Eating Disorders in Children and Adolescents. An Updated Review on Screening Methods

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Abstract

This article aims to review the screening and diagnostic tools for eating disorders (ED). Eating disorders represent a complex pathology defined by an imbalance between hunger and satiety, installed in an emotional, traumatic, or conflictive context. Recently, the emphasis regarding ED is focused on the link between genetics, the mental pathology, and the somatic and metabolic phenotype and early detection. Early detection and intervention can assure a better recovery and can improve a lot the quality of life of these patients. **Methods**: We selected ten articles of central importance on the topic in a systematic search on eight databases, articles selected on the type of scales, and size of the study. **Results**: We identified eight questionnaire scales used in large trials in ED disorders in the scanned literature, choose because we consider it the most accurate and the ones that evaluate best the pathology and the elements that are important as specific traits in ED. There are interview-type scales and self-administered scales. Interview scales are characterized by assessments of symptoms and diagnosis, while self-administered assess particular traits and the possibility of further development of eating disorders. The majority of the scales evaluated were described and used in adult populations. From all the scales assessed and analyzed, only three are described at the child population – it is EAT-26 (> 16 years), EDI-3 (>13 years), and ANSOCQ (> 13 years). **Conclusions**: It is essential to develop specific scales for people under 18 years of age, given the increasing incidence of ED among children and the need for early detection and appropriate intervention. Early detection of ED in children implies a simple and accurate evaluation at the primary care level or in schools, as the course of the disease can be subclinical for several years. Moreover, the need for accurate scales and telemedicine testing and diagnosis is of high importance during the COVID-19 pandemic as youth are at particular risk being psychologically affected due to disrupted education and social interactions - at a critical time.

Keywords: eating disorders, anorexia nervosa, bulimia nervosa, personality traits, screening tools, Covid-19

Introduction

The Eating Disorders represent a pathology which *is* among us since the beginning of the civilization – in Ancient Greek women from the high-class society fasting themselves to be thinner and to be perceived well by the people [1]. Feeding is the most crucial initial step for the connection between mum and child. According to DSM –V – The Diagnostic and Statistical Manual of Mental Disorders, the central eating disorders (EDs) described in the early years of life are pica, rumination, then in adolescence - anorexia nervosa (AN), bulimia nervosa (BN) and the newly introduced Night Eating Syndrome (ENS) [13,32]. Besides the somatic disturbances, the ED pathology specter includes emotional instability and a nutritional imbalance. Even though with the appropriate therapeutic approach, there are extended periods of remission, 30-50% of cases relapse. The setting out can be in childhood, between 5 and 12 years; first is noticed by the close environment (family, friends, school, family doctor), but usually neglected or ignore the pathology due to insufficient knowledge about an adequate diet.

During the COVID-19 pandemic, children are at particular risk due to disrupted education and social interactions - at a critical time. [34]. Early detection implies a simple and accurate evaluation at the primary care level, in the early stages, both in adults and, more importantly, in children often undiagnosed for an average of 4 to 12 years. For this purpose, several screening interview scales are available (not freely accessible), a few of them feasible for the pediatric population.

Several types of scales are currently used – (a) self-report questionnaires –EDI-3, BSQ, TFEQ, MAC, BULIT-R, QEWP-R, EDE-Q, EAT, NEQ – and other; (b) semi-structured interviews – SCID-I, EDE – and other; (c) clinical interviews unstructured or observer-based rating scales- Morgan Russel scale [33, 1]. Less is known about the better selection of the most sensitive and accurate scale for children, the implementation level, and outcomes in our country and also worldwide.

Aim of the study: to overview the available screening scales for ED (especially AN and BN) and use in clinical trials and identify research and practice gaps in screening AN and BN, the search was made specially to see which one applies to the pediatric populations. We test the literature for the available screening tools in ED and studies using the scales. **Data sources**: we made an accurate search in the primary sources of Databases (PubMed, BMC Public Health, Global Health, Cross Ref, Scopus, Web of Science, Google Scholar and Medline) with the keywords: "screening eating disorders," "intervention Anorexia Nervosa," "intervention eating disorders," "screening Bulimia Nervosa." Binge-Purge subtype. Forty studies using AN and BN scales with a clinical eating disorder group with or without a control group were identified. Of these, eight were included in the present study (Table 1).

Scales reviewed in the current paper:

–   EDE –useful for the clinician to observe the pathology and evaluate the primary and specific characteristics regarding the present moment of disease.

–   EDE-Q –semi-structured and administered by a qualified person, takes a long time for administration; a self-administered questionnaire that assesses the severity of symptoms and how somatic features are altered - weight, height, menstruation. For good accuracy, it is preferable to use it together with another questionnaire that better evaluates the specific symptoms [16].

–   EDI - over 13 years; evaluate the specific characteristics of AN and BN; Now is available the third version, with 91 items, 12 subscales that assess the particular aspects; it also evaluates the weight.

–   EAT - 26 item – over 16 years; also evaluate somatic features-weight, height and the specific behaviours that determine eating disorders

–   SWEAA – self-reported questionnaire, administered to children with autism spectrum disorder and average intellect, which have particularities of eating behaviour [18]

–   CIA 3.0 – self-reported questionnaire; evaluates the specific features of eating disorders and complete the clinical diagnosis [22]

–   SCOFF – the test includes five simple questions addressed to patients in primary care units by clinicians to facilitate if there is a suspicion of a diagnosis of ED. It has a very high sensitivity. Not enough data to consider the validity and reliability and the possibility of using it to screen ED in the general population. But it can still be used in primary medicine care for patients considered at risk for ED After application. The clinician evaluates the existence of ED diagnosis and the necessity of the referral to a specialist for a complex evaluation [7,20].

–   ANSOCQ – over 14 years; reliable and self-report questionnaire – assess the readiness for change and motivation, 20 items, it is used to evaluate the wish of change of the persons already diagnosed with AN. Lickert Scale CUT-OFF 2,5; As the scores on these scales are more significant, the person is more motivated to change (made after the stages of change model – DiClemente and Prochaska 1998 – pre-contemplation, contemplation, preparation, action, maintenance).

Results

Ten articles of central importance on the topic were identified in a systematic search on eight databases, articles selected on the type of scales and size of the study; we identified nine questionnaire scales used in large trials in ED disorders in the scanned literature for the most accurate scales (Table 1).

To observe the personality traits, the clinician may use SCID II Interview – a structured interview used in persons who already have the diagnostic, and it helps to follow the specific characteristics. It also evaluates the personality disorder – used at the persons that already have a diagnostic of AN, the most common types of personality were avoidant (13%), followed by borderline (9%), obsessive-compulsive (8%) and antisocial (7%) [32].

It's good to know that the devastating effects of eating disorders didn't affect only the persons who have the pathology but also the family and the people around it. It is well known that the Anorexia Nervosa has the highest rate of mortality from all eating disorders (up to 10% [6]), and it's one of the most common pathologies in adolescents, over asthma or diabetes. There is a high risk of suicide, severe depression, alcohol abuse, substance dependence, or significant stress in this kind of person [12, 15]. The rate of mortality rises if there are comorbidities like significant depression or addiction [5].

In many cases, it was reported that there is a pre-existing cerebral dysfunction regarding structural or neurochemical fields. Studies in recent years open new perspectives that support the existence of specific pre-existing genetic mutations in eating disorders (modified locus on chromosome 12 rs4622308) [1]. According to Rahkonen & al., in 2016 the eating disorders affected up to 4% of persons around the world; the most frequent being Anorexia Nervosa, followed by binge eating and less expanded, is Bulimia Nervosa [3]. Unfortunately, less than 10% of people address to a doctor, and up to 70% have psychiatric comorbidity. Salbach-Andrae & al. discovered that 25-29% of Anorexia Nervosa cases associated with Obsessive-Compulsive Disorder (OCD), and up to 79% would develop an episode during life [14].

It is evident that in ED, there is a genetic vulnerability. History of anxiety disorders, depression, alcoholism, or "schizo" spectrum disorders are usually present in this kind of patients [13, 28].

The Global Burden of Disease Study published the results in 2015 states that AN and BN are responsible for 1.9 million people affected globally by burden –chronic and disabling diseases lasting over long periods measured by DALY (disability-adjusted life year). Unfortunately, there are not enough studies on large population groups to accurately characterize the profile of these disorders, but the inclusion in the Global Burden of Disease marks a critical moment and increases the need for prevention and early detection, requiring the attention of Public Health Services [2].

It is essential to know that nutritionist or endocrinologist treats obesity and it's not considered a mental disease; It is regarded as a metabolic disease even though in many cases it has been demonstrated an overlap of specific personality traits and behaviors that aggravates and sustain the disorder. In a group of diabetic patients from Romania, most of them obese, it has been proved that anxiety and depression are usually met [6, 7]. Also, we are not talking about malnourishment or sub nutrition in this paper. These are fundamental Heath service problems and worldwide, and it is due to poverty, but this can determine low school performance or other emotional imbalances. Unfortunately, during the Covid-19 pandemic, billions of children didn't receive the food anymore from their schools.

The psychological impact of the recent COVID-19 quarantine on ED patients are PTSD symptoms, confusion, boredom, anger, anxiety, increased risk of relapses. The period may amplify compulsive eating and favored diets due to the fear of infection, sedentary lifestyle, social isolation, strict hygiene [33].

Regarding the somatic impact of ED, AN is the most affected and presents a wide range of changes on various organs and systems; the most important are functional amenorrhea, dysfunction of the hypothalamic-pituitary-ovarian axis, impaired fertility [27].

From studying the literature, in the present study, we identified several types of issues linked to the ED: lack of public health programs, late diagnoses, lack of information for teachers and parents in child ED aspects and risk factors, low access or addressability of the patients to the

specialized clinicians (psychologists, psychiatrists), limited access to screening for the behalf of primary healthcare professionals (GP's, school doctors, nutritionists, school nurses, dentists, pediatricians), low capacity of management the ED disorders in quarantine situations.

The issues linked with ED questionnaires in ED and ED literature regarding early diagnosis and screening scales studies: translation, validity, accuracy, reproducibility were taken into account in the analyzed studies and met all the conditions for statistical validation.

The evaluation method is an essential element - some questionnaires are self-administered, others are by clinical interview. We believe that a trained person is needed to apply these questionnaires and to explain leisurely what each item represents and how it should be best interpreted.

Conclusions

There is more than ever essential to know that by intervention in the field of teenagers, especially in their school and families, we have a chance to prevent the development of eating disorders and to stop unrealistic perceptions of the body image. Among the risk factors to develop eating disorders are the bullying phenomena due to body weight, the lack of physical activity in schools, small meals, restrictive diets, social/online/family unrealistic beauty standards that are accessible from the period of childhood. An essential number of preventing programs for ED risk factors have developed in the world [17].

A broad topic about prevention and intervention will be the topic of our future research. In this study, we only evaluate the screening and diagnostic. The auto-administered scales give liberty to the person to express how they feel but has the disadvantages that can be misunderstood. It often happens that people with eating disorders, especially those with anorexia nervosa, avoid giving accurate answers about symptoms, hide many behaviors, and consider their behavior to be normal [30].

The majority of the scales used were described and used in adult populations. From all the scales evaluated and analyzed, only three are described at the child population – it is EAT-26 (children above 16 years), EDI-3 (children above 13 years), and ANSOCQ (children above 13 years). One of the scales that we presented in this paper is used after the diagnostic is made (ANSOCQ) and help the clinician to evaluate the stage and to understand how much work he has to do and what levels need to be improved.

The present study evaluates the actual scales used in the screening and follow-up of the nutritional psychiatric pathologies. The next step is the application of selected questionnaires or a combination of during a future coordinated clinical trial to objectively evaluate the best form in screening the ED in youth. It is essential to develop specific scales for people under 18 years of age, given the increasing incidence of ED among children and the need for early detection and appropriate intervention. Moreover, the urgent need for accurate scales and telemedicine testing and diagnosis tools are of high importance during the COVID-19 pandemic as youth are at particular risk - at a critical time.

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Legend

> *AN: Anorexia Nervosa*
> *BN: Bulimia Nervosa*
> *ED – eating disorders*
> *EDE-Q: Eating Disorder Examination Questionnaire*
> *EDI – Eating Disorder Inventory*
> *SWEAA – The Swedish Eating Assessment for Autism Spectrum Disorders,*
> *EAT-26 –The Eating Attitude Test*
> *CIA – Clinical Impairment Assessment,*
> *SCOFF – Sick Control One Fat Food,*
> *ANSOCQ – AN Stages of Change Questionnaire*

ANNEX - **Table I**. Selected studies of correlations - specific screening and evolution methods in eating disorders – described on adult populations mostly (ED) - *Total participants=2797*

Study participants	Scale used	Year/duration	Control	Method	Results	Reference
N=802	EDE-Q	2003/1 year follow up? participants – general population (18-45 years), remain 208	-	Compared EDE, an semi-structured interview, self-reported. The study recruited persons in 2 phases. It is a good measure for real cases- a superior self-reported measure. Useful in two-phase epidemiological studies	It has been proved that the scale is feasible to be used in prospective epidemiological studies.	Mond &al. 2003 [18]
N=243 young women	EDE	1994 Reevaluate at 28 days	No control	Investigator-based Interview. It will be administered periodically for a period of time More fileds evaluated – restraint, eating concern, shape concern, weight concern	It's very good rated as an interview for evaluating the simptoms and put the diagnostic of ED	Fairburn et al 2008
N=670 113-AN	EDI	1983	N=557	Cross-validation procedure. It was considered internal consistency for all subscales and some		First developed by Garner & Polivy in 1983 [19]

				indices of validity. Evaluate Drive to Thinness, Bulimia, Body Dissatisfaction, Ineffectiveness, Perfectionism, Interpersonal Distrust, Interoceptive Awareness, Maturity Fears	Used for prognostic screening instrument – Isolate and objectively measure specific psychological characteristics for AN. Due to a good reliability and validity, it can be used for evaluate behavioral and psychological traits that are common in ED	
N=436 total distributed questionnaire Completed by 268 weight preoccupied female college freshman	EAT -26 item version	1982		90% agreement between EAT score and EDI Drive for Thinness Subscale		Raciti 1987[21] (first described by Garner & Garfinkel 1979)
					Frequently used in clinical studies and research. Also, it can be used to detect the probable cases in the general population. Described as one of the best screening tools	
N=88 total 57 – Autism Spectrum Disorder	SWEAA	2012	31 healthy control group	Administered in parallel with EDE to 190 individuals		Karlsson and Rastam 2013 [20]
					It was tested the validity and reliability for maladaptive eating disorders in children with Autism Spectrum Disorder	
N=190 individuals refer to an eating disorder service	CIA 3.0	2012/ Nov 2009- Aug20 11	no	Observe the psychometric properties of the CIA in comparison with Eating Disorder Examination – afterthat using confirmatory factor analysis Evaluate the diagnostic	It seems to be a good and valid measure to evaluate the impairment in EDs	Jenkins 2012 [22] (first described by Bohn & Fairburn 2008)
N=116 women from specialist clinic with AN (68) or BN (48)	SCOFF	1999	N=96 women	Develop 5 essential question in order to help the services of primary medicine for easy screening of EDs. Use of all statistics matters to help develop these questions and validate them		Morgan 1999
					The SCOFF questionnaire seems highly effective as a screening instrument for detecting eating disorders; it is simple, memorable, and easy to apply and score, and it is designed to raise suspicion of a likely case rather than to diagnose.	
44 pacients with AN >14 years	ANSOCQ	2002	no	The AN Stages of Change Questionnaire assesses the 5 stages of readiness and motivation for change in people with AN	The majority of persons which were evaluated were in the Contemplation Stage of Change (43.20%), and so have a low motivation and desire for change.	