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Development and validation of the Ottawa disordered eating screen (ODES): a brief screening tool for service and surveillance

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Abstract

Background Brief, accessible screening tools are needed to identify disordered eating and eating disorder (ED) risk across clinical settings and population health surveillance. The Ottawa Disordered Eating Screen (ODES) was developed as a 4-item self-report measure using language applicable across the lifespan. This study describes the development and psychometric evaluation of the ODES, including its scoring guidelines, measurement properties, and applications in both service and surveillance contexts.

Methods The tool was developed through multidisciplinary expert consultation and refined using clinical vignettes to capture a range of eating- and body-related concerns. Psychometric testing used retrospective data from 278 participants aged 26–33 years in the Research on Eating and Adolescent Lifestyles 2.0 study. Convergent validity, internal consistency, and classification accuracy were evaluated. To assess utility as a surveillance tool, the ODES was implemented in two Canadian surveillance efforts: the 2024 Mental Health Research Canada (MHRC) Poll 21 ($n = 3,213$; ages 16–65) and the 2023 Ontario Student Drug Use and Health Survey (OSDUHS; $n = 10,145$; ages 11–20).

Results A dual scoring approach was supported: a domain-based "traffic light" model for clinical triage that assigns a risk level and recommended next step, employing a communimetric design, and a total score cutoff (≥ 7) for identifying at-risk individuals in surveillance and outcomes monitoring. The ODES demonstrated strong convergent validity with measures of restrained and emotional eating, appearance and weight satisfaction, and internalizing symptoms, alongside acceptable internal consistency and classification accuracy. In population surveillance, elevated disordered eating symptomatology was observed across demographic groups, with higher levels among adolescent girls, racialized individuals, and 2SLGBTQ+ groups.

Conclusions The ODES is a brief, valid, inclusive, and scalable tool suitable for use across age groups in clinical, community, and public health settings. Its dual scoring framework supports both service-level triage and population-level surveillance, facilitating screening efforts, monitoring, public health initiatives, and informed resource planning.

Keywords Disordered eating, Eating disorder, Screening tool, Psychometrics, Surveillance

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Early identification and screening for disordered eating and eating disorders (EDs) are critical for reducing long-term morbidity, improving treatment outcomes, and informing population health planning [1–3]. Although onset most commonly occurs during adolescence and young adulthood [4], disordered eating and ED symptoms are observed across the lifespan and, when left undetected or untreated, can result in significant physical and psychological sequelae, including increased mortality risk [5, 6]. Disordered eating encompasses problematic thoughts, attitudes, and behaviors that do not meet the full diagnostic criteria for an ED according to the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; DSM-5) [7], yet it is associated with substantial health risks [8] and may progress to a full-threshold ED if left unaddressed [9]. Early identification and intervention are associated with improved health outcomes and a reduced risk of chronic illness [1, 8, 9]; however, disordered eating and early signs of EDs often go unrecognized. A meta-analysis spanning 16 countries (n = 63,181) found that approximately 22% of young people experience disordered eating [10], yet only one in four receive treatment [11]. Furthermore, 30% to 63% of youth report subclinical eating-, weight-, and body-related concerns [12–14]. This high prevalence highlights a critical gap in the early identification and support of individuals across the spectrum of disordered eating and ED symptoms, underscoring the need for brief, scalable screening tools suitable for diverse populations and settings.

Many existing screening tools for EDs and disordered eating were originally developed for adult clinical populations, including the *S*ick, *C*ontrol, *O*ne, *F*at, and *F*ood (SCOFF) screener [15], which is commonly cited in population health studies [10]. Some of its language may be difficult for certain respondents to understand (e.g., "sick" for vomiting), and it emphasizes behaviors less pertinent to early or subthreshold signs of EDs and disordered eating (e.g., rigidly eating only "healthy" foods, or intentional weight loss). Additionally, it focuses on ED presentations more centered around a desire for thinness versus other body type ideals (e.g. muscularity), limiting its utility and acceptability among those who desire other body ideals, including men and gender diverse populations [16, 17], key groups already facing significant barriers to care [18]. Another widely used tool is the Eating Disorder Screen for Primary Care (ESP) [19], which demonstrated strong initial psychometric properties in its original validation study. However, subsequent research has raised concerns regarding its specificity, with lower estimates reported across ED diagnoses (approximately 34–40%), suggesting a higher likelihood of false-positive screens and potential limitations for accurate identification in primary care settings [20]. In addition, the ESP was validated exclusively in adult populations, limiting its applicability to younger age groups and broader lifespan use. Importantly, the SCOFF and ESP were developed before the DSM-5 [7] and were not explicitly constructed using DSM-5 criteria, which may limit their alignment with more recently defined ED presentations. In contrast, the *S*creening *T*ool for the early detection *O*f *B*inge Eating Disorder (STOB) [21] uses clear, developmentally appropriate language, targets behaviors relevant to early-stage binge eating, and incorporates participant feedback to improve comprehension. However, its age range and scope are limited, focusing primarily on adolescents aged 13–18 and early-stage binge eating. Reflecting this need, recent Canadian recommendations have called for the expansion of ED screening within pediatric healthcare services [22]. These considerations underscore the need for screening tools that are both developmentally adaptable and suitable for use across the lifespan, capturing a broad range of early EDs and disordered eating indicators and supporting population-level surveillance and early identification in diverse communities.

Building on the need for accessibility and inclusivity, providers emphasized the importance of screening tools that clearly communicate actionable next steps. Communimetric tools, which facilitate shared decision-making and provide guidance to providers for appropriate follow-up, have gained attention as healthcare systems increasingly adopt measurement-based care and learning health systems [23]. Unlike traditional tools that focus solely on diagnostic accuracy, communimetric tools are designed to support dialogue between service users and providers, guiding referral, monitoring, and further assessment [23]. This approach is particularly important for EDs, where stigma, limited access, and lack of specialized ED training for primary care providers can delay identification and care [20, 24–26]. By translating complex clinical information into clear and actionable guidance, communimetric tools promote capacity-building and person-centered care that can be provided in a variety of settings.

The InsideOut Screener from Australia illustrates a brief screening tool designed to identify early-stage or high-risk EDs in clinical and self-referral settings [27]. Intended for adolescents aged 14 and older, this 6-item screener has demonstrated strong psychometric properties, including high internal consistency, test-retest reliability, and strong sensitivity (82.8%) and specificity (89.7%), and indicates whether further assessment is needed [27]. While a step forward, the tool, to our knowledge, is only available digitally via self-report, is not indicated for use in surveillance efforts, and is not validated in those under 14.

As awareness of disordered eating increases, there is growing demand for screening tools that can be deployed across diverse systems to support early identification, surveillance efforts, and monitor symptom trends at the

population level [8]. In response, the Ottawa Disordered Eating Screen (ODES) was developed for use across the lifespan. Unlike the widely used SCOFF screener [15], which was originally developed for adults and only later applied to adolescents, the ODES was purposefully designed to be broadly accessible and relevant across age groups and symptom presentations. Created around the same time as the InsideOut Screener [27], the ODES shares the core goal of identifying disordered eating thoughts and behaviors while providing guidance on immediate next steps. Compared with the InsideOut Screener [27], the ODES is shorter (four items), enhancing brevity and accessibility, and was additionally designed for use in population-level surveillance, with Likert scales that capture at-risk individuals. Its language incorporates inclusive wording (e.g., adding "muscle" to questions about weight and shape), supports ongoing monitoring, and employs a communimetric structure suitable for both clinical screening and public health applications. In doing so, the ODES provides a reflective assessment of disordered eating prevalence across the population while supporting timely, tailored responses across diverse settings.

Development of the ODES

The ODES was developed to address the need for a brief, accessible, and communimetric screening tool that supports early identification of disordered eating symptoms across clinical, community, and surveillance settings. The items were written in clear, non-clinical language to ensure accessibility across age groups while remaining developmentally appropriate. The measure was adapted from a prior 2-item, 2-domain version [28] assessing cognitive (e.g., preoccupation with eating, shape, weight, or muscularity) and behavioral (e.g., restrictive eating or binge eating) symptoms. This earlier iteration was validated [28] using retrospective data from the Research on Eating and Adolescent Lifestyles (REAL) study, a community-based sample collected between 2004 and 2010 [29]. With yes/no response options, the screener allowed users to identify risk profiles based on symptom domains (e.g., cognitive symptoms only, behavioral symptoms only, both, or neither). Validation results demonstrated good sensitivity and specificity, with performance comparable to the well-established SCOFF screener [15], supporting its potential utility across diverse populations and settings [28].

To enhance measurement precision and accessibility, a revised 4-item self-report version was subsequently developed in collaboration with survey experts. This version did not introduce new constructs but refined the behavioral domain to improve specificity, with the behavioral component disaggregated into three distinct items capturing restrictive eating, binge eating episodes, and associated loss of control overeating, while the cognitive domain remained a single item assessing preoccupation with weight, shape, or muscularity. The revised version also prioritized readability and incorporated communimetric response options directly linked to clinical action, with wording deliberately kept accessible across the lifespan to support its use in clinical and population surveillance contexts across diverse age groups. Since its refinement to the 4-item communimetric version, the ODES has been administered in two national surveillance surveys, and as part of REAL 2.0, a 15-year longitudinal follow-up of the original study population [30], which allowed for evaluation of the tool's performance across a broad age range. Given the availability of other diagnostic tools as part of REAL 2.0, a formal psychometric evaluation assessing criterion, convergent, and discriminant validity, and internal consistency, was possible.

The present study had three main objectives. First, we described the development of the revised 4-item ODES and its scoring guidelines, which uses a dual-scoring system consisting of a domain-based "traffic light" model for clinical triage and a total score cutoff for population surveillance and outcomes monitoring (Objective 1). Second, we evaluated its psychometric properties using data from REAL 2.0 (Objective 2). Last, we demonstrated the utility of the ODES by deploying it in two large-scale Canadian surveillance initiatives: the 2024 Mental Health Research Canada's (MHRC) 21st National Poll, *Understanding the Mental Health of Canadians* (ages 16–65) [31], and the 2023 Ontario Student Drug Use and Health Survey (OSDUHS; grades 7–12; Objective 3) [32]. Descriptive findings from these applications provide initial insights into disordered eating symptom prevalence across youth and adult populations, highlighting the tool's versatility for clinical, community, and public health applications.

Methods

Data

Three datasets were used to examine the ODES, providing evidence of its psychometric properties and its utility for population-level surveillance. The REAL 2.0 study served as the primary dataset for evaluating the psychometric properties of the ODES [30]. This 15-year follow-up study investigated the long-term mental and substance use outcomes associated with adolescent ED risk factors. It included 278 participants aged 26–33 years (M = 28.6, SD = 1.5), of whom 69.4% identified as female at birth (n = 195) and 30.6% as male at birth (n = 83). Recruitment, enrolment, and retention procedures for the REAL 2.0 cohort are described in detail in the original cohort publication [30]. Administering the ODES in this cohort allowed evaluation of its performance relative to the established reference measure, the Eating Disorder

Diagnostic Scale (EDDS) [33], and supported its applicability beyond the initial developmental target population. The REAL 2.0 study has been approved by the organization's research ethics board. The MHRC's 21st National Poll (July 12–21, 2024) [31] assessed the broader applicability of the ODES in a national sample of Canadians (n = 3,213) aged 16–65 (M = 47.1, SD = 18.0) [31]. Since 2020, MHRC has conducted recurring cross-sectional surveys tracking mental health and substance use indicators, providing an opportunity to evaluate the ODES in a population-based sample spanning adolescents to older adults. Finally, the OSDUHS captured disordered eating symptom prevalence among school-based populations in Ontario. This long-standing biennial self-report survey of students in grades 7–12 (ages 11–20; M = 15.0, SD = 1.8) included the ODES in its 2023 cycle, surveying 10,145 students from 235 schools across 46 school boards [34]. While psychometric validation relied primarily on REAL 2.0, the MHRC and OSDUHS datasets provided complementary evidence of the ODES's utility for population-level surveillance across youth and adult populations.

Mechanisms for capturing sex and gender identities varied across datasets, and analyses employed the measure that allowed for greatest sample inclusion. In REAL 2.0, as there were few individuals who identified as gender diverse, the decision to use the sex variable allowed for all participants to be included. In the MHRC dataset, gender was available and used in all analyses. In the OSDUHS, gender was available for students in grades 9–12, whereas sex assigned at birth was available for grades 7–12 sample.

Transparency and openness

This study's design and its analysis were not preregistered. Data and research materials from the REAL 2.0 study are available by contacting the authors. Publicly accessible data were drawn from the MHRC Data Hub [35] and OSDUHS [34]. All analyses were conducted using IBM SPSS Statistics Version 28, R (version 4.4.0) [36], and the R psychology package (version 2.4.1) [37]. Analytic code and study materials are available from the corresponding author upon request.

Objective 1: Development of the self-report ODES and accompanying scoring guidelines

To support broader implementation and utility, a 4-item self-report version of the ODES was developed from the original 2-domain tool [28]. Development was led by a multidisciplinary working group that included the tool's original developers, experts in ED prevention, measurement and treatment, as well as weight management experts and epidemiologists with expertise in population-level surveys. The goal was to strengthen the assessment of both cognitive and behavioral symptoms of disordered eating while maintaining brevity, accessibility, and relevance across diverse groups (e.g., age, gender). The revised tool was designed for use in a variety of settings, including clinical screening, community programs, and public health surveillance.

Scoring guidelines for the ODES were developed through a collaborative, iterative process involving a review of screening goals and consultation with clinical and public health experts. A communimetric approach was adopted, focusing on clear communication and decision support, while balancing sensitivity for early detection with specificity to reduce unnecessary referrals. Draft scoring procedures were tested using clinical vignettes and expert feedback to determine how different symptom frequencies and item combinations could best inform risk classification and guide decision-making for next steps. This process resulted in a dual-scoring system: a domain-based "traffic light" scoring model for clinical and community use, and a total score approach for population-level surveillance and outcomes monitoring. Overall, this communimetric development process aimed to ensure the ODES provides clear, actionable guidance suitable for both service provision and public health monitoring.

Objective 2: Psychometric evaluation of the self-report ODES

Psychometric properties of the 4-item self-report ODES were examined using two independent samples: the REAL 2.0 dataset [30] and data from MHRC's 21st National Poll [31]. The ODES was administered online in both studies. Missingness was minimal across these samples, with no missing ODES scores in the MHRC dataset and missing data for only four of 278 participants in REAL 2.0. Complete-case analysis was therefore used for the psychometric validation analyses.

Criterion validity was assessed using the REAL 2.0 sample by evaluating the ODES's ability to distinguish individuals with and without clinically significant ED symptoms. The EDDS [33], a validated 22-item self-report measure aligned with DSM-5 diagnostic criteria [7], was used as the reference standard. The EDDS assesses ED symptoms and applies a standardized scoring algorithm to classify individuals with probable full or subthreshold DSM-5 eating disorder presentations based on self-report. No clinical interviews or clinician-confirmed diagnoses were conducted. Classification accuracy analyses included cross-tabulations and Receiver Operating Characteristic (ROC) curve analysis. Diagnostic performance metrics were calculated with 95% confidence intervals (CIs) and included sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and likelihood ratios.

To identify optimal cut-off scores for the ODES total score, the Youden Index [38] was applied. This statistic maximizes the balance between sensitivity and specificity. The area under the ROC curve (AUC) was interpreted based on Swets' [39] criteria: small (0.5–0.7), moderate (0.7–0.9), or high (> 0.9) diagnostic accuracy.

Convergent and discriminant validity were also evaluated in the REAL 2.0 sample. Spearman correlation coefficients were calculated between the ODES total score and theoretically related and unrelated constructs [40]. Convergent validity was assessed via correlations with measures expected to relate to DE, including restrained and emotional eating subscales of the Dutch Eating Behaviour Questionnaire (DEBQ) [41], the appearance and weight satisfaction subscales of the Body Esteem Scale for Adolescents and Adults (BESAA) [42], depressive symptoms measured by the Patient Health Questionnaire-9 (PHQ-9) [43], and generalized anxiety symptoms measured by the Generalized Anxiety Disorder-7 (GAD-7) [44]. Both depressive and generalized anxiety symptoms are commonly comorbid with disordered eating and represent important indicators of concurrent psychiatric burden [45]. Discriminant validity was assessed using the Social Connectedness Scale [46], a construct expected to be unrelated to disordered eating symptoms. Correlation strength was interpreted following Cohen's [47] guidelines: weak ($r < .30$), moderate ($r = .30–0.60$), and strong ($r > .60$). Steiger's Z test [40] was used to compare the strength of convergent versus discriminant correlations.

Internal consistency reliability was examined by calculating Cronbach's alpha separately for the REAL 2.0 and MHRC samples. This analysis assessed the degree to which the ODES items coherently measured disordered eating symptoms within each sample.

Objective 3: Applications of the ODES in population-based surveillance

To evaluate the utility of the ODES as a population-level surveillance tool, the 4-item self-report version was administered in MHRC's 21st National Poll (ages 16–65) and the 2023 OSDUHS (grades 7–12, ages 11–20) [31, 32]. Descriptive analyses were conducted to examine the ODES's performance in identifying patterns of disordered eating across a broad age range (11–65 years). These analyses assessed the prevalence of high or moderate risk classifications using the domain-based scoring system, the frequency of specific disordered eating thoughts and behaviors, and the co-occurrence of these symptoms with sociodemographic characteristics (including age) and other mental health concerns. Results were compared with published prevalence estimates to assess consistency and comparability. Findings demonstrate the tool's potential to inform public health monitoring, support surveillance of disordered eating symptoms across diverse populations, and improve accuracy in estimating population-level prevalence.

Results

Objective 1: Development of the self-report ODES and accompanying scoring guidelines

The finalized 4-item self-report ODES was developed through multiple rounds of expert consultation, review of existing ED screening and diagnostic tools, and iterative revisions focused on accessibility and developmental appropriateness. The behavioral domain expanded from a single item to three distinct items assessing restrictive eating, over-eating, and loss of control eating, allowing more precise identification of behavioral risk profiles by differentiating both presence and frequency of behaviors. The cognitive domain remained a single item assessing persistent preoccupation with weight, shape, or muscularity. Response options were carefully designed to capture behavior frequency, reflecting the normalization of dieting culture and situating these behaviors along a continuum.

Language was simplified to enhance comprehension among young people. For example, the term "fasting" was replaced with "skipped a couple of meals or went most of the day eating nothing or almost nothing." The recall period was standardized to "the last four weeks" across all items, and response options were refined to reflect commonly reported frequencies in adolescent populations, supporting clearer and more accurate risk classification. Language around bodies was also expanded to include muscularity to increase inclusivity of different body ideals. These refinements enhanced utility, acceptability, and interpretability for both respondents and clinicians. The tool is presented in Fig. 1.

Draft scoring guidelines were tested using clinical vignettes covering a range of disordered eating presentations, allowing refinement in interpreting symptom frequency and combinations. This iterative testing resulted in a dual-scoring system: a domain-based "traffic light" model for clinical and community use, and a total score approach for large-scale population surveillance.

The domain-based scoring classifies risk as low (green), moderate (orange), or high (red) based on responses in the cognitive and behavioral domains. The cognitive domain is measured by item 1 (weight, shape, or muscularity-related preoccupation), while the behavioral domain is assessed by item 2 (restriction) and/or items 3a + 3b (binge eating) in combination. This structure supports a clearer understanding of symptom severity by assessing frequency across both domains and aims to capture a broader and earlier range of disordered eating symptoms. The traffic light system, grounded in symptom frequency, facilitates clear, actionable decision-making

ODES

Instructions: The Ottawa Disordered Eating Screen asks questions about food, bodies, and eating. Please circle the option that best describes how often this may have happened in the last 4 weeks.

In the last 4 weeks, how often did you...						
worry so much about your weight, shape, or muscles that you couldn't get it out of your head?	Never	Rarely	Sometimes	Often	Always	
not eat, or eat in a way to change your weight, shape, or muscles?	Never	Once or twice	Once or twice each week	3 or 4 times each week	5 or 6 times each week	Daily or almost daily
binge on food (eaten what other people would say is an unusually large amount of food such as a whole litre of ice cream, in a few hours?)	Never	Once or twice	Once or twice each week	3 or 4 times each week	5 or 6 times each week	Daily or almost daily
feel like you couldn't stop eating or couldn't control how much you ate?	Never	Once or twice	Once or twice each week	3 or 4 times each week	5 or 6 times each week	Daily or almost daily

Fig. 1 4-Item self-report ODES. Note: A French version of the ODES is available from the FREEDcan website: https://www.freedcan.ca/en/for-professionals/tools-for-practice/

Table 1 Proportion of participants classified as at-risk by ODES across samples

Dataset	Age		Total Score Method	Risk Category		
	M	SD	At-risk	High	Moderate	Low
REAL 2.0 ($n=278$)	28.6	1.5	41.6%	4.7%	40.5%	54.7%
MHRC ($n=3,213$)	47.1	18.0	48.8%	10.6%	44.3%	45.1%
OSDUHS ($n=9,482$)	15.0	1.8	61.2%	16.0%	49.8%	34.2%

M mean, *SD* standard deviation, *REAL* 2.0 Research on Eating and Adolescent Lifestyles, *MHRC* Mental Health Research Canada, *OSDUHS* Ontario Student Drug Use and Health Survey

for service providers and offers a low-barrier approach to screening.

A simplified method of scoring the ODES involves summing all items to identify individuals at risk for disordered eating, with total scores ranging from 4 to 23 (higher scores indicate greater risk). ROC analysis and the Youden Index identified a total score of ≥7 as the optimal cutoff for detecting disordered eating risk in population surveillance. Table 1 presents domain and total scores across samples, and Fig. 2 outlines the scoring guidelines. This dual-scoring system provides a flexible and scalable framework for applying the ODES in both clinical and public health contexts.

Objective 2: Psychometric properties of the 4-item ODES

Criterion validity

To assess the classification accuracy of the ODES's domain-based scoring, data from REAL 2.0 were analyzed using the EDDS [33] as the reference standard. In this sample, 9.4% met DSM-5 [7] diagnostic thresholds for an ED. Specifically, fewer than five individuals (0.4%) met criteria for anorexia nervosa, 10 (3.6%) for bulimia nervosa, 11 (4%) for binge eating disorder, and 4 (1.4%) for purging disorder. An additional 49 participants (17.6%) met criteria for a subthreshold ED or disordered eating based on EDDS classification.

Using the domain-based scoring, the ODES showed high sensitivity (91.9%) and adequate specificity (72.0%), as detailed in Table 2. These results suggest that the ODES effectively identifies individuals both with and

Scoring Instructions for ODES

The ODES scoring system is designed to assess the risk of disordered eating by evaluating two main domains: the **cognitive domain** and the **behavioural domain**.

The cognitive domain is measured by **item 1**, which assesses preoccupation with food, body, shape, weight and/or muscularity.
The behavioural domain is measured by **items 2, 3a and 3b**:

- **Item 2**, which assesses restrictive eating patterns, and
- **Items 3a and 3b combined**, which assess binge-eating behaviours.

Recommendations for use of ODES in healthcare settings (traffic light system):

In the last 4 weeks, how often did you...						
Item 1. worry so much about your weight, shape, or muscles that you couldn't get it out of your head?	◉ (1) Never	◉ (2) Rarely	■ (3) Sometimes	▲ (4) Often	▲ (5) Always	
Item 2. not eat, or eat in a way to change your weight, shape, or muscles?	◉ (1) Never	◉ (2) Once or twice	■ (3) Once or twice each week	▲ (4) 3 or 4 times each week	▲ (5) 5 or 6 times each week	▲ (6) Daily or almost daily
Item 3a. binge on food (eaten what other people would say is an unusually large amount of food such as a whole litre of ice cream, in a few hours?)	◉ (1) Never	■ (2) Once or twice	■ (3) Once or twice each week	▲ (4) 3 or 4 times each week	▲ (5) 5 or 6 times each week	▲ (6) Daily or almost daily
Item 3b. feel like you couldn't stop eating or couldn't control how much you ate?	◉ (1) Never	■ (2) Once or twice	■ (3) Once or twice each week	▲ (4) 3 or 4 times each week	▲ (5) 5 or 6 times each week	▲ (6) Daily or almost daily

Using the traffic light system, a **positive screen** occurs when a person scores in the **orange or red zones** on the cognitive domain (item 1) **OR** behavioural domain (item 2 **and/or** items 3a and 3b combined).

▲ High Risk/Red	Has red scores on BOTH cognitive and behavioural domains	Recommend further screening/assessment, including medical assessment.
■ Moderate Risk/Orange	Has orange scores on BOTH cognitive and behavioural domains OR If scores are in the red or orange zone for EITHER cognitive or behavioural domains	Recommend further screening/assessment.
◉ Low Risk/Green	Has green scores on BOTH cognitive and behavioural domains	Recommend no further screening/assessment.
*Note: this scoring guide does not replace clinical judgement.		

Recommendations for use of ODES in surveillance:
A **total score of 7 or higher when summing the 4 items** indicates the individual is "at risk" for disordered eating.

Fig. 2 Domain-based and total scoring for the ODES. Note: A French version of the ODES is available from the FREEDcan website: https://www.freedcan.ca/en/for-professionals/tools-for-practice/

Table 2 Classification accuracy statistics of the ODES using domain and total scoring methods ($n = 278$)

Statistics % (95% CI)	Domain-based scoring	Total Score ≥ 7	Total Score ≥ 8	Total Score ≥ 9	Total Score ≥ 10
Sensitivity	91.9 (83.2–97.0)	90.5 (82.5–95.8)	75.7 (65.1–84.5)	64.9 (53.6–75.1)	45.9 (34.9–57.3)
Specificity	72.0 (65.2–78.1)	76.5 (70.3–82.0)	84.5 (79.1–89.1)	89.0 (84.2–92.8)	94.0 (90.1–96.7)
PPV	54.8 (45.7–63.8)	58.8 (49.6–67.5)	64.4 (54.0-73.9)	68.6 (57.2–78.6)	73.9 (60.2–85.1)
NPV	96.0 (91.5–98.5)	95.6 (91.7–98.1)	90.4 (85.6–94.0)	87.3 (82.3–91.4)	82.5 (77.2–87.0)
+LR	3.3 (2.60–4.14)	3.85 (2.97-5.00)	4.88 (3.45–6.92)	5.90 (3.84–9.05)	7.66 (4.2-14.98)
–LR	0.11 (0.05–0.24)	0.12 (0.06–0.25)	0.29 (0.19–0.43)	0.39 (0.29–0.54)	0.58 (0.46–0.71)
Accuracy (%)	77.4	77.4	82.1	82.5	81.0

CI Confidence interval, *PPV* Positive predictive value, *NPV* Negative predictive value, *+LR* Positive likelihood ratio, *–LR* Negative likelihood ratio

without disordered eating. The PPV of 54.8% indicates that a positive screening result moderately predicts the presence of disordered eating. The NPV was 96.0%, indicating that a negative result reliably reflects the absence of disordered eating.

To identify an optimal ODES total score cutoff for epidemiological screening, all possible cutoff scores were initially evaluated. For clarity, only scores ranging from 7 to 10 are presented in Table 2. ROC analysis yielded a moderate AUC of 0.89 (Fig. 3). Using Youden's *J* statistic, Euclidean distance, and maximum sensitivity × specificity methods, a total score cutoff of greater than 6.5 was recommended. A rounded cutoff score of 7 was selected as optimal, producing high sensitivity (90.5%) and adequate specificity (76.5%). Using this cutoff, the tool continued to demonstrate strong classification accuracy (80.3%), with a PPV of 58.8% and an NPV of 95.6%. Likelihood ratios further supported screening accuracy (+ LR = 3.85; –LR = 0.12).

Internal consistency of the ODES was found to be adequate in both the REAL 2.0 (Cronbach's α = 0.72) and MHRC (α = 0.77) samples.

Convergent and discriminant validity

Table 3 presents Spearman's rank-order correlations between the ODES total score and various related and unrelated measures within REAL 2.0. Evidence for convergent validity was demonstrated by statistically significant and theoretically consistent correlations between the ODES total score and related constructs ($r = .46$ to 0.63). Additionally, negative correlations with appearance and weight satisfaction also supported convergent validity (BESAA; Appearance Satisfaction, r = -.58; and Weight Satisfaction, r = -.62). The correlations between individual ODES item scores and related constructs were also calculated. The behavioral restriction score (item 2) showed a moderate correlation with the DEBQ Restrained Eating Subscale ($r = .54$), while the behavioral binge domain (combined items 3a and 3b) was moderately correlated with the DEBQ Emotional Eating Subscale ($r = .40$).

Discriminant validity was assessed via correlations between the ODES and the Social Connectedness Scale. The ODES showed a marginally moderate positive correlation with social connectedness ($r = .34$). Steiger's Z tests confirmed that this correlation was significantly lower than the ODES's correlations with appearance ($p < .001$) and weight satisfaction ($p < .001$), restrained eating ($p < .001$), and depressive symptoms ($p < .001$). The ODES correlation with social connectedness was lower, but not significantly, than its correlation with emotional eating ($p = .059$) and generalized anxiety symptoms ($p = .051$).

Sex differences in response patterns

Independent samples t-tests revealed a large and significant sex difference in the cognitive domain of the ODES, with female participants reporting greater preoccupation with food, body, shape, weight and/or muscularity compared to male participants ($M = 2.22$ vs. 1.72; $t(196.66) = 3.42$, $p < .001$, Cohen's $d = 1.22$). Consistent with this result, a larger proportion of female participants endorsed cognitive symptoms (34.4%) compared to male participants (20.5%). No significant sex differences were observed in the behavioral domains (all $p > .05$), with comparable proportions of males and females reporting restrictive behaviors (12.0% vs. 16.9%) and binge eating (24.1% vs. 30.2%). These findings suggest that cognitive symptoms are more pronounced among female participants, whereas rates of behavioral symptoms appear relatively the same across females and males. Additionally, more females score in the high risk range than their male counterparts, with 5.8% females versus 1.2% males scoring in the high risk category; 42.9% of females versus 34.9% of males scoring in the moderate risk category, and 51.3% of females versus 63.9% of males scoring in the low risk category.

Objective 3: Population-based surveillance using the ODES

Mental health research canada (MHRC) Poll 21

The ODES was administered as part of MHRC's 21st National Poll, *Understanding the Mental Health of Canadians* (July 12–21, 2024), in a nationally representative sample of individuals aged 16–65 ($M = 47.1$ years;

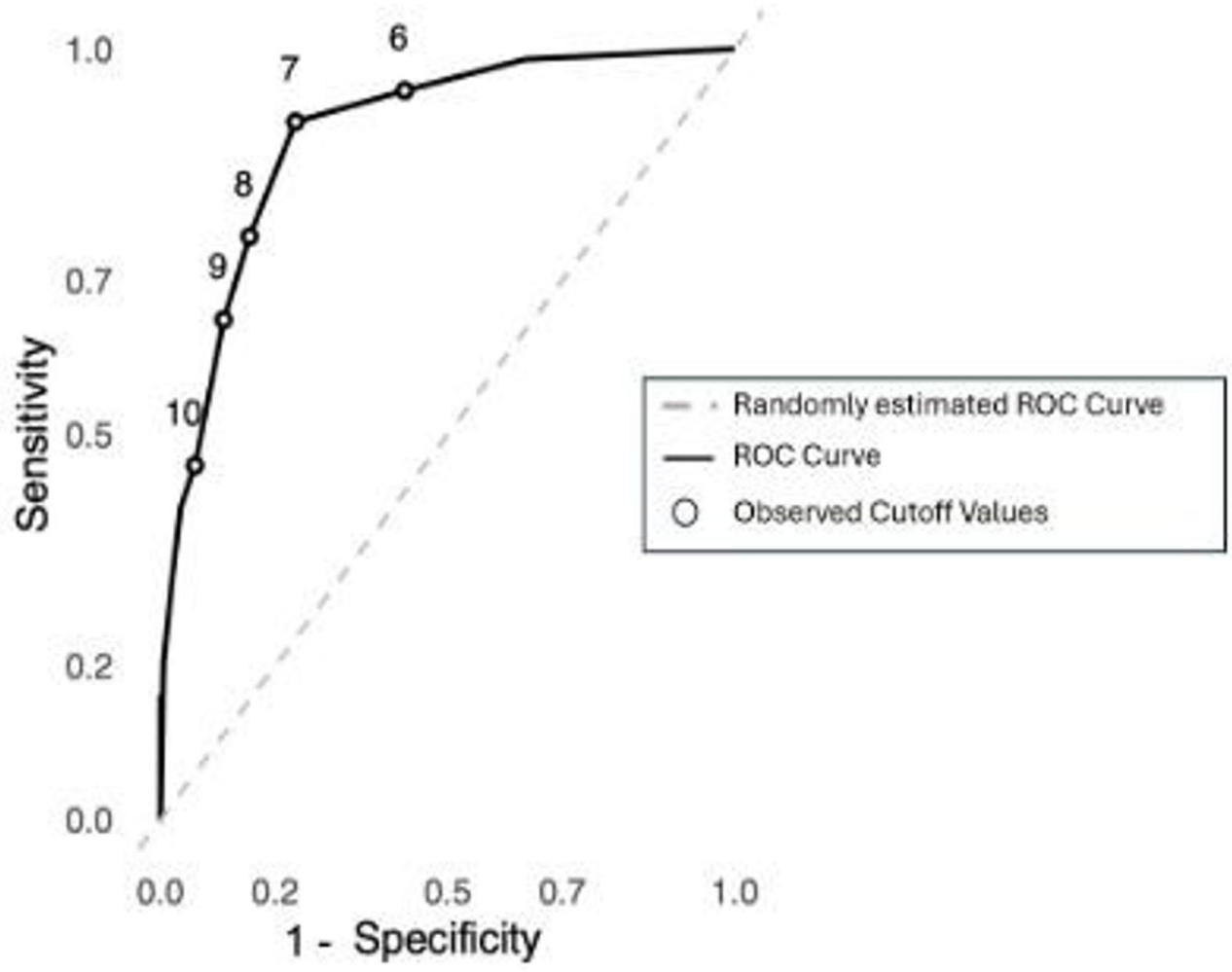


Fig. 3 Receiver operating characteristics (ROC) curves of the ODES total score cut-offs

Table 3 Bivariate correlations between ODES total score and psychometric measures within REAL 2.0

	Spearman's Correlation Coefficient	*p*-value
Mood: PHQ-9 Total Score	0.53	< 0.001
Anxiety: GAD-7 Total Score	0.46	< 0.001
Body Esteem: BESAA Appearance Satisfaction Subscale	-0.58	< 0.001
Body Esteem: BESAA Weight Satisfaction Subscale	-0.62	< 0.001
Disordered Eating: DEBQ Restrained Eating Subscale	0.63	< 0.001
Disordered Eating: DEBQ Emotional Eating Subscale	0.47	< 0.001
Social Connectedness Scale Total Score	0.34	< 0.001

BESAA Body-Esteem Scale for Adolescents and Adults, *DEBQ* Dutch Eating Behavior Questionnaire, *PHQ-9* Patient Health Questionnaire-9, *GAD-7* Generalized Anxiety Disorder-7

SD = 18.0; 30). Using the domain-based scoring system, 10% of respondents were classified as high risk, 44% as moderate risk, and 46% as low risk. When applying the total score cutoff (≥ 7), 48.8% were classified as at-risk, demonstrating the broader sensitivity of the total scoring method.

Clear age gradients emerged. Youth aged 16–17 showed the highest levels of risk, with 21% classified as high risk and 52% as moderate risk using domain-based scoring, and 60% scoring at risk via total scoring. A similar pattern was observed among individuals aged 18–34: 14% were high risk and 54% were moderate risk based on domain-based scoring, while 63% were classified as at risk using the total score.

Disordered eating behaviors were common across the sample. In total, 37% endorsed at least one high-risk behavior (restriction or binge eating). Weekly restrictive eating or dieting was reported by 26% of respondents, while 11% reported weekly binge eating accompanied by perceived loss of control. Cognitive preoccupation

with eating, weight, shape, or muscularity was also widespread: 47% reported at least moderate preoccupation (10% "always," 15% "often," and 22% "sometimes"). Younger adults (aged 18–34) reported substantially higher levels of preoccupation (62%) compared to older adults aged 55+ (33%). Gender differences were also evident, with 15% of women reporting being "always" preoccupied, compared to 6% of men; overall, 54% of women and 40% of men reported at least some level of preoccupation.

High-risk ODES scores were significantly associated with co-occurring mental health and substance use concerns. Among respondents with elevated symptoms of depression and anxiety (scores ≥ 5 on a 10-point scale), 71% and 64%, respectively, were classified as a-risk based on the ODES total scoring, compared with 38% and 35% among those reporting lower symptom levels (< 5). Individuals showing indicators of alcohol (74%) or cannabis (79%) dependency were also more likely to score in the high risk range on the ODES [31]. Marked disparities were also observed across equity-deserving groups: 37% of racialized respondents and 47% of 2SLGBTQ+ respondents screened as high-risk on the ODES [31].

Ontario student drug use and health survey (OSDUHS)

The ODES was included in the 2023 OSDUHS administration to examine disordered eating patterns among younger populations (grades 7–12). Over half of students (56%) reported preoccupation with shape and/or weight, 49% engaged in restrictive eating, 40% reported binge eating, and 34.9% felt unable to stop or control their eating [34]. Using both total and domain-based scoring, 61.2% of students were classified as at-risk, and 65.8% screened positive overall (16% high risk, 49.8% moderate, and 34.2% low; Table 1).

Sex was assessed for all participants (grades 7–12), and gender identity was collected for grades 9–12 ($n = 6{,}676$). Female respondents ($n = 5{,}358$) showed a higher risk, with 21.2% classified as high risk compared with 8.8% of male respondents ($n = 4{,}107$). Among students in grades 9–12, gender-diverse respondents ($n = 310$; including queer, non-binary, gender-fluid, trans male, trans female, questioning, and two-spirit identities) had the highest risk, with 30.9% classified as high risk, 45.8% as moderate risk, and 23.2% as low risk on the domain score. In comparison, cisgender females were 22.4% high risk, and cisgender males were 9.8% high risk.

Discussion

The ODES represents a significant advancement in screening for disordered eating symptoms across diverse populations. Its brief, self-report format and clear, accessible language make it suitable for use across the lifespan. Developed through an evidence-informed, iterative process, this 4-item tool balances psychometric rigour with practical utility. It captures both cognitive and behavioral aspects of disordered eating, enabling identification of diverse risk profiles to guide appropriate care pathways. Its administration in large-scale surveillance studies has demonstrated utility across groups, highlighting its dual use in clinical and public health contexts. Although the ODES was developed and evaluated within Canadian populations, its accessible, non-clinical language and availability in English and French may support potential use in other English- and French-speaking contexts. Additionally, the tool's evidence-informed scoring guidelines, including a three-tiered traffic light model following a communimetric approach, provide clinicians and service providers with a structured, actionable framework for early detection and how to respond, while total cutoff scoring supports population-level monitoring and surveillance efforts.

The ODES builds on the original 2-domain version [27], that equally prioritizes thoughts and behaviours, while maintaining brevity. It is currently the shortest disordered eating screener, with four items compared to five on the SCOFF [15] and six on the InsideOut Screener [25]. Item wording was refined for clarity and accessibility, replacing clinical terminology with language understandable across age groups. A consistent four-week recall period and tailored response options further enhanced usability. The tool can be completed independently or administered in an interview format, allowing flexibility across literacy levels and settings. Gender-neutral language and omission of direct questions about weight support a weight-neutral approach, facilitating detection of disordered eating symptoms across the weight spectrum. Behavioral patterns did not differ significantly between participants who identified as male and female (sex assigned at birth), suggesting limited sex-based differences in observed response patterns within this sample. This finding supports the use of inclusive, muscle-related wording that does not rely on gendered assumptions and may improve identification across diverse populations.

Psychometric analyses supported the tool's internal consistency, convergent validity, and discriminant validity. The ODES was strongly correlated with measures of appearance and weight satisfaction and symptoms of depression and anxiety, which are findings consistent with established ED literature [45]. These associations confirm that the ODES captures key dimensions of disordered eating risk and is aligned with related mental health constructs. The screening accuracy of the total scoring method was comparable to established tools, such as the SCOFF [15] and the InsideOut Screener [27], demonstrating strong classification performance. Together, the ODES's psychometric robustness and accessibility make

it a valuable addition to existing screening measures, particularly for use in clinical, community, and public health settings.

Application of the ODES in large-scale surveillance revealed concerning rates of disordered eating symptoms across both youth and adult populations. High rates of cognitive preoccupation with weight, shape, and muscularity, alongside frequent restrictive and binge eating behaviors, highlight the urgent need for widespread screening and early intervention. Gender differences, where females reported higher preoccupation with body, eating, and weight, align with existing literature and indicate populations at higher risk for targeted prevention [10]. Strong associations between ODES risk classifications and co-occurring mental health and substance use concerns further support the importance of integrated screening and prevention approaches. Elevated risk among racialized and 2SLGBTQ+ groups highlights equity considerations and demonstrates the ODES's ability to identify disordered eating risk in underserved populations. Population-based surveys incorporating tools such as the ODES are essential for producing more accurate disordered eating prevalence estimates and identifying groups most affected in Canada.

The higher prevalence rates observed with the ODES were expected. Its inclusive, neutrally phrased items and the ability to capture a broad range of symptoms, including appearance and weight concerns and prodromal states, likely identified a wider spectrum of disordered eating than tools such as the SCOFF [15]. For instance, whereas López-Gil et al. [10] reported a global disordered eating prevalence of 22% using the SCOFF [15], MHRC data showed that 48.8% of Canadians were at risk based on the ODES total score. This discrepancy likely reflects the ODES's broader design, which places less emphasis on weight *loss* and captures earlier-stage or subthreshold symptoms, including obsessive preoccupation with weight and shape concerns.

Higher ODES scores observed in the younger OSDUHS cohort (ages 11–20; 61.2% at risk), compared with MHRC respondents (ages 16–65; 48.8%) and the REAL 2.0 sample (ages 26–33; 41.6%), align with evidence that disordered eating impacts young people disproportionately, likely related to the collective shifts physically, emotionally, socially, and educationally/vocationally [48]. Greater population screening, especially in youth, with brief tools like the ODES will allow for a more clear understanding of the prevalence of disordered eating in communities across Canada.

Strengths, limitations and constraints on generality

The study offers a comprehensive evaluation of the ODES's psychometric properties for screening disordered eating across diverse groups. Strengths include a well-powered validation sample (N = 278) and two large Canadian population-based surveys (MHRC and OSDUHS), enhancing generalizability and real-world relevance. The ODES's dual-scoring system supports flexible use in clinical and population-level surveillance contexts. The domain-based "traffic light" model is particularly suited for clinical screening, offering high sensitivity (91.9%) and moderate specificity (72%), while providing interpretable guidance regarding a respondent's cognitive and behavioral risk profiles. The total score cutoff of 7 maximizes case detection in population screening with high sensitivity (90.5%). These complementary approaches are reflected in the MHRC's 21st National Poll, where 55% of the sample was at risk (11% high, 44% moderate) using domain-based scoring, and 49% was at risk using total scoring. By capturing symptom frequency rather than relying on binary yes/no responses, as in the SCOFF [15], the ODES provides richer data and supports more nuanced clinical decision-making in low-barrier or non-specialist settings.

Several limitations constrain the generalizability of the results. Although the ODES was developed and evaluated within Canadian populations and is available in English and French, further validation across diverse cultural, clinical, and population settings is needed to establish its broader applicability and ensure appropriate interpretation across contexts. The ODES mainly relies on self-report, which may introduce biases related to social desirability, recall accuracy, or limited self-awareness. While the tool was designed to be applicable across the lifespan, formal validation was conducted only in the REAL 2.0 dataset, which included participants aged 26–33. Additionally, criterion validity was assessed against the EDDS [33], a validated self-report measure that provides probable DSM-5 ED classifications rather than clinician-confirmed diagnoses. As a result, further validation using clinical diagnostic assessments in younger and older populations is needed to fully establish the tool's performance across diverse settings. Additionally, the REAL 2.0 sample was predominantly White and cisgender, with limited representation of gender-diverse, racialized, Indigenous, or 2SLGBTQ+ individuals, further constraining generalizability of the psychometric results to more diverse populations. Sex assigned at birth was used as the primary demographic variable in the present analyses due to the harmonization constraints across datasets, as gender identity was not consistently collected across all samples. Accordingly, analyses were limited by their ability to examine gender-diverse populations, and findings related to sex-based differences should be interpreted in this context. Lastly, while the ODES was also administered in the larger MHRC and OSDUHS surveys, these datasets were used for descriptive surveillance rather than formal validation.

The study also lacked access to data, including other validated diagnostic tools (e.g., EDE-Q) [49] or screening measures (e.g., SCOFF) [15], limiting assessment of convergent validity. In terms of scoring methods, both the domain-based "traffic light" model and the total scoring method may increase false positives due to moderate specificity rates of 72% and 76.5%, respectively. As such, the ODES should be used as an initial screen followed by clinical assessment where indicated (for those that fall into the moderate or high risk category). Finally, the cross-sectional design of the validation and surveillance datasets limits conclusions about the predictive validity or temporal stability of ODES scores. Future research should include longitudinal studies in larger, diverse populations across age, gender, racial, and socioeconomic backgrounds to validate the tool further and strengthen its psychometric properties.

Conclusions

The ODES is a brief, flexible, and accessible screening tool designed to identify disordered eating symptoms across the lifespan. Its dual scoring options, inclusive language, and strong psychometric performance support its use across clinical, community, and surveillance settings. Functioning as a communimetric measure, the tool provides actionable scores to guide care decisions, facilitate triage, and support measurement-based care and learning health system initiatives. With continued integration into large-scale surveys, the ODES has strong potential to improve the accuracy of disordered eating estimates, inform public health planning, and enhance early detection and intervention for diverse populations across Canada.

Abbreviations

ED	Eating disorder
ODES	Ottawa Disordered Eating Screen
REAL	Research on Eating and Adolescent Lifestyles
MHRC	Mental Health Research Canada
OSDUHS	Ontario Student Drug Use and Health Survey

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Authors' contributions

N.O. contributed to conceptualization, investigation, project administration, supervision, and writing (original draft), and writing (review and editing). S.J.B. contributed to supervision, formal analysis, and writing (review and editing). W.S. contributed to writing (review and editing). A.B. contributed to investigation, data acquisition, and writing (review and editing). S.H. contributed to investigation, formal analysis, and writing (review and editing). G.M. contributed to supervision and writing (review and editing). G.G. contributed to investigation, data acquisition, and writing (review and editing). S.R. contributed to formal analysis and writing (original draft), and writing (review and editing). N.M. contributed to formal analysis and writing (original draft), and writing (review and editing). S.D. contributed to writing (original draft), and writing (review and editing). M.C., S.M., H.H., and A.Bo. contributed to data acquisition and writing (review and editing). M.L.N. contributed to conceptualization and writing (review and editing). All authors read and approved the final manuscript.

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Data availability

Data sharing is not available for the REAL dataset due to lack of consent to share as open source. The ODES and its scoring guide are publicly available and can be downloaded at Tools for Practice | CHEO FREEDcan. For data related to the Mental Health Research Canada Poll 21 and Ontario Student Drug Use and Health Survey please contact these respective sources for more details.

Declarations

Ethics approval and consent to participate

Data for this study were drawn from multiple sources. The Research on Eating and Adolescent Lifestyles (REAL) 2.0 cohort study was approved by the Children's Hospital of Eastern Ontario Research Ethics Board (CHEO REB# 21/130X), and informed consent was obtained from participants prior to participation. Secondary analyses of Mental Health Research Canada (MHRC) data relied exclusively on anonymous data; therefore, review by a REB was deemed not required under the *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans* (TCPS2), *Article 2.4*, as confirmed by the CHEO REB. The Ontario Student Drug Use and Health Survey (OSDUHS) protocol was approved by the Centre for Addiction and Mental Health (CAMH) and York University Research Ethics Boards, and school board research review committees (CAMH REB# 059/2022). Informed consent-assent was obtained from parents and students. All procedures were conducted in accordance with the principles of the Declaration of Helsinki.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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