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Tools to evaluate eating behavior of children and adolescents

Instrumentos para avaliar o comportamento alimentar de crianças e adolescentes

Abstract

Introduction: Eating behavior enables protection or risk for eating disorders, obesity, and chronic diseases *Objective:* To investigate current valid tools used to evaluate the eating behavior of children and adolescents *Methods*: Bibliographic review of articles published from 2014 to 2018 in the electronic databases Scielo, LILACS, and Pubmed. The descriptors used were *"instrumento validado", "instrumento comportamento alimentar adolescentes", "instrumento comportamento alimentar crianças"*, "instrument validation", "eating behavior children", "eating behavior adolescent". *Results*: A total of 14 tools was found, able to detect eating behavior of subjects with diseases such as diabetes, autism, eating disorder, obesity; social, family and caregiver aspects of food behavior; disordered eating attitudes; self-regulation and weight control. *Conclusion*: There are tools that can be applied to the Brazilian population of children and adolescents. We suggest that the early identification of these issues will enable interventions to minimize damages in this population.

Keywords: Feeding Behavior. Adolescent Health. Child Health. Food. Diet and Nutrition.

Resumo

Introdução: O comportamento alimentar é capaz de desenvolver proteção ou risco para distúrbios alimentares, obesidade e doenças crônicas. *Objetivo*: Investigar instrumentos recentes válidos para avaliar o comportamento alimentar de crianças e adolescentes *Métodos*: Revisão bibliográfica, através de busca de artigos nas bases de dados eletrônicas Scielo, LILACS e PubMed, correspondente ao período de 2014 a 2018. Os descritores utilizados foram "instrumento validado", "instrumento comportamento alimentar adolescentes", "instrumento comportamento alimentar crianças", "*instrument validation*", "*eating behavior children*", "*eating behavior adolescent*". *Resultados:* Obtiveram-se 14 instrumentos, que são capazes de detectar: comportamento alimentar de indivíduos com doenças como diabetes, autismo, transtorno alimentar, obesidade; aspectos sociais, familiares e de cuidadores do comportamento alimentar; atitudes alimentares transtornadas; autorregulação e controle de peso. *Conclusão*: Há instrumentos passíveis de aplicação para a população de crianças e adolescentes brasileiros. Sugere-se que a identificação precoce das referidas condições irá permitir intervenções para minimizar os danos nessa população.

Palavras-chave: Comportamento Alimentar. Saúde do Adolescente. Saúde da Criança. Alimentos. Dieta e Nutrição.

INTRODUCTION

Childhood and adolescence are marked by changes, and eating behavior develops differently during these phases. In the womb, babies are exposed to food-related sensory experiences that can influence eating behavior.[1] This is characterized by a set of cognitions, affects that govern actions, eating behaviors, and is used to express all types of constructs in food, such as consumption, eating way, and other related issues (how and where to eat).[2]

Eating behavior is influenced by the stages of physical, cognitive, social and emotional development.[2] Understanding these influencing and motivational factors may favor compliance to nutritional behaviors and actions.[3] Understanding why people eat what they eat is therefore key for the creation of easy to practice dietary recommendations that generate effective changes in dietary patterns.[4]

As childhood evolves and the child enters into adolescence, food choosing becomes more autonomous; however, this autonomy seems to be associated with an increasingly inappropriate eating behavior.[5] Risk behaviors for eating disorders (ED) feature classic symptoms of ED, such as food restriction, binge eating or purging, while less severe behaviors for weight control should be called "disordered eating".[6]

Over time, studies have focused on the amount of food consumption and walked on a path towards better understanding of the neural and molecular mechanisms that control eating behavior. However, the processes regarding food quality and how it is consumed, equally important for health, are poorly studied.[7]

Assessing eating behavior in childhood and adolescence is important in order to understand the mechanisms that can determine health in adulthood. The objective of this study is therefore to do a bibliographic review intended to investigate valid tools from the last five years, used to assess the eating behavior of children and adolescents.

METHODS

An integrative review was carried out, consisting of bibliographic verification in the electronic databases Scielo, LILACS, and PubMed. The descriptors were chosen according to the DeCS (Health Sciences Descriptors) and MeSH (Medical Subject Headings).

In addition to the descriptors, the Boolean operator AND' was applied to combine the terms in the databases. Therefore, in the search strategy for "advanced search", the following individual and combined keywords were used: *"instrumento validado", "instrumento comportamento alimentar adolescentes", "instrumento comportamento alimentar crianças",* "instrument validation", "eating behavior children", "eating behavior adolescent", in Portuguese and English.
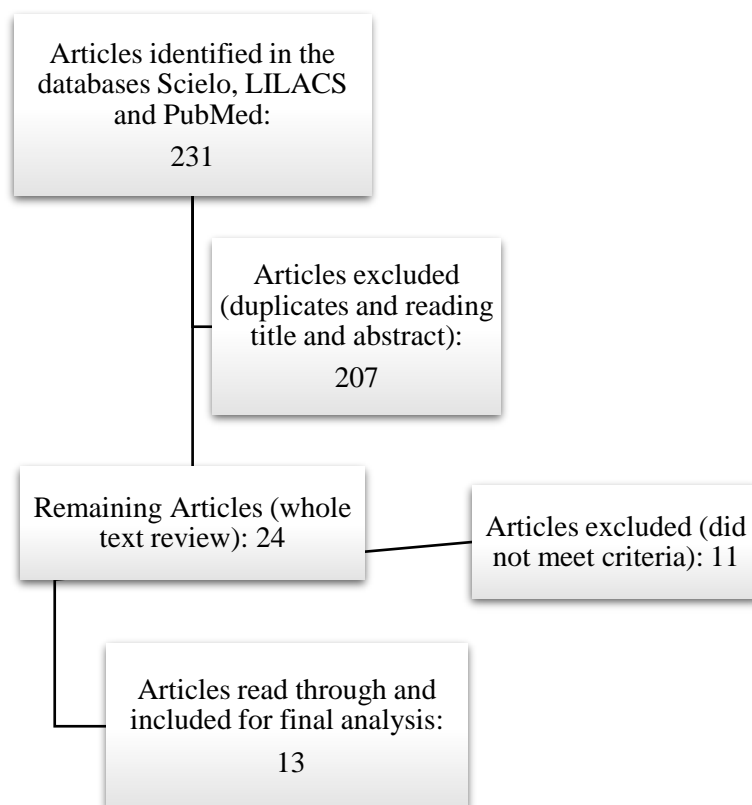
The inclusion criteria for the articles were: validation studies, translation, adaptation of tools that assess eating behavior, published in Portuguese or English, from 2014 to 2018. The papers found were independently examined by two researchers. Discrepant opinions between the evaluators were analyzed by a third one.

A four-step process was used to select the articles: identification searching the databases; selection, i.e., exclusion of duplicate articles and screening by titles and abstracts of the remaining ones; eligibility evaluating articles in full; inclusion of those that met the inclusion criteria.

RESULTS

A total of 231 publications were found in the electronic databases Scielo, LILACS and PubMed. The procedures adopted for the selection are described in Figure 1. After exploring the content of each paper, 13 scientific articles which presented the investigated tools were selected for this review; of those, 11 were for validation, two were translation and adaptation. Five Brazilian papers were found.

Figura 1. Ferramentas para avaliar o comportamento alimentar em crianças e adolescentes

Articles identified in the databases Scielo, LILACS and PubMed: 231

Articles excluded (duplicates and reading title and abstract): 207

Remaining Articles (whole text review): 24

Articles excluded (did not meet criteria): 11

Articles read through and included for final analysis: 13

The main information contained in each article is described in Table 1, ordered according to the year of publication.

Chart 1. Tools to evaluate eating behavior in children and adolescents.

Author/year	Tool	Objective	Age group	Place	Conclusions
Hurley et al., 2013[11]	Toddler Feeding Behavior Questionnaire	Creation and validation of a questionnaire reported by children's caregivers	Caregivers of children aged 12-32 months	United States-Maryland	Validated. Can be applied in 5 minutes to assess feeding behavior reported by the caregiver
Karlsson et al., 2013[10]	Swedish Eating Assessment for Autism spectrum disorders (SWEAA)	Assessment of Swedish Feeding for Autism Spectrum (ASD)	15-25 years	Sweden	Validated and reliable to detect disordered eating behaviors in subjects with ASD and normal intelligence
Leme e Philippi, 2014[15]	Social Cognitive Scales Related to Adolescent Dietary Behaviors	Instrument adaptation, validation, reliability for Brazil	12-19 years	Brazil	Adapted, validated, reliable and useful to evaluate the social cognitive aspects of adolescents' dietary behavior

Chart 1. Tools to evaluate eating behavior in children and adolescents. (Continues)

Author/year	Tool	Objective	Age group	Place	Conclusions
Laurent, 2015[13]	Children's Power of Food Scale (C-PFS)	C-PFS psychometric properties to be used in youth	10-14 years	United States	Validated and useful to identify young subjects more vulnerable to the concern with food and excessive eating, considering obesogenic environments
Pamies-Aubalat et al., 2013[16]	Dieting Peer Competitiveness Scale	Psychometric properties and internal validation of the Spanish version	12-16 years	Spain	Despite the limitations, it is supposed to be a useful starting point for the assessment of peers social comparison regarding adolescents' eating attitudes and physical appearance
Peláez-Fernández et al., 2014[17]	Eating Attitudes Test (EAT-40)	Validate EAT-40 best cut-off value, Spanish version, for eating disorders screening in the general population	12-21 years	Spain - Madrid region	The use of 21 as cut-off value is recommended for epidemiologic studies on eating disorders in the general Spanish population
Gaspar et al., 2015[9]	Tempest Self-Regulation Questionnaire for Eating (TESQ-E)	Validation of the TESQ-E Portuguese version	9-17 years	Portugal	Reliable to estimate self-regulatory strategies in children and adolescents
Mais et al., 2015[12]	Comprehensive Feeding Practices Questionnaire (CFPQ)	CFPQ among Brazilian parents of school-age children and new version	Parents of children 5-9 years	Brazil	Valid to measure eating behaviors of parents of school-age children
Pereira et al., 2015[20]	Questionário das Escolhas Alimentares dos Adolescentes	Identify the factors that influence adolescents' eating behavior	12-19 years	Portugal	Despite the limitations, the questionnaire is consistent and valid
Alvarenga et al., 2016[8]	Escala de Atitude Alimentar Desordenada para Adolescentes (EAAT)	Disordered Eating Attitude Scale for Adolescents (DEAS) validation and psychometric evaluation	12-18 years	Brazil	Potential in identifying disordered eating attitudes among adolescents and risk for eating disorder
Powers et al., 2016[18]	Screen for Early Eating Disorder Signs (SEEDS) in persons with type 1 diabetes	Develop and validate a tool to identify risk of developing eating disorder in type 1 Diabetes subjects	18.5 ± 4.1 years	United States	Convenient for use in clinical settings without suggesting weight control behaviors that might influence the development of eating disorder
Warkentin et al., 2016[19]	Comprehensive Feeding Practices Questionnaire (CFPQ)	Test validity of a translated and adapted Comprehensive Feeding Practices Questionnaire (CFPQ) on a sample of pre-school children	Parents/care givers of children aged 2-5 years	Brazil	Significant internal reliability. Scale validity in different cultures is crucial
Lorenzato et al., 2017[14]	Child Feeding Questionnaire (CFQ)	Translation and adaptation of the Child Feeding Questionnaire (CFQ)	Parents/care givers of children aged 2-11 years	Brazil	Valid, reliable, and useful to assess family aspects, child feeding parental attitude, beliefs, and practices relevant to child obesity prevention

DISCUSSION

In the referred period of the investigation, no tool primarily produced in Brazil was published, only validations and adaptations. The tools found are able to evaluate aspects of eating behavior, such as: disordered eating attitudes;[8] self-regulatory strategies;[9] disordered eating behaviors on the autism spectrum;[10] eating behaviors reported by the caregiver;[11,12] concern with food and excessive consumption;[13] parental attitudes, beliefs and practices about children feeding and obesity propensity;[14] social dietary behaviors;[15] dietary peer competitiveness;[16] eating disorder in the general population,[17] and eating disorder in people with type 1 diabetes.[18]

Children's eating behaviors are influenced by parents, who are the first nutritional educators.[12] Three validated questionnaires were found on this subject. The Toddler Feeding Behavior Questionnaire,[11] prepared by Hurley et al., is focused on the caregiver's report and contains 27 items on the nutrition of children between 12 and 32 months of age. It is based on an interactive feeding theory that encompasses the caregivers' responses to concerns about food intake, appetite, size and behaviors of their children, rather than relying solely on the caregiver's actions. The filling time is five minutes to explore how eating behaviors relate to the child's health and behavior. The tool proves to be advantageous, since it is useful in the formulation of recommendations for the caregiver feeding actions responding to the feeding behavior of their children.[11]

Along the same line, Mais et al. developed in Brazil the Comprehensive Feeding Practices Questionnaire (CFPQ)[12] in order to validate feeding practices among Brazilian parents of school-age children and present a new version of the tool, drawing attention to cultural aspects. This modified six-factor model of the CFPQ is valid for measuring the eating behavior of parents of school age children in Brazilian urban environments.[12]

Following the context of assessing children's eating behavior in parental perception, Warkentin et al. tested the validity of a Comprehensive Feeding Practices Questionnaire,[19] translated and adapted, in a sample of Brazilian children from private schools, aged 2-5 years. The adapted questionnaire had significant internal reliability in the Brazilian urban sample.[19] Likewise, the Child Feeding Questionnaire[14] assesses parents' beliefs, attitudes and practices regarding feeding and the propensity for obesity of children aged 2-11 years. The questionnaire is a remarkable multifactorial tool and has applicability in Brazilian families; it can be used to design strategies for prevention and family intervention in childhood obesity.[14]

Regarding eating behavior in adolescents, five tools were found. Gaspar et al. validated a Portuguese version of the Tempest Self-Regulation Questionnaire for Eating (TESQ-E),[9] which assesses strategies for self-regulating eating behavior in pre-adolescents and adolescents. Self-regulatory strategies seem to involve cognitive, behavioral and emotional competences; therefore, TESQ-E is important for health intervention and promotion, in addition to disease prevention in several disciplinary areas of Health Education.[9]

Likewise, the Children's Power of Food Scale[13] measures appetite impulse and responsiveness of children and adolescents across three domains: food available, food present, and food tasted but not eaten. Appetite responsiveness is therefore divided between these three domains: food available, food present, and food that has been tasted but not eaten, and a total aggregate score. It is accepted as an appropriate, clear and age-appropriate measure, for use in students aged 10-14 years of different ethnicities.[13]

Pamies-Aubalat et al. intended to adapt the Peer Competitiveness Scale[16] to the Spanish population, as well as to analyze its psychometric properties. The scale aims to evaluate peers social comparison regarding eating attitudes and physical appearance. The adaptation had worse results as compared to the original version, however, despite the perceived limitations, the tool proved to be a useful starting point to assess social comparison in Spanish adolescents.[16]

In an attempt to understand the factors that influence adolescent eating behaviors, Pereira et al. constructed and applied the Portuguese Adolescent Food Choices Questionnaire,[20] in order to identify the factors involved in adolescents' food choices. They therefore identified nine factors: health, mood, convenience, sensory appeal, natural content, price, weight control, familiarity, and ethical concern.The results exacerbate the need to develop explanatory theories of food choices and specific interventions for the adolescent population that are more competent in promoting health and preventing diseases associated with adolescent eating behaviors. The investigation pointed out factors that influence the adolescents' food choices, which should be considered in theory and in interventions as motivating factors for change.[20]

In Brazil, Leme and Philip adapted a tool that examines the social cognitive aspects of dietary behavior,[15] as well as its reliability and confirmatory factor validity in adolescents. The tool comprises the following constructs: self-efficacy, intentions, situation, social support, behavioral strategies, expectations, and predictors of expectations. It is useful in the study of adolescent's eating behavior and capable of pinpointing differences in social cognitive aspects.[15]

With regard to the assessment of eating disorders, eating problems in populations of children and adolescents with some chronic condition, four tools were found. Karlsson et al. produced and validated an instrument for the investigation of eating problems in subjects with autism spectrum disorder (ASD) and normal intelligence.[10] It has eight subscales: perception; motor control; food purchasing; eating behavior; mealtime surroundings; social situation at mealtime; other behaviors associated with disturbed eating and hunger/satiety. It also has two individual items such as simultaneous capacity and pica. The questionnaire is an important tool to identify the extent of problems related to food and meals in subjects with normal intelligence and ASD.[10] Powers et al. developed and validated a tool to identify adolescents with type 1 diabetes who are at risk of developing an eating disorder.[18] The factor analysis revealed 20 items in three factors (Body Image, Feelings, Quality of Life), showing strong psychometric properties. The instrument is self-administered, designed for use in clinical practice or research.[18]

Regarding eating disorders in the general population, Peláez Fernandez et al. validated the Eating Attitudes Test (EAT-40),[17] for the Spanish version, setting the cutoff value for subjects aged 12-21 years with the purpose of tracking eating disorders. Consequently, the 21 cut-off value was the best diagnostic predictor, being the most appropriate to screen for eating disorder in epidemiological investigation.[17] Likewise, Alvarenga et al. carried out the psychometric evaluation of the Disordered Eating Attitudes Scale (DEAS)[8] for adolescents, which contains 25 questions classified on a Likert scale. The questions are divided into five subscales: (1) Relationship with food; (2) Concerns about food and weight gain; (3) Restrictive and compensatory behaviors; (4) Feelings towards eating; and (5) Idea of normal eating. It has good internal consistency for girls and boys, adequate convergent validity with similar scales used in the same field, and good test-retest reliability. This tool is therefore able to differentiate students and patients with eating disorders.[8]

It is important to emphasize about this review that, considering the limitations pointed in each tool for the assessment of eating behavior, as well as the methodology of virtual data collection, the findings need to be cautiously interpreted in order to be extrapolated.

CONCLUSION

We emphasize the importance of having tools applicable to children and adolescents of different populations and situations. We suggest that early identification of the referred conditions will enable interventions to minimize harm in this population.

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Contributors

D'avila HF and da Cás S did data analysis and interpretation, paper review, and approval of the final version. Mello ED did data analysis and interpretation and approval of final version.

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