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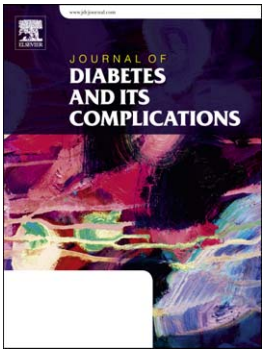

Choosing a screening tool to assess disordered eating in adolescents with type 1 diabetes mellitus

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Title: Choosing a screening tool to assess disordered eating in adolescents with type 1 diabetes mellitus

Commentary

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Commentary

Disturbed eating behaviours and insulin omission in adolescents with type 1 diabetes mellitus (1) have concerned diabetes clinicians for decades, yet screening and management protocols using validated tools for this high risk group are lacking. Clinical eating disorders and milder forms of disordered eating can impact negatively on glycaemic control and are associated with serious health consequences (2). Early detection and treatment of disturbed eating thoughts and behaviours is important. (3).

Diabetes specific tools are needed as insulin misuse is a potential purging behaviour unique to individuals with diabetes. Additionally, assessment of dietary restraint needs clarification to ascertain if affirmative answers are attributed to disordered eating behaviours or to diabetes management.

Evidence in support of three screening tools for adolescents with T1DM is now available; the Diabetes Eating Problem Survey Revised (4), the youth version of the Eating Disorder Examination Questionnaire (Goldschmidt, 2007 #236;d'Emden, 2012 #64) and the Eating Disorder Inventory -3 Risk Composite (EDI-3RC) (5, 6)) (Table 1).

The DEPS-R is a brief 16 item tool and takes less than ten minutes to complete, and is available for purchase from the Joslin Diabetes Centre, Boston USA. Evidence of validity has been demonstrated in 112 males and females aged 13-19 years (4). The DEPS-R has shown good internal consistency (Cronbach's alpha = 0.86) and construct validity with positive correlations with body mass index (BMI) z score ($p = 0.01$), HbA1c ($p = 0.001$), diabetes specific family conflict ($p < 0.005$), youth negative affect around blood glucose monitoring ($p = 0.03$) and parental specific diabetes burden ($p =$

0.0005). It showed negative correlations with frequency of blood glucose monitoring ($p = 0.03$) and quality of life ($p \leq 0.001$). External validity was assessed against clinician report of insulin omission. The DEPS-R assesses the importance of weight loss, skipping meals, control of eating, insulin manipulation, importance of diabetes control, eating alone, vomiting and the views of others on eating and diabetes management. It does not assess the full spectrum of disordered eating behaviours, in particular driven exercise, nor does it comprehensively assess body dissatisfaction or shape concerns, just the desire to lose weight and be thin. Body dissatisfaction, including shape concerns are known precursors for eating disorders (6). Additionally, it has not been validated against a gold standard diagnostic interview or other validated eating disorder screening tools.

The YEDE-Q has a third grade reading level. It was specifically developed as an adolescent modification of the parent measure, the Eating Disorders Examination Questionnaire (EDE-Q) (7), and includes specific questions on the presence and frequency of restraint, binge eating, self-induced vomiting, use of diuretics or laxatives, and driven exercise for the purpose of weight control. When modified for diabetes with additional questions on insulin misuse, it has 45 questions and takes 20 minutes to complete (5). There is no cost to use the YEDE-Q after permission is obtained from the author. In a recent study among adolescents with T1DM, good internal consistency was reported (Cronbach alpha scores 0.78 – 0.95) ($n = 124$), and significant concurrent validity with the child Eating Disorder Examination (chEDE) was demonstrated (intra-class correlations ($p < 0.001$) ($n=51$) (5). Support for the construct validity was also evident as shown by correlations with the YEDE-Q Global score for females ($p < 0.001$), BMI z score ($p < 0.001$), and the Strengths and Difficulties Questionnaire total difficulties score (SDQ) ($p < 0.01$) (8). The YEDE-Q is comprised of four subscales: Eating Concern, Weight Concern, Shape Concern and Restraint. Normative data is

available for 12-14 year old girls with the parent tool (EDE-Q) (9), however norms for males and older adolescents are not known, and norms for the YEDE-Q have not been established.

The EDI-3RC has a fourth grade reading ability with 25 items and takes five minutes to complete. It is the first version of this tool to include adolescents. The EDI-3RC can be purchased from Psychological Assessment Resources Incorporated (PARInc) if your team has access to a psychologist, appropriately trained to administer, score and interpret psychological tests (6). Support for the reliability and validity of the EDI-3RC in male and female adolescents is established (6). For adolescents with T1DM, good Cronbach alpha scores for the EDI-3RC were seen (0.77 – 0.94) (n = 119). Additionally, appropriate concurrent validity is seen with bivariate correlations between the EDI-3RC subscale scores and Risk Composite score compared with the chEDE subscales ($p < 0.001$) and Global score ($p < 0.001$) (n = 47), with the one exception, the EDI-3 Bulimia Scale and chEDE weight concern scale ($p < 0.01$). Support for the construct validity is evident with correlations of the EDI-3RC score with female sex ($p < 0.001$), BMI z score ($p < 0.01$), HbA1c ($p < 0.01$) and the SDQ ($p < 0.001$). Interestingly, clinical case status as defined by a borderline or clinical total difficulties score on the SDQ, showed 100% sensitivity and 71% specificity for determining 'at risk' status for disordered eating using the EDI-3RC. For the YEDE-Q, sensitivity was 67% and specificity 74% (10).

The EDI-3RC comprises of three subscales: Body Dissatisfaction, Bulimia and Drive for thinness, which are easily scored and interpreted. The subscale scores are clinically relevant for early intervention however determining the Risk composite score to assess

'risk for a clinical eating disorder' does require T-Score conversions (computerised scoring can also be purchased). The EDI-3RC addresses cognitions associated with body dissatisfaction, loss of control of eating, drive for thinness, as well as binge eating, restraint, vomiting but as with the DEPS-R, does not address driven exercise, laxative or diuretic abuse (both rarely seen in the context of T1DM), or insulin misuse. Normative data is available from a large adolescent clinical sample in the United States (n= 355).

With the current data, the EDI-3RC is recommended as the screening tool of choice for adolescents with T1DM. Of the three tools, the EDI-3RC has the most evidence to support its use in the general adolescent population as well as adolescents with T1DM. Its brevity is an advantage and it was highly correlated with both glycaemic control and psychosocial issues measured with the SDQ. The subscales provide helpful clinical information to the diabetes team on disturbed thoughts and behaviours which can then be addressed early in routine clinics. Those who score highly on any EDI-3RC subscale or on the Risk Composite, should also be questioned about the presence and frequency of compensatory behaviours including insulin reduction or omission, vomiting, fasting, excessive exercise, laxative or diuretic use. Alternatively, the EDI-3 Symptom Check List is an additional tool which takes approximately 20 minutes to complete and asks about compensatory behaviours in detail, ideal for research purposes.

Further studies are warranted including a gender specific analysis as our preliminary results support the use of the EDI-3RC in females with T1DM but not males. Females often strive to be thin whereas males are equally divided between wanting to lose weight and gain weight (11). Body dissatisfaction needs to be assessed differently for males as they strive to increase muscle tone and pursue leanness simultaneously.

Additionally, careful assessment of binge eating for males is required especially in relation to loss of control, given that overeating episodes may be socially sanctioned (12).

In conclusion, routine psychological screening is recommended for children and adolescents with T1DM. The EDI-3RC could be utilised as part of routine psychosocial screening commencing in early adolescence. This could be universal, e.g. all adolescents, or a targeted approach inclusive of adolescents with poor glycaemic control, body image concerns, or those having difficulty controlling their weight. Those who score highly on the EDI-3RC Risk Composite or any subscale, should be questioned further about compensatory behaviours.

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Highlights

- In T1DM disordered eating and clinical eating disorders have serious consequences
- Screening and management protocols for this group are yet to be determined
- The EDI-3RC has the most evidence to support its use in adolescents with T1DM
- Further research is needed to assess the need for male specific screening tools

Table 1: Comparison of validated eating disorder screening tools for adolescents with type 1 diabetes

Tool	Author	Strengths	Limitations
Diabetes Eating Problem Survey [1]	Markowitz J	• Brief, 16 item tool, takes ≤ 10 minutes to complete • Evidence of construct validity	• No subscales to outline psychological traits • No assessment of body dissatisfaction or weight concerns • Some items ambiguous/not well understood • Potential cost to use
Youth Eating Disorder Examination Questionnaire-modified for diabetes [2,3]	Goldschmidt A	• Developed specifically for adolescents • Includes questions on the presence and frequency of disturbed eating behaviours • Assesses broad spectrum of eating disorder thoughts and behaviours • Has subscales to outline psychological traits e.g. Weight Concern, Shape Concern, Eating Concern and Restraint • Has binge eating instructions • 3rd grade reading ability • This tool is available at no cost to clinics	• 45 items, 20 minutes to complete • Limited evidence available for the youth version • Normative data for 12-14 year old females but not for older adolescents or males.
Eating Disorder Inventory- 3 Risk Composite [4]	Garner D	• Assesses broad spectrum of eating disorders • Brief, 25 items, 5 minutes to complete • Has subscales outlining psychological traits – Body Dissatisfaction, Bulimia, Drive for Thinness • Large normative adolescent sample involving male and female 13+ years • 4th grade reading ability • EDI-3 Symptom Check List is an additional tool which would be valuable for research purposes	• Potential cost to use • Clinics must have access to a health professional appropriately trained to administer, score, and interpret psychological tests (see PAR Inc website). • Need to also enquire about specific disturbed eating behaviours and their frequencies

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