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REVIEW

Methodological approach to the assessment of the obesogenic environment in children and adolescents: A review of the literature

D. Rendina [a,b], A. Campanozzi [c], G. De Filippo [b,d,*] On behalf of the SINU Working Group on Nutritional Surveillance in Adolescents

[a] Department of Clinical Medicine and Surgery, Federico II University of Naples Medical School, Naples, Italy
[b] Assistance Publique-Hôpitaux de Paris, Hôpital Bicêtre, Service de Médecine des Adolescents, Le Kremlin Bicêtre, France
[c] Department of Medical and Surgical Sciences, Pediatric Unit, University of Foggia, Foggia, Italy
[d] French Clinical Research Group in Adolescent Medicine and Health, Paris, France

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KEYWORDS
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Obesogenic environment;
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Abstract *Aims:* Childhood and adolescent obesity has been defined as a planetary epidemic by WHO "globesity". The obesogenic environment, defined as a life environment promoting a high-energy intake and a sedentary lifestyle, significantly contributes to the genesis and the diffusion of the globesity. In the last decades, several authors and working groups tried to develop methodological instruments in order to guarantee a reliable analysis of an obesogenic environment. Their efforts have led to the production of a relatively large number of questionnaires with different characteristics. The general aim of these questionnaires is to identify the factors that significantly contribute to the creation of an obesogenic environment around children and adolescents. As a result of this work, a number of studies were carried out using such questionnaires. Aim of this review is to evaluate ad hoc questionnaires useful to identify and analyze obesogenic environment.
Data synthesis: The search was carried out in February–March 2017 using the *PubMed-Medline* and *Scopus* databases (time interval: the last 10 years). After the selection and verification phases, a total of 14 studies were selected and therefore included in the present review.
Conclusions: The questionnaires constructed and validated to analyze multiple constitutive elements of an obesogenic environment at the same time are complex and must be administered by qualified and trained staff. On the other hand, when two or more questionnaires are used to analyze different factors, the questionnaires used are generally shorter, self-administered, and generally easier to understand and interpret.

Introduction

In 2014, the World Health Organization (WHO) founded the Commission on Ending Childhood Obesity (ECHO). The main ECHO purpose was to identify the most effective approaches and interventions in tackling childhood and adolescent obesity in different contexts around the world. In the final report published in 2016, the ECHO defined the

* Corresponding author. Service de Médecine des Adolescents, Hôpital Bicêtre, 78 rue du Général Leclerc, 94275, Le Kremlin-Bicêtre, France.
E-mail address: gianpaolo.defilippo@aphp.fr (G. De Filippo).

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obesogenic environment as "an environment that promotes high energy intake and sedentary behavior. This includes the foods that are available, affordable, accessible and promoted; physical activity opportunities; and the social norms in relation to food and physical activity" [1]. One can then identify a familial obesogenic environment and an urban obesogenic environment, which are strictly related to each other (Fig. 1) [2].

Familial obesogenic environment

Major factors contribute to generate a familial obesogenic environment: children ⧵ teenagers' eating habits at home, which in turn is significantly influenced by the availability and accessibility of food and by the parental model of healthy/unhealthy eating; ii) children ⧵ teenager's physical activity level, which significantly depends on the possibility to perform physical activity and on the parental model of physical activity; and iii) the mass media availability at home and the parental model regarding their correct use [3,4]. Regarding mass media availability, an epochal shift took place at the third millennium with the World Wide Web (WWW) and Internet. The WWW revolution allows an interactive and not unidirectional worldwide communication process while possibly bringing about an impulsive psychiatric disorder similar to the gambling pathological addiction, the Internet Addiction [5]. Although there is currently no definitive diagnostic criteria for Internet Addiction, the pilot diagnosis of "Internet Gaming Disorder" has been suggested in the third Section "Emerging Measures and Models" of the "Diagnostic and Statistical Manual of Mental Disorders (DMS) –V" [6]. The Internet Addiction is a possible risk factor for both familial and urban obesogenic environment [7]. However, at least in theory, the WWW can also be an instrument for primary and secondary prevention of obesity adolescence in the first two decades of life, because it offers the possibility to interact with a large people [8,9].

Urban obesogenic environment

Physical and social factors contribute synergically to generate an urban obesogenic environment. The more relevant physical factors are community environment, public transport system, availability of areas for physical activity, and availability of places where food is consumed or sold. On the other hand, the primary social factor is the impact that political, cultural, social and macro- and micro-economic factors exercise on the community, on the family as well as on the children ⧵ teenager's life.

Analysis of obesogenic environment to elaborate intervention strategies

Considering the relevant medical, social and economic impact of childhood obesity [10,11], the ECHO commission have indicated that an integrate action of all human institution (from supranational Institutions to the family) is mandatory to face the global epidemic of childhood obesity [1]. The critical objectives of such institutional interventions must be very clearly identified in order to optimize the expenses [12]. Obesogenic environment should be primarily and carefully analyzed as a first step form implementing programs to obtain an effective primary and secondary prevention of childhood obesity [13]. Other methods exist to study the obesogenic environment

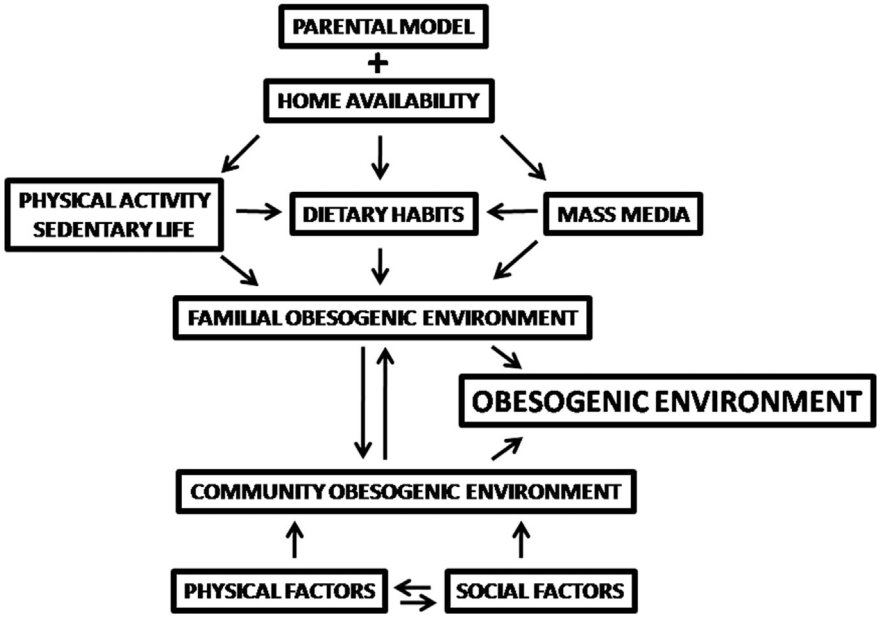

Figure 1 Interaction between factors determining an obesogenic environment.

(i.e. measurement of traffic, availability of facilities for outdoor activities and so on); interaction between the environment and individuals are beginning to be explored in multilevel studies and qualitative and sociological research [14]. In an epidemiological aim, several methods could be used to analyze the environment and its obesogenic potential. An interesting way is the network approach, allowing considering multiple features of communities hypothesized to be related to obesity, sparing from household density to public outdoor parks and recreational spaces [15]. In clinical practice the most common instruments used to analyze the obesogenic environment on an individual basis are the questionnaires with items ranging from food availability to physical activity and behavioral concerns. Data obtained from the questionnaires can be used to screen youth that are at increased risk or overweight or also to identify specific intervention targets, but also for research and/or epidemiological purposes (in this way, integrating other tools like network approach cited formerly).

Aim of this review is to evaluate ad hoc questionnaires useful to identify and analyze obesogenic environment.

Methods

Study selection and data extraction

The inclusion criteria were:

- Observational studies published in the English, Italian or Spanish language from January 01 2007 to January 31 2017,
- Study population consisting of adolescents from general population,
- Collection of obesogenic environment data after 2006

The exclusion criteria were:

- Study population consisting of adolescents selected for peculiar characteristics (i.e. athletes, subjects with specific diseases),
- The impossibility to extrapolate data related only to adolescents from an experimental group that also included children and/or adults.

Data sources and searches

The search was carried out in February–March 2017 using the *PubMed-Medline* and *Scopus* databases (time interval: the last 10 years). The period (last decade) was chosen to allow a view of the actual clinical practice in the field.

For the obesogenic environment questionnaires, a combination of the following key words was used:

- children, adolescent, teenager, pubescent, boy, girl, youth;
- obesogenic environment;
- questionnaire, surveys;
- observational, epidemiologic, cohort study

The *PubMed-Medline* and *Scopus* query translations are reported in supplemental table 1.

For internet addiction questionnaires a first research was made using the keywords “obesogenic environment” AND “internet addiction”. This search did not produce any results. However, considering that very recently several authors identify the Internet Addiction as a constitutive element of the familial and urban obesogenic environments [5,7], we decided to carry out a further literature search to identify the questionnaires used to assess the Internet Addiction. Thus, the final combination of key words was:

- Children, adolescent, teenager, pubescent, boy, girl, youth;
- Internet addiction;
- Questionnaire, surveys;
- Observational, epidemiologic, cohort study

The research was conducted in duplicate (sites of Naples, Department of Clinical Medicine and Surgery and Foggia, Unit of Pediatrics, respectively by DR and AC) and, when useful, a manual search was performed from the references listed in the articles chosen (in particular, when more recent papers referred to older ones).

Data were extracted from selected studies using a standardized extraction form. The following data were collected:

- Publication data (authors, title, journal, year of publication);
- Study participants characteristics (study populations, male to female ratio, age, race);
- Details related to the validation of the questionnaire used in the study;
- Primary outcome (relationship between one obesogenic environment constitutive element and the weight of enrolled subjects);
- Secondary outcomes (relationship between one obesogenic environment constitutive element and other parameters affected by obesogenic environment (see Tables 1–3).

Results

The database search led to the retrieval of 1209 publications in PubMed and 1482 publications in Scopus. After the identification of 1124 publications selected in both databases, the number of articles retrieved fell to 1567 (Fig. 2).

Through the analysis titles and abstracts, we eliminated 1361 publications not meeting the established inclusion criteria (including reviews, meta-analyses, book chapters or contributions related to the experimental design only).

Upon the analysis of the full text of the remaining 206 studies, we excluded additional 192 studies (because of the use of the same questionnaire). Thus, a total of 14 studies were selected and included in the present review (Table 1). All selected questionnaires have been used to

Table 1 Selected articles and their principal characteristics.

Authors	Years	Country	Questionnaire	Subjects	Male/Female	Age[a]
D'Elia F, Callea A. [14]	2010	Italy	UADI	121	56/65	18–56
Egger G et al. [15]	2007	Australia	DAB-Q	–	–	–
Ferraro G et al. [16]	2007	Italy	IAT	236	139/97	13–50
Golan M. [17]	2014	Israel	FEAHQ	270	149/121	9.43 ± 2.0
Janssen JA et al. [18]	2017	Great Britain	GLTEQ	206	97/109	15–16
Johnson R et al. [19]	2012	USA	PSDQ	171	–	9–11
Kliemann N et al. [20]	2016	Great Britain	SREBQ	923	388/535	–
Lowe et al. [21]	2009	USA Great Britain	PFS	466	–	18–42
Mielgo-Ayuso J et al. [22]	2016	Spain	IPAQ	424	263/161	9–17
Schrempft S et al. [23]	2016	Great Britain	HEI	1133	0/1133	33.86
Sisson SB et al. [24]	2014	USA	CAHMI	55094	28,208/26886	11.6 ± 0.04
Stok FM et al. [25]	2015	Netherlands, Belgium, Germany, Great Britain, Denmark, Finland, Poland, Romania, Portugal	TESQ-E	11,392	5639/5753	13.2 ± 2.0
van Strien T, Oosterveld P- [26]	2008	Netherlands	DEBQ	769	382/387	9.6 ± 1.4
Yee KE et al. [27]	2011	USA	FNPA	119	59/60	10.5 ± 0.4

N–: data not available.
HEI: Home Environmental Interview. DEBQ: Dutch Eating Behaviour Questionnaire. SREBQ: Self-Regulation of Eating Behaviour Questionnaire. IPAQ: International Physical Activity Questionnaire. TESQ-E: 24-item Tempest Self-Regulation Questionnaire for Eating. CAHMI: National Survey of Children's Health Child and Adolescent Health Measurement Initiative. GLTEQ: Godin leisure-time exercise questionnaire. FEAHQR Family Eating and Activity Habits Questionnaire revised. PSDQ: Parenting Styles and Dimensions Questionnaire. FNPA: Family Nutrition and Physical Activity. PFS: Power of Food Scale. DAB-Q: Diet, Activity and Behaviour Questionnaire. UADI: Uso, Abuso, Dipendenza da Internet. IAT: Internet Addiction Test.
[a] Data are expressed as range or mean ± standard deviation or mean (standard error).

analyze the relationships between lifestyles and body weight.

General characteristics of selected questionnaires

The studies sample size ranged from 119 (FNPA) to 55094 (CAHMI) subjects.

All but one (which involved only female subjects) of the studies examined were carried out on subjects of both genders.

As the items analyzed (obesogenic environment and internet addiction) involve both pediatric and adult age, the age of the participating subjects ranged from 4 to 56 years. As to the questionnaires used in teenagers, six were

Table 2 Age range in which each questionnaire was validated.

	Age (years)										
QUESTIONNAIRE	<10	10	11	12	13	14	15	16	17	18	19
CAHMI											
DABQ											
DEBQ-C											
FEAHQR											
FNPA											
GLTEQ											
HEI											
IAT											
IPAQ											
PFS											
PSDQ											
SREBQ											
TESQ-E											
UADI											

HEI: Home Environmental Interview. DEBQ: Dutch Eating Behaviour Questionnaire. SREBQ: Self-Regulation of Eating Behaviour Questionnaire. IPAQ: International Physical Activity Questionnaire. TESQ-E: 24-item Tempest Self-Regulation Questionnaire for Eating. CAHMI: National Survey of Children's Health Child and Adolescent Health Measurement Initiative. GLTEQ: Godin leisure-time exercise questionnaire. FEAHQR Family Eating and Activity Habits Questionnaire revised. PSDQ: Parenting Styles and Dimensions Questionnaire. FNPA: Family Nutrition and Physical Activity. PFS: Power of Food Scale. DAB-Q: Diet, Activity and Behaviour Questionnaire. UADI: Uso, Abuso, Dipendenza da Internet. IAT: Internet Addiction Test.

Table 3 Major items analyzed in each questionnaire.

Authors. Year	Questionnaire	Dietary habits	Food availability	Physical activity	Mass media availability	Emotional aspects linked to dietary habits	Self-regulation of food intake	Strategies for halthy eating	Familial/urban environment	Parental behavior	Sleep	Internet addiction
Craig et al., 2003 [29]	IPAQ			✓								
De Vet et al., 2014 [30]	TESQ-E							✓				
Del Miglio et al., 2001 [31]	UADI											✓
Egger et al., 2007 [15]	DABQ	✓		✓								
Godin et al., 1997 [32]	GLTEQ			✓								
Golan et al., 2014 [17]	FEAHQR	✓		✓		✓						
Ihmels et al., 2009 [33]	FNPA	✓		✓	✓					✓	✓	
Kliemann et al., 2016 [20]	SREBQ						✓					
Lowe et al., 2009 [21]	PFS					✓						
Robinson et al., 1995 [34]	PSDQ									✓		
Schrempft S, 2016	HEI		✓	✓	✓				✓			
Sisson et al., 2014 [23]	CAHMI		✓	✓	✓				✓			
van Strien 2008 [26]	DEBQ-C					✓						
Young et al., 1998 [35]	IAT											✓

HEI: Home Environmental Interview. DEBQ: Dutch Eating Behaviour Questionnaire. SREBQ: Self-Regulation of Eating Behaviour Questionnaire. IPAQ: International Physical Activity Questionnaire. TESQ-E: 24-item Tempest Self-Regulation Questionnaire for Eating. CAHMI: National Survey of Children's Health Child and Adolescent Health Measurement Initiative. GLTEQ: Godin leisure-time exercise questionnaire. FEAHQR Family Eating and Activity Habits Questionnaire revised. PSDQ: Parenting Styles and Dimensions Questionnaire. FNPA: Family Nutrition and Physical Activity. PFS: Power of Food Scale. DAB-Q: Diet, Activity and Behaviour Questionnaire. UADI: Uso, Abuso, Dipendenza da Internet. IAT: Internet Addiction Test.

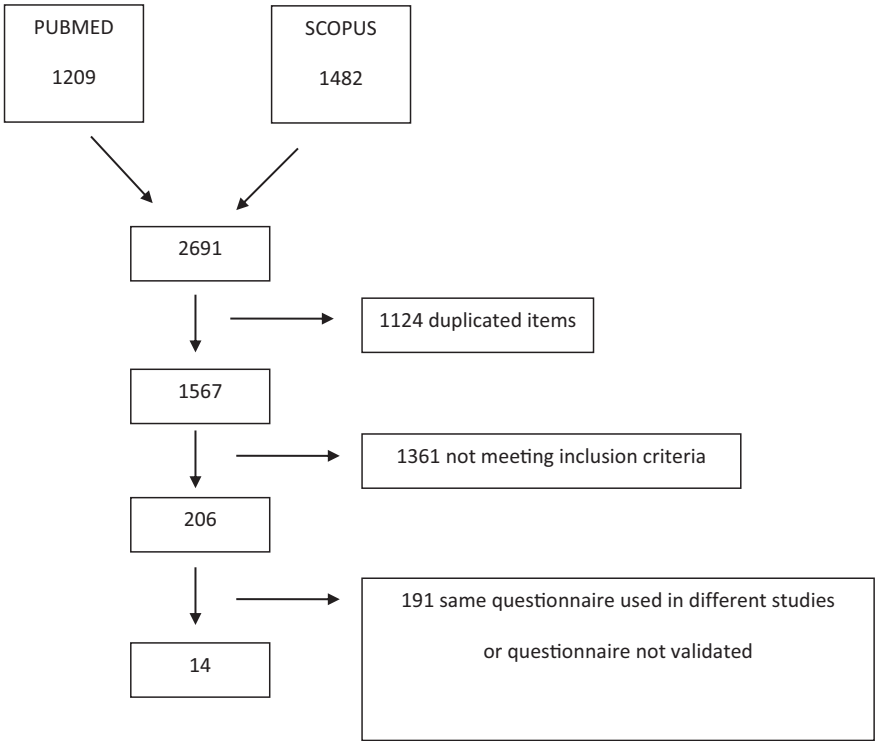

Figure 2 Data base search. Flow chart.

validated in subjects from between 10 and 20 years, three in subjects aged up to 12 years and four, including those analyzing the internet addiction, in subjects aged up to 13 years (Table 2).

Four questionnaires (DABQ, UADI, HEI and CAHMI) included more than 50 questions, while the remaining questionnaires ranged from 2 (GLTE) to 32 questions (FEAHQ-R). The maximum compilation time reported is 60 min for HEI and CAHMI questionnaire. The other questionnaires have a maximum compilation time of less than 30 min.

According to specific instructions, the HEI and CAHMI questionnaires (phone administration) must be administered while the parent/tutor of the teenager is at home, preferentially in the kitchen. The DABQ questionnaire must be completed online. All the other questionnaires, administered in paper format, can be completed at home, at the school and within other environments (for example, public places).

All the questionnaires were validated. Two questionnaires (IPAQ and TESQE) were produced by European consortia and validated in various European countries; one questionnaire (UADI) was validated in Italy, while the remaining ones were validated in the USA (n = 5), in Great Britain (n = 2), in Canada (n = 1), Australia (n = 1), Israel (n = 1) and the Netherlands (n = 1).

Two questionnaires (IPAQ and TESQE), being produced by international consortia are available in different languages, one (UADI) is available in Italian, while all the remaining were structured or are available in English.

To our knowledge, a manual of standard operating procedures is available for 12 out of 14 questionnaires. The manual can be found at a specific link for 5 questionnaires (FEAHQ, FNPA, IAT, TESQ and IPAQ), whereas for the remaining ones, the instructions for use can be found within the questionnaire itself or in the validation article.

All questionnaires, except the HEI and CAHMI, can all be self-completed, although for the two internet addiction questionnaires (UADI and IAT) it is preferable to have the intervention of an expert examiner.

For all questionnaires, the questions evaluating individual behavior are all structured according to a Likert scale with closed response: for each specific topic, some questions express a positive attitude and others a negative one [16].

Analysis of the questionnaires according to the topic

Internet addiction (UADI and IAT)

UADI (in Italian, uso, abuso e dipendenza da internet). The tool can prove useful for the identification of the type and degree of abuse that some users make of the Net and help the operator understand the type of psychological function that this technology can play for the individual. It is composed of 80 items [17,18].

The Internet Addiction Test (IAT) measures self-reported compulsive use of the Internet and assesses symptoms of Internet addiction in a variety of settings. Questions also assess problems related to the addictive use in personal, occupational, and social function.

The test can be administered either individually or within a group sample. It can be administered in two ways: self-administered and oral administration, in case someone needs assistance in completing the test. It takes 5–10 min to complete it when it is self-administered [19]. It is composed by 20 items.

Both questionnaires should be preferentially administered by an expert examiner.

Emotional aspects linked to dietary habits (DEBQ-C and PFS)

DEBQ-C (Dutch Eating Behavior Questionnaire-Children)

Three types of eating behavior are thought to be associated with excessive snacking, weight gain, and bingeing, which are: eating in response to negative emotions (emotional eating), eating in response to the sight or smell of food (external eating), and (paradoxically) dietary restraint, which is, eating less than desired to lose or maintain body weight. The three types of eating behavior can be reliably and validly assessed by the Dutch Eating Behavior Questionnaire. Though originally intended for adults and adolescents [20], the restraint scale of the DEBQ has been used with British schoolgirls as young as 9 years old. VanStrient et al. then constructed an age adapted version of the DEBQ for 7- to 12-year-old children [21]. It is composed by 33 items.

The PFS (Power of Food Scale) assesses the psychological impact of living in food-abundant environments. It measures appetite for, rather than consumption of, palatable foods, at three levels of food proximity (food available, food present, and food tasted) [22]. It has to be highlighted that the measure is based on the assumption that the respondent is living in an environment such as a developed country where a variety of highly palatable foods is readily available. Thus the PFS is not a measure of the food environment, but a measure of individual differences in appetite-related thoughts, feelings and motivations in environments where plentiful palatable foods are constantly available. It is composed by 21 items.

Self-regulation of food intake (SREBQ)

SREBQ (Self-Regulation of Eating Behavior Questionnaire) is a five-item questionnaire assessing people's capacity to control and manage their eating behavior in order to achieve and/or maintain their eating intentions [23]. It is composed of 5 items.

Parental behavior (PSDQ)

PSDQ (Parenting Styles and Dimensions Questionnaire) was elaborated assuming that three global parenting dimensions emerged consistent with Baum rind's authoritative, authoritarian, and permissive typologies. A 62-item instrument was retained, and the global parenting dimensions were subsequently analyzed to determine their internal structures using principle axes factor analyses [24].

Strategies of healthy eating (TESQ-E)

TESQ-E (Tempest Self-Regulation Questionnaire for Eating) is a 24-item questionnaire assessing adolescent-reported use of six specific strategies for healthy eating that represent three general self-regulation approaches [25].

Physical activity (IPAQ and GLTEQ as only issue and DABQ, FEAHQR, FNPA, in multiple complex, see below).

IPAQ questionnaire (International Physical Activity Questionnaire) is a self-reported measure of physical activity suitable for assessing population levels of physical activity across countries. It is available in a short and in a long version.

The IPAQ short "last 7 d" measure could be used for national and regional prevalence studies; the long version of IPAQ could be used for research purposes or studies requiring more detail on the separate domains or dimensions of physical activity [26].

GLTEQ (Godin Leisure Time exercise questionnaire) assesses self-reported physical activity. Initially conceived for adults [27], it was later modified for children [28] and finally it was tested on adolescents [29]. It is a useful evaluative measure of self-reported physical activity for comparing activity levels across groups of adolescents, but may be less accurate for assessing physical activity on an individual level.

Physical activity and dietary habits (DABQ)

DABQ questionnaire (Diet, Activity and Behavior Questionnaire) was designed as a set of five independent sub questionnaires, each one assessing a different constitutive element of the obesogenic environment (physical activity A and B, hedonic aspects related to the consumption of food, eating habits A and B). The DABQ questionnaire, to be compilated on-line, has only closed responses [30].

Physical activity, dietary habits and emotional aspects (FEAHQR)

The FEAHQ-R questionnaire is available in two versions. In the first one, it is proposed as a table made of 32 rows and 4 columns. Each row corresponds to a question, which occupies the first column to the left of the table. The next three columns are reserved to the responses that the teenager and his parents provide to each question. In the second version, the FEAHQ-R questions are listed in progressive order, without any tabular scheme. After each question, the adolescent and its parents can provide a response [31].

Physical activity, dietary habits, mass media availability, parental behavior and sleep (FNPA)

FNPA questionnaire (Family Nutrition and Physical Activity) [32] is designed to determine the strength of evidence linking overweight or obesity with specific physical activity and diet behaviors. FNPA takes into account also parental behavior, sleep, dietary habits and physical activity. Ten main factors were identified that had positive associations with overweight and obesity and these were used to create ten distinct FNPA constructs. A total of 21 survey questions were created so that all of the constructs could be captured with at least 2 items.

Physical activity, food availability, mass media availability and familial/urban environment (HEI and CAHMI)

The Home Environment Interview (HEI) is a comprehensive measure of the food, activity, and media environment, developed for the study (and available on request), which was administered as a telephone interview with the primary caregiver (mothers in 99% of cases) when the children were 4 years old [33].

CAHMI questionnaire (National Survey of Children's Health Child and Adolescent Health Measurement Initiative) is used to explore the relation between family structure (marital status and number of siblings) and obesogenic behaviors and environments, including elevated TV time, insufficient physical activity, infrequent family meals, and the presence of bedroom television [34].

The HEI and CAHMI questionnaires both require a preliminary preparation of the examiner. It needs an in-depth reading of the instruction operative manual as well as an adequate coaching period by an experienced examiner, and a specific expertise for the use of the PC (to collect data) and of the calculation software (Excel). Both questionnaires can be administered only by phone. The HEI and CAHMI questionnaires have closed and open responses.

Discussion

The present review shows that no questionnaire considers all items, thus no single questionnaire currently allows an exhaustive analysis of all the components of obesogenic environment for children and adolescents. The number of constitutive elements, their heterogeneity as well as the complexity of their interactions, account the difficulty to analyze this phenomenon as a whole. With the aim to restrict the area under investigation by analyzing a single constitutive element at a time, two methodological approaches can be proposed. The first one is to use a single questionnaire, considered the most reliable and most widely used (based on the literature data). This methodology is economically convenient and produces comparable data, even from different geographical areas. However, the questionnaire has to be adapted to the particular environment to be analyzed, unless one uses questionnaires designed by international teams such as the IPAQ or the TESQ-E [35]. The second approach is to conceive, construct, describe and validate a new questionnaire, different from those already available, specifically designed for the analysis of the constitutive elements of the obesogenic environment to be investigated [26]. This second method obviously requires greater economic and temporal investments.

Another strategy is to analyze two or more constitutive elements of obesogenic environments (generally three) at the same time so that their possible interaction cans also be investigated. Also in this case, two different methodological approaches have been implemented by different investigators. The first one uses a complex single questionnaire that analyses different constitutive elements of the obesogenic environment (i.e. HEI and CAHMI).

The use of this complex questionnaire generally requires an adequate training of the interviewer, in order to limit the inter-individual and intra-individual variability in the process of data collection. This training is obviously crucial to obtain evaluable and comparable data [34]. An alternative methodological choice is to use two or more validated questionnaires that are serially administered, in order to analyze different constitutive elements of an obesogenic environment. In the latter case, the methodological approach always includes the administration of a first questionnaire for the evaluation of food intake (generally food frequency questionnaire type or a food diary) followed by administration of one or more additional questionnaires for the evaluation of other elements not closely related to food intake (i.e. physical activity, internet dependency, family life environment, social life). To this aim, preference is given to relatively short and simple questionnaires that can be administered in a short time. These questionnaires are structured according to a Likert scale when analyzing a behavior, have closed responses (generally 3 or 5), and do not require the administration by trained interviewers. This methodological approach minimizes the inter-individual and intra-individual variability in the process of retrieving information and facilitates data collection and analysis. The greatest limitation of this approach is the need for a larger sample size [36]. To this regard, the possibilities provided by the global network are potentially very interesting [8].

The strength and limitations of each questionnaire are provided in Table 4. All the questionnaires are standardized and validated, have a solid internal structure even at test-retest and have an excellent articulation of the questions in relation to the prefixed objectives of the questionnaire. In most cases they are perfectly adaptable to Italian adolescents and in four cases they evaluate the nutritional aspects considered relevant for the Italian Preventive National Plan (PNP). Excluding the DABQ, all questionnaires have already been used in European countries. Except for the two questionnaires to be administered by phone (HEI and CAHMI), they are easy to use and administer. The processing of their results is simple in all cases. In case of the DABQ, which must be completed online, the online site returns the results for each sub-questionnaire. The internal stability of all questionnaires and their validation makes them comparable whatever the different geographical and social contexts. To this regard, it should be underlined that the IPAQ and TESQ-E questionnaires were conceived, structured and extended to be immediately applicable in international contexts.

Regarding their limitations, none of the questionnaires analyzing food intake used an image system to identify the portions. The data analysis appears generic or partial when the GLTEQ questionnaire is used to estimate the degree of physical activity, being dependent on the opinions of the individual examined. Also in case of other questionnaires, the data analysis appears generic when referred to the participant's options and/or to qualitative scales. The software processing the response to the DABQ on-line

Table 4 Obesogenic environment and internet addiction questionnaires: strengths and limits.

Questionnaire	Author (Yrs)	Strengths														Limits							
		Standard tool	Brief and easy to use tool	Easy to fill tool	Questions fitted to the objectives	Simple results processing	Score easy to understand	Comparability	Wide diffusion and use	Used in EU countries	Used in Italy	Available in Italian	Adaptable to Italian teenagers	Socioeconomic inequalities analysis	Analysis of items relevant for PNP 2014–2018[a]	Slightly used	Difficulty of administration	Not exhaustive in relation to the questionnaire objectives	Exclusive use by expert operators	Not applicable to the Italian reality	Not available in English and/or Italian	Complex results processing	Generic and/or partial data analysis
CAHMI	Sisson (2014) [24]	✓✓			✓✓					✓					✓✓		✓✓		✓			✓✓	
DAB-Q	Egger (2007) [15]	✓✓	✓✓		✓✓								✓✓		✓✓		✓✓					✓✓	
DEBQ	van Strien (2008) [26]	✓✓	✓✓		✓✓		✓			✓✓			✓✓										✓✓
FEAHQ	Golan (2014) [17]	✓✓	✓✓		✓✓					✓✓			✓✓			✓							✓✓
FNPA	Ihmels (2006) [33]	✓✓	✓✓		✓✓	✓✓				✓✓			✓✓		✓								✓✓
GLTEQ	Godin (1997) [32]	✓✓	✓✓		✓✓	✓✓	✓			✓✓	✓												✓✓
HEI	Schrempft (2016) [23]	✓✓			✓✓					✓✓			✓		✓		✓		✓✓			✓	
IAT	Young (1998) [35]	✓✓	✓✓		✓✓		✓		✓✓	✓✓	✓✓								✓✓				
IPAQ	Craig (2003) [29]	✓✓	✓✓		✓✓				✓✓	✓✓	✓✓											✓	
PFS	Lowe (2009) [21]	✓✓	✓✓	✓✓	✓✓	✓	✓		✓✓	✓✓			✓✓										✓
PSDQ	Robinson (1995) [34]	✓✓	✓✓	✓✓	✓				✓	✓✓			✓✓						✓				
SREBQ	Kliemann (2016) [20]	✓✓	✓✓	✓		✓	✓			✓✓			✓✓			✓							
TESQ-E	De Vet (2014) [30]	✓✓	✓✓	✓✓	✓	✓	✓			✓			✓✓										✓
UADI	Del Miglio (2001) [31]	✓✓	✓✓		✓✓	✓✓					✓	✓				✓	✓						

[a] Fruit, vegetables and salt supplies.

questionnaire does not return a quantitative score of simple interpretation and the score cannot calculate outside the DABQ site. The HEI, CAHMI, and IAT questionnaires must be administered only by specialized and trained operators. The administration of HEI and CAHMI questionnaires is not intuitive. The quantitative score returned by the CAHMI questionnaire is not of immediate interpretation.

Contrasting children and adolescent obesity has been set as a priority by the Italian Ministry of Health [37]. The approach to this problem starts with the evaluation of the obesogenic environment and must necessarily involve the family, the school system and the local institutions. All the validated questionnaires proposed for the analysis of the constitutive elements of the obesogenic environment are adaptable to the Italian social and cultural context by small, formal, and non-substantive changes. The internet network offers the possibility to administer these questionnaires to a large number of subjects. The on-line survey has to be regarded as a faster way of collecting data from the respondents compared to other survey methods such as a paper-and-pencil method and personal interviews. Other advantages could be minimal costs, automation in data input and handling, increase in response rates. In this context, the use of simple questionnaires (with closed responses and structured according to a Likert scale, if behaviors are to be analyzed) appears to be the best strategy, eliminating (or at least minimizing) the possibility of errors due to bad interpretations in the absence of a physical interlocutor.

Conflicts of interest

None of the authors had a personal or financial conflict of interest.

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The research group was made by Doctors Francesca de Blasio, Marika Dello Russo, Gaetana Paolella, DomenicoRendina, Alice Rosi and Garden Tabacchi.

The Group was integrated by SINU experts from the University sector (Prof. Pasquale Strazzullo and Prof. Luca Scalfi) and the area of Public Health (Dr. Giulia Cairella and Dr. Francesca Garbagnati).

The Working Group was coordinated by Dr. Giulia Cairella.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.numecd.2019.02.009.

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