rigorous data analysis, and unclear ethical considerations)	Minor concerns about coherence (some concerns about the fit between the data from primary studies and the review finding)	No concerns about adequacy (many studies that offer very rich data)	No concerns about relevance (studies from the 5 continents)	High confidence	Moderate methodological limitations and no concerns or minor concerns regarding coherence, adequacy, and relevance

<p>15. The home environment influences the eating behavior of adolescents. The low availability of healthy and processed food at home is a barrier to healthy eating for teens, while the availability of healthy snacks is a facilitator.</p>	<p>1, 12, 19, 22, 23, 24, 28, 33, 38, 41, 42, 45</p>	<p>Moderate methodological limitations: 3 studies with minor methodological limitations (unclear ethical considerations), 3 studies with moderate methodological limitations (insufficient explanation of techniques and insufficiently rigorous data analysis), and 1 study with serious methodological limitations (inappropriate research design, unclear reflexivity, insufficiently rigorous data analysis, insufficient explanation of techniques, and unclear ethical considerations)</p>	<p>Minor concerns about coherence (some concerns about the fit between the data from primary studies and the review finding)</p>	<p>No concerns about adequacy (many studies that offer very rich data)</p>	<p>No concerns about relevance (studies from the 5 continents)</p>	<p>High confidence</p>	<p>Moderate methodological limitations and no concerns or minor concerns regarding coherence, adequacy, and relevance</p>
<p>16. Food security is a major concern in emerging countries. In the context of social transition, access to healthy and safe food is reduced, and the consumption of prepared foods, usually on the street, increases. Seasonality is another factor that influences eating behavior in emerging countries and rural areas.</p>	<p>7, 9, 11, 16, 24, 28, 32, 33, 42, 43</p>	<p>Moderate methodological limitations: 1 study with minor methodological limitations, 4 studies with moderate methodological limitations (unclear ethical considerations and insufficiently rigorous data analysis), and 1 study with serious methodological limitations (unclear reflexivity, insufficiently rigorous data analysis, and unclear ethical considerations)</p>	<p>No concerns about coherence</p>	<p>Very minor concerns about adequacy (many studies that offer rich data)</p>	<p>Minor concerns about relevance (studies from 3 continents—Africa, Asia, and South America—and especially from disadvantaged social settings)</p>	<p>High confidence</p>	<p>Moderate methodological limitations and no concerns or minor concerns regarding coherence, adequacy, and relevance</p>

<p>17. Affordability and availability of processed food in different environments is a factor that influences an adolescent's unhealthy diet.</p>	<p>9, 11, 13, 18, 24, 29, 32, 35, 43, 46, 50</p>	<p>Moderate methodological limitations: 6 studies with moderate methodological limitations (unclear ethical considerations and insufficiently rigorous data analysis) and 2 studies with serious methodological limitations (unclear reflexivity, insufficiently rigorous data analysis, and unclear ethical considerations)</p>	<p>No concerns about coherence</p>	<p>Very minor concerns about adequacy (many studies that offer rich data)</p>	<p>Minor concerns about relevance (studies from 4 continents and especially from disadvantaged social settings)</p>	<p>High confidence</p>	<p>Moderate methodological limitations and no concerns or minor concerns regarding coherence, adequacy and relevance</p>
<p>Macrosystem factors</p>							
<p>18. Mass media, social media, video games, and the Internet have an increasing influence on adolescents' eating behavior. Screen time is generally associated with a worse diet and less physical activity.</p>	<p>1, 19, 20, 23, 28, 31, 41, 49</p>	<p>Moderate methodological limitations: 3 studies with moderate methodological limitations (inappropriate research design, insufficient explanation of techniques, insufficiently rigorous data analysis)</p>	<p>Moderate concerns about coherence (some concerns about the fit between the data from primary studies and the review finding)</p>	<p>Moderate concerns about adequacy (7 studies that offer thin data)</p>	<p>Minor concerns about relevance (a few studies but 4 continents)</p>	<p>Moderate confidence</p>	<p>Moderate concerns regarding methodology, coherence, and adequacy and minor concerns regarding relevance</p>
<p>Abbreviation: CERQual, Confidence in Evidence from Reviews of Qualitative Research.</p>							

Individual factors

As depicted in Table 3, 7 individual factors influencing adolescent eating behaviors emerged: gender; nutritional knowledge; taste and appearance; stress and mental health problems; motivational factors, such as maintaining health and preventing diseases; physical appearance; and lack of time.

Gender stereotypes influenced food choices: female adolescents were associated with thinness and male adolescents were associated with a virile and strong image.⁴⁷ Thus, female adolescents usually were more concerned about body weight and healthy eating and male adolescents perceived healthy eating as an unmasculine behavior, although this perception is changing.⁵¹ Male adolescents were more concerned about gaining muscle mass^{48,63} and were more involved in physical activity because they had more opportunities to do so.^{52,61} Female adolescents had more responsibilities at home, which undermined their physical activity and healthy eating habits.^{33,35,38} There could be gender segregation in low- and middle-income countries, with female adolescents having less access to healthy food.⁵⁴

Nutritional knowledge was another factor influencing adolescents' eating behaviors. Nevertheless, the evidence is mixed. Some studies showed how adolescents acknowledged the relevance of healthy eating,^{29,33,40,46,62} and confirmed the importance of nutritional knowledge for healthy eating,^{34,42} while other studies stated that adolescents' nutritional knowledge was limited and they had some misconceptions.^{34,39,42} In contrast, other studies showed how nutritional knowledge does not necessarily influence making healthier food choices, as these can provide adolescents with some misconceptions^{39,55,66} or can be influenced by aspects such as taste or appearance.^{47,48,60,69} The latter, taste and appearance and not nutritional value, was identified as a motivation for adolescents' food choices.^{21,34,35,38,42,57,62,65,66} Although adolescents acknowledge the risks of ultra-processed foods, they eat it because of their palatability. Moreover, they associate eating in fast-food restaurants with pleasure, freedom, and friendship. In addition, convenience and ease of preparation influence adolescents' choices.²²

Stress was also identified as an influential factor, which could originate from school or the family. Often, academic demands,^{40,58} social pressure related to body control, problems at home, and lack of family support triggered stress and mental health problems (anxiety, depression, lack of self-confidence) in adolescents, which were identified as barriers to healthy eating.²³ Furthermore, distress could lead to emotional overeating.⁵⁵ In contrast, self-confidence and adolescent self-esteem prevented unhealthy behaviors.⁷⁰

Individual motivations act as facilitators for healthy eating. Maintaining good health and preventing diseases were the main motivations to care for oneself through nutritious food.^{34,40,59} In addition, maintaining good social relationships and achieving success were motivational factors for healthy eating.²⁸

Motivational factors, adolescents' gender, and the desire to improve appearance were facilitating factors for healthy eating.^{34,42,62} However, excessive concern or pressure for body image was a barrier. Lack of time was also a barrier to healthy eating, which limited parents' ability to prepare healthy food and was associated with purchasing processed food.^{21,22,25,40,60,65} Lack of time was also associated with skipping breakfast.^{36,48}

Social factors

Five social factors emerged, as shown in [Table 4](#): the positive influence of parents/caregivers, the negative influence of parents/caregivers, family socioeconomic status, influence of peer group, and influence of teachers.

Parents and caregivers were one of the biggest influences on adolescents' eating behaviors.⁴¹ Parents were role models and promoted healthy eating by providing information and advice on food choices.^{22–24,34,36,39,40,42,46,49,50,63–65} They were the ones who chose and prepared the food for adolescents,³⁵ and home-made food was a facilitator of healthy eating.⁴⁵ Furthermore, family meals promote healthy habits as they provide routine, communication opportunities, and connection.^{26,44} Females were usually responsible for food purchases, preparation, and cooking.⁵⁹

However, parents and caregivers could also act as negative influences if forms of parental indulgence were present, namely the following: having no rules, avoiding talking about health-related issues, having high permissiveness, and giving money for adolescents to eat outside the home.^{43,67,70} Moreover, some parents buy non-healthy foods to please their children.^{21,34,38} Limited parental supervision during meals was also a barrier.⁴⁰

The availability of healthy food was lower among low-SES families, while the consumption of ultra-processed products was higher.^{21,32,42,44,54,56,64} Obesity showed a social gradient: poorer adolescents were more at risk of presenting obesity^{AQ9} compared with their more advantaged counterparts.²³

In addition to the family, another social group emerged as being influential: adolescents' peer groups, such as classmates and friends. Peer groups were considered a barrier because they put pressure on developing unhealthy food habits.^{40,41,49,53,62,64} Schoolmates or friends could influence the purchase of low-nutrient foods at/outside school, food outlets, and on the way to school restaurants or during the weekends.^{22,60,65} Nevertheless, some studies mentioned that peer influence could be positive if the peer group reinforced healthy habits.^{59,63} In addition, they could motivate sports and physical activity.⁶⁶

The fifth social factor was the influence of teachers on eating behaviors, although this factor had a low confidence result only supported by 2 articles. Teachers were positive influential figures in adolescents' nutritional habits by providing information and teaching about nutrition.^{40,49}

Community factors

As shown in [Table 5](#), 5 community factors resulted from our analysis^{AQ10}: the school environment, the neighborhood environment, the home environment, food security, and affordability and availability of ultra-processed food.

The first community factor was the school food environment, one of the most critical factors in explaining adolescent eating behaviors, because this is where adolescents spent much of their time, snacked, and ate the main meal. Although an educational environment, current school food environments did not promote healthy eating.⁴¹ The main reasons^{AQ11} are the lack of healthy food options, the availability of unhealthy foods, and issues around preferences and affordability.^{21,34,38,42,53,57,60,67} School food could be unhealthy and unpleasant for adolescents,^{39,66} and the cafeteria could be a noisy and chaotic place.⁵² The lack of financing and robustness in implementing school interventions and the fact that school canteens were mainly profit-oriented^{AQ12} were also barriers.^{25,41} However, other studies showed how the school was an enabler of healthy eating by providing more nutritious school menus and snacks, such as fruit, and removing sugary drinks from vending machines,^{25,36,44,46,61} and how the school played a significant role in nutrition education.⁶⁹ In addition, school activities promoted and facilitated physical activity among adolescents.^{25,46,66} The

measures, such as making healthy options more affordable and allowing students to participate in decision making, were also mentioned.³⁷

The neighborhood environment was another important community factor. Street food and stores selling unhealthier foods were accessible to adolescents, especially around schools in low-SES neighborhoods and in low- and middle-income countries.^{25,36–39,41,45,50,67} Adolescents in urban areas had more opportunities to make their own choices, although ultra-processed foods were also more available.²⁹ In rural settings, it was more difficult to meet adolescents' dietary and physical activity needs.^{53,57}

The home environment could be a barrier or a facilitator for healthy eating. The low availability of healthy food and the presence of ultra-processed food at home was a [AQ13](#) In contrast, the availability of healthy snacks was a facilitator^{23,39,44,45,58,61} The availability of healthy food in households was also highly influenced by socioeconomic position.^{21,46,50,54}

Food security was a relevant community factor among low- and middle-income countries, with reduced access to healthy and safe food.^{21,46,50,53,54,62} Often, the hygienic conditions of street food stalls were poor.⁷¹ Seasonality was another factor that influenced adolescents' eating behaviors in these countries and rural areas.^{29,33,38}

Affordability and availability were other factors that influence adolescents' food choices. Low prices and wide availability in different environments (on the street or in the house) of unhealthy and prepared foods seem to favor their purchases and consumption.^{22,33,35,40,46,53,56,62,67,70,71}

Macrosystem factors

As shown in [Table 5](#), 4 factors at the macrosystem level resulted from the literature review: mass media, social media, video games, and the Internet. Mass media, social media, video games, and the Internet increasingly influenced adolescents' eating behaviors, as they were sources for gathering nutritional information.^{41,50} Screen time was associated with worse dietary outcomes and lower physical activity levels.^{45,52,61} Importantly, mass media could influence the perception of ideal body weight.⁴² Technology could have a dual role in adolescents, positive or negative, depending on time use.²³ Video games could also be a facilitator of physical activity.³⁹ [Figure 2](#) summarizes all of the factors exposed in the results.

DISCUSSION

To our knowledge, this is the first systematic review to synthesize qualitative research on the factors influencing eating behaviors among adolescents. We included 50 relevant studies conducted globally over the last decade.

Four types or levels of factors were identified: individual, social, community, and macrosystem factors. Most

studies provided high-quality reports of thoughtful and rigorous qualitative work. The main limitations were methodological aspects such as insufficiently rigorous data analysis, unclear ethical considerations, or inadequate explanation of applied techniques. Most factors resulting from the review showed a high consistency. However, there is a need for more in-depth qualitative research into some less-studied factors that have become increasingly important, such as stress or social media.

Gender was found to be an individual factor that influences adolescents' eating habits. This factor was widely supported by qualitative research and had high coherence between different articles. Stereotypes surrounding femininity and masculinity influenced female adolescents to be [AQ14](#) more concerned with body weight, while males sought to convey a more virile image.⁴⁷ Female adolescents tended to be more involved in healthy eating, while males were more interested in gaining muscle mass.^{48,63} In poorer contexts, female adolescents had fewer opportunities to have a nutritious diet and engage in physical activity.^{33,35,38} Another systematic review of qualitative research also found gender to be an essential factor influencing adolescents' eating behaviors in India and sub-Saharan Africa.⁷²

Nutritional knowledge was also an individual factor found by many studies in the review^{29,33,40,46,62} and other reviews of qualitative research.⁷³ However, there was a need for consensus regarding adolescents' nutritional knowledge and its importance in healthy eating. The conclusion suggests that it was a necessary but not sufficient condition [AQ15](#); adolescents needed to have nutritional knowledge for healthy eating, but this did not always imply good choices, as these could be influenced by taste and appearance,^{47,48,60,69} which were considered other influential factors.

Some authors identified stress and mental health problems as barriers to healthy eating. Stress could be caused by academic pressure or the home environment,^{40,70} and could lead to mental health disorders such as anxiety or depression²³ and emotional overeating.⁴² Furthermore, good self-esteem and self-confidence during adolescence are related to better habits.⁷⁰ Despite the apparent significant influence of stress on adolescents' diets, further research is needed.

Other individual factors that acted as facilitators of healthy eating were the motivation to maintain good health^{39,40,61} and good appearance,^{28,34,62} although excessive concern for the body could be a barrier.⁵¹ Lack of time was a barrier to healthy eating and was associated with purchasing processed foods.^{21,22,25,40,60,65}

With regard to social factors, the scientific literature showed that parents and caregivers were the most significant influences on adolescents' eating behaviors. The influence of parents was usually positive because they acted as role models, controlled adolescents' food choices, and provided routine with family meals.^{22–24,26,34,36,39,40,42,44,46,49,50,64,65} However, parents' influence could be a barrier if forms of parental indulgence were present and they made food choices guided by adolescents' tastes.^{38,39,43,65,67,70} Moreover, socioeconomic inequalities are very present, making low-SES families more vulnerable to unhealthy eating.^{21,32,42,44,54,56,64} A systematic review of qualitative studies⁷⁴ also supported the significant influence of

parents on adolescents' diets.

In addition to the influence of parents, the adolescents' peer groups showed a great impact.⁷⁰ This often acted as a barrier to healthy eating, as friends and classmates encouraged the purchase of snacks and less-nutritious foods at school or on weekends at fast-food chains.^{40,41,49,53,62,64} Teachers could serve as sources of nutritional knowledge,^{40,49} as confirmed by a study on adolescents' trust in various sources of information.⁷⁵ In addition to teachers, coaches and other authority [AQ16](#) figures could positively influence adolescents' eating behaviours,⁷⁵ although more research is needed.

With regard to community factors, the home, school, and residential food environments were important influences. Since food in school canteens and cafeterias was usually not healthy, affordable, or appealing for adolescents, it was considered a barrier.^{21,34,38,42,53,57,60,67,70} However, with specific interventions, schools could act as a facilitator.^{25,36,44} The neighborhood food environment also negatively influenced those of low SES due to the wide availability of unhealthy food outlets, bars, and street vendors.^{25,36–39,41,45,50,67} Rural environments had fewer food opportunities for healthy eating than urban settings.^{53,57} The home environment acted as a facilitator or a barrier depending on the family's SES; low-income households consumed more ultra-processed foods.^{21,46,50,54}

Additionally, food insecurity significantly influenced dietary behaviors among low-income countries, as concluded by a qualitative synthesis.⁷² Prepared and ultra-processed foods are replacing fresh and traditional foods.^{21,46,50,53,54,62} Factors such as seasonality, affordability and availability of food greatly influenced these contexts.^{29,33,35,38,40,67,70,71}

Last, macrosystem factors, also referred to as digital factors, influence adolescents' eating behaviors. Yet, the evidence is mixed. Screen time was the most mentioned aspect identified as being detrimental to both eating and physical activity habits.^{45,52,61} The Internet, mass media, and social media conditioned adolescents' food choices and influenced their self-perception.^{23,41,42,50} Another study conducted with experts about the impact of social media marketing on adolescents' eating behaviors supported the above conclusion.⁷⁶ Video games could be facilitators and barriers to better eating habits and physical activity since some promoted a sedentary lifestyle while others promoted physical activity.⁶⁶ Among the latter, we emphasize [AQ17](#) those video games that require the engagement of full body movement.⁶⁶

CONCLUSIONS

This systematic review of qualitative evidence identified different factors—at the individual, social, community, and macrosystem level—influencing adolescents' eating behaviors. At the individual level, gender roles and lack of time were the most influential factors. Socially, we identified parents, caregivers, peer groups, and SES as significant facilitators or barriers to healthy eating. The school, neighborhood, and home food environments

were significant at the community level. Finally, digital tools were identified as significant macrosystem-level facilitators or barriers to healthy eating.

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Declaration of interest. The authors have no relevant interests to declare.










Supporting Information

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




Appendix S1 [AQ18](#) XXX




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9. **Query [AQ9]** : Do you mean “more at risk of being obese” instead of “more at risk of presenting obesity”? Please check wording. 

Response by Author: "Replace "more at risk of presenting obesity" by more at risk of being obese""
10. **Query [AQ10]** : Confirm or amend addition of “from our analysis”. 


Response by Author: "Replace "our analysis" by "the analysis""
11. **Query [AQ11]** : Please check addition of “reasons”. 


Response by Author: "Replace "the main reasons" by "the factors that explain the food environmens did not promote healthy eating are....""
12. **Query [AQ12]** : Confirm or amend “profit-oriented” as edited. 


Response by Author: "Confirm "profit-oriented""
13. **Query [AQ13]** : Please add missing word(s) after “was a.” 

Response by Author: "Replace "was a" by "were risk factors for unhealthy diet""
14. **Query [AQ14]** : Confirm or amend “influenced female adolescents to be” as edited. 


Response by Author: "Confirm "influenced female adolescents to be""


15. **Query [AQ15]** : Do you mean, eg, “results” instead of “conclusion” and “factor” instead of “condition”? Please check wording for clarity. 
Response by Author: "Replace "The conclusion suggests that it was a necessary but not sufficient condition" by "The results suggest that it was a necessary but not sufficient factor""


16. **Query [AQ16]** : Confirm or amend addition of “authority”. 
Response by Author: "In confirm "authority figure""


17. **Query [AQ17]** : Do you mean, eg, “recommend” or similar instead of “emphasize”? Please clarify if possible. 
Response by Author: "Replace "emphasize" by "point out""







18. **Query [AQ18]** : Please provide the supplementary appendix legend. 
Response by Author: "Accept"


19. **Query [AQ19]** : Please provide the authors/collaborators name for Refs [4], [5], [14]. 
Response by Author: "Reference 4. World Health Organization
Reference 5. Mayne S, Virudachalam S, Ficks A.
Reference 14. World Health Organization"

20. **Query [AQ20]** : Reference 13: Please provide publisher’s location. 
Response by Author: "Publisher's location is "Thousand Oaks, California""

21. **Query [AQ21]** : Reference 20: Please add publisher’s location. 
Response by Author: "Publischer's location is Chichester"

22. **Query [AQ22]** : Details given in references [48] and [76] were same. Hence, reference [48] has been deleted and the references have been renumbered accordingly. 
Response by Author: "Accept"

23. **Query [AQ23]** : There is no mention of Reference [77] in the text. Please insert a citation in the text or delete the reference as appropriate, maintaining the numerical order of the references 
Response by Author: "We have deleted reference 77"
24. **Query [AQ24]** : Confirm or amend the table footnotes as edited to better correspond to style. 
Response by Author: "I confirm the table footnotes"
25. **Query [AQ25]** : Please check addition of “are”. 
Response by Author: "Replace "Most adolescents know what healthy foods are" by "Most adolescents know healthy foods""
26. **Query [AQ26]** : Confirm or amend “societal” as edited. 
Response by Author: "Change "societal" by "social""
27. **Query [AQ27]** : Please clarify or reword “Free-listing” if possible. 
Response by Author: "Change "Free-listing exercises" by "Choose free-listing exercises""
28. **Query [AQ28]** : Please check definition of “CERQual” in the table footnote, as added (see also Tables 4 and 5). 
Response by Author: "To add in thable footnoote of table 3, 4 and 5 the following comment: "The GRADE-CERQual (‘Confidence in the Evidence from Reviews of Qualitative research’) approach provides guidance for assessing how much confidence to place in findings from systematic reviews of qualitative research (or qualitative evidence syntheses). "
29. **Query [AQ29]** : Confirm or amend “major” as edited. 
Response by Author: "Change "an major" by "an important""

30. **Query [AQ30]** : Please confirm that the running footer removed to increase the text size of the Tables 3, 4, 5. 
- Response by Author:** "Do not confirm that the running footer is removed because is necessary to explain CerQual assessment"

Attachments

1. **File attached by Author:** Appendix S1[AU].doc