



Original Article

Depression and anxiety screening for adolescents with type 1 diabetes: A quality improvement project

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ABSTRACT

Objectives: Symptoms of anxiety and depression are more common in adolescents with type 1 diabetes (T1D) than in their peers without diabetes, and annual screening for psychological comorbidities is recommended in these patients. We aimed to pilot a screening protocol for symptoms of depression and anxiety in an adolescent T1D clinic to (i) establish the baseline prevalence of anxiety and depression symptoms and (ii) determine the feasibility and acceptability of the screening process.

Material and Methods: Adolescents with T1D aged 14–18 years who were not currently accessing psychological services were screened using the patient health questionnaire-9 and generalized anxiety disorder-7 assessment. Patients reporting mild-severe symptoms of anxiety and/or depression were referred for further assessment and referral to psychological services, if appropriate.

Results: 20% of patients were already engaged with mental health services and so were not screened. Of the remaining patients, 29% reported experiencing mild-severe depressive symptoms, and 18% reported experiencing mild-severe anxious symptoms. Furthermore, the use of these screening tools identified one patient in need of urgent intervention, who was taken to the hospital emergency department.

Conclusion: Our results highlight the importance of regular mental health screening using validated tools to capture all the patients who may benefit from referral to psychological services.

Keywords: Type 1 diabetes, Anxiety, Depression, Adolescents, Screening

INTRODUCTION

The association between depression, anxiety, and diabetes is now well-established^[1,2] and adolescents^[1,3] with type 1 diabetes (T1D) are more likely to suffer mental health problems than their peers. This can negatively impact diabetes management.

Previous studies suggest that the use of screening tools to detect mental health symptoms in patients with T1D may identify patients suffering from psychiatric co-morbidities who were not previously detected.^[4,5] It has been shown that using psychological interventions such as motivational interviewing and cognitive behavior therapy can reduce hemoglobin A1C by 0.45%.^[6] Thus, screening for depression in adolescents with T1D is important^[7] and is recommended^[3,8] so that patients who might benefit from psychological interventions can be reliably identified. Despite recommendations,^[3,8,9] service providers often find implementing annual depression screening logistically difficult.^[7] The main difficulties are having clinical staff available to administer the

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questionnaires and having procedures in place to deal with cases where a patient discloses issues that require immediate attention, such as suicidal ideation or possible imminent self-harm. This study is a quality improvement project using validated tools to screen for depressive and anxious symptoms in adolescents with T1D.

Before this project, there was no routine mental health screening of adolescents with T1D at Perth Children's Hospital (PCH). Hence, the prevalence of symptoms of depression and anxiety in adolescents with T1D who attend the adolescent diabetes service (ADS) at PCH was not known.

MATERIAL AND METHODS

Participants included patients with T1D aged 14–18 years attending the ADS clinic who had been under the care of the PCH Diabetes Team for at least 6 months. Patients who could not participate due to language barriers or who declined to participate in the screening process were excluded.

After consenting to the study, patients were first asked if they were under the care of a mental health practitioner for the management of depression and/or anxiety. Patients who answered affirmatively did not undergo further screening.

Patients not already engaged with mental health services were asked to complete screening for symptoms of depression and anxiety using validated tools. Depression symptoms were assessed using the patient health questionnaire nine (PHQ-9)^[10], and anxiety symptoms were assessed using the generalized anxiety disorder seven (GAD-7).^[11] Both tools are widely used in both research and clinical practice and have previously been used with adolescents with T1D. In addition, the PHQ-9 and GAD-7 are recommended by Thabrew *et al.*^[12] and are available at no cost.

The PHQ-9 and GAD-7 ask participants to rate symptoms on a scale of 0 (“not at all”) to 3 (“nearly every day”). Scores are summed to provide a total score, and clinical cut-offs are provided for ease of interpretation. Depressive symptoms are classified as “minimal” if the patient's PHQ-9 score is 0–4; “mild” if the patient scored 5–9; “moderate” if the patient scored 10–14; “moderately severe” if the patient scored 15–19; and “severe” if the patient scored 20 or greater. In the current study, a score >4 was considered a positive screen for symptoms of depression.

Similarly, anxious symptoms are classified as “minimal” if the patient's GAD-7 score is 0–4; “mild” if the patient scored 5–9; “moderate” if the patient scored 10–14; and “severe” if the patient scored 15 or greater. In the current study, a score >4 was considered a positive screen for symptoms of anxiety.

Following screening for depressive and anxious symptoms, patients were asked whether they considered that the screening process was a valuable tool for communicating issues that were affecting them.

Patients returning a positive screen for either depression or anxiety symptoms were referred for further assessment by the treating team. Usually, this assessment included the clinic social worker. When appropriate by the team (usually after a social work assessment), referrals were then made to various psychological support services, with the exact pathway dependent on a range of factors, including severity of symptoms, need for support, and availability of services.

The percentages of patients with each category of depressive and anxious symptoms were calculated along with 95% confidence intervals (CIs). These results were then collated into percentages (95% CIs) who had positive and negative screens for anxiety and depression. The results are shown in Table 1. The percentages of patients accessing each referral pathway were also calculated. These results are shown in Table 2.

Permission to conduct this project was granted by the appropriate ethical authorities at both Perth Children's Hospital and the University of Western Australia.

RESULTS

A total of 126 patients were seen in the ADS clinic from March to August 2021. One patient was excluded from screening due to insufficient English to complete the measures. Six patients declined to participate in the study.

In response to the initial question of whether they were already engaged with a mental health practitioner to help manage depressive/anxious symptoms, 25 patients (20%, 95% CI [13%, 27%]), answered in the affirmative. For the remaining patients, the results of screening are shown in Table 1.

Following a positive screen and subsequent mental health assessment, various referral pathways were available for patients, as shown in Table 2.

In response to the question, “this questionnaire is a valuable tool for communicating issues which are affecting me,” only 7 patients disagreed, 47 patients agreed, and the rest did not answer or answered “neutral.”

DISCUSSION

This study revealed that although 20% of patients with T1D were already engaged with mental health services, many patients with significant symptoms of depression and/or anxiety had not previously been identified.

The proportion of patients reporting any symptoms of depression was 29%, 95% CI (21% and 37%), with approximately half of these having symptoms that were moderate or severe. The proportion of patients reporting any symptoms of anxiety was 18% (11% and 25%), with similarly approximately half of these having moderate or severe symptoms. These are significant proportions of the patient population, and it is likely

Table 1: The severity of depressive or anxious symptoms in the patients who were screened.

Severity of depressive symptoms	Number of patients	Percentage of total patient population with 95% CI	
Depressive symptoms: None or minimal	58	46% (37%, 55%) (Negative depression screen)	
Mild depressive symptoms	19	15% (9%, 21%)	29% (21%, 37%) (Positive depression screen)
Moderate depressive symptoms	11	9% (4%, 14%)	
Severe depressive symptoms	6	5% (1%, 9%)	
Anxious symptoms: None or minimal	71	56% (47%, 65%) (Negative anxiety screen)	
Mild anxious symptoms	12	10% (5%, 15%)	18% (11%, 25%) (Positive anxiety screen)
Moderate anxious symptoms	7	6% (2%, 10%)	
Severe anxious symptoms	4	3% (0%, 6%)	

CI: Confidence interval

Table 2: The proportion of patients with positive depression and/or anxiety screens who were directed to each referral pathway.

Referral pathway	Percentage of patients (%)
Emergency department	3
PCH mental health service	10
GP to obtain a mental healthcare plan	10
Private psychologist	8
Psychoeducation by social worker in ADS	10
Emergency telehealth service	3
Headspace Australia	3
Referral not required following mental health assessment	16
Patient/care declined an offer of referral	29
Unknown	8

PCH: Perth Children's Hospital, ADS: Adolescent diabetes service, GP: General practitioner

that without appropriate referral to psychological services, many of these patients will suffer sub-optimal mental health, which will also impact^[5,13] their glycaemic control. As a result of screening, one patient was identified as suffering severe anxiety/depression with thoughts of deliberate self-harm and suicidal ideation. This patient was taken to the PCH emergency department by one of the clinic's social workers.

Depression and anxiety are highly co-morbid.^[14] In the present study, all patients, except two, who had significant symptoms of anxiety also had significant symptoms of depression. Therefore, if time were an issue, it would be possible to screen only for symptoms of depression. However, given that the chosen screening instruments are short, it is considered important to conduct both screens as this will also guide further discussion with the treating team around the best referral options.

Patient acceptability of the screening process was high, with only 6 patients declining to participate and only 7 patients following the screening, disagreeing with the statement: "This questionnaire is a valuable tool for communicating

issues which are affecting me."

One limitation of the present study was no mechanism to screen patients who could not perform the screening tasks due to difficulties with English. It should also be noted that not all patients who screened positive were willing to accept a referral to psychological services. The reasons for this are unclear. Perhaps more referral pathways could be made available, which might be more suitable for some patients and could result in better engagement. It might also be beneficial if there were staff available in the clinic who could do a more comprehensive mental health assessment. These issues could form the basis of future research.

While the results of this study are specific to the clinic in which they were conducted, the similarity to those conducted in other clinics^[4,5] is striking. The benefit of screening for mental health issues in adolescents with T1D was clearly shown in previous studies.^[4,5] For example, 18% of patients were shown to be experiencing a psychiatric disorder^[4] compared with 18% of patients in the present study experiencing symptoms of anxiety. Furthermore, previous studies also identified that a small proportion of patients were experiencing active thoughts of self-harm, as in this study^[5] and that many patients (72%) were not being identified without formal screening procedures.^[4] The previous studies also found that patients with significant mental health issues were often not being identified. Early intervention has the potential to prevent the progression of low levels of psychological distress to more serious and chronic mental health difficulties. In the current study, as in one previous study,^[5] a patient was found to have significant suicidal ideation and required immediate intervention, highlighting the importance of screening for mental health difficulties in this vulnerable population.

CONCLUSION

This project highlighted the importance of screening adolescents with T1D for symptoms of depression/anxiety. In the present study, 29% of patients reported mild-severe

symptoms of depression, and 18% reported mild-severe symptoms of anxiety. It is important to note that in addition to these patients, 20% of patients were already receiving treatment from mental health services, so true estimates of the prevalence of depression and anxiety in our cohort could be as high as 49% and 38%, respectively. Furthermore, patients were generally accepting of the screening process.

Furthermore, this study reveals that there is a significant proportion of patients with mental health symptoms who could benefit from intervention who are not being identified without active screening. To improve health outcomes for these patients, a dedicated in-house psychologist would be a useful addition to the ADS team.

In terms of the feasibility of these kinds of screening, it was necessary to have one person in each clinic to administer the surveys for the duration of the clinic. This person, however, was not a trained mental health practitioner as they referred any positive screens to the social workers or endocrinologists for follow-up. If the costs of providing an additional staff member for a clinic were prohibitive, it might be possible to set up a self-serve style iPad or tablet for patients to do the screening independently, with the results automatically being sent to the clinic staff. Future studies could investigate this possibility.

Further studies are needed to determine the best referral pathways for patients with positive screens. It is also considered very important in future studies to investigate the reluctance of patients to accept referrals, as without good follow-up, the utility of screening becomes very much reduced.

Author's Contributions

BJS conducted the screening, analyzed the results, and drafted the manuscript. VBS, KB, and TB oversaw the project and edited the manuscript. SR and KBC conducted mental health assessments on the patients with positive screens. SV helped set up the electronic screening system on iPads and assisted in collecting the results of the referral pathways. TB provided expertise in clinical psychology.

Research data

Research data are available from the authors.

Ethical approval

The research/study is approved by the Hospital Quality Improvement Committee at Perth Children's Hospital, Project reference number GEKO39931, dated 12th May 2021.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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Nil.

Conflicts of interest

There are no conflicts of interest.

Use of artificial intelligence (AI)-assisted technology for manuscript preparation

The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript, and no images were manipulated using AI.

REFERENCES

1. Buchberger B, Huppertz H, Krabbe L, Lux B, Mattivi JT, Siafarikas A. Symptoms of depression and anxiety in youth with type 1 diabetes: A systematic review and meta-analysis. *Psychoneuroendocrinology* 2016;70:70-84.
2. Musselman DL, Betan E, Larsen H, Phillips LS. Relationship of depression to diabetes types 1 and 2: Epidemiology, biology, and treatment. *Biol Psychiatry* 2003;54:317-29.
3. American Diabetes Association. Executive summary: Standards of medical care in diabetes-2014. *Diabetes Care* 2014;37(Supplement 1):S5.
4. Wilkinson G, Borse DQ, Leslie P, Newton RW, Lind C, Ballinger CB. Psychiatric disorder in patients with insulin-dependent diabetes mellitus attending a general hospital clinic: (i) two-stage screening and (ii) detection by physicians. *Psychol Med* 1987;17:515-7.
5. Watson SE, Spurling SE, Fieldhouse AM, Montgomery VL, Wintergerst KA. Depression and anxiety screening in adolescents with diabetes. *Clin Pediatr* 2020;59:445-9.
6. Ismail K, Maissi E, Thomas S, Chalder T, Schmidt U, Bartlett J, *et al.* A randomised controlled trial of cognitive behaviour therapy and motivational interviewing for people with Type 1 diabetes mellitus with persistent sub-optimal glycaemic control: A Diabetes and Psychological Therapies (ADAPT) study. *Health Technol Assess* 2010;14:1-101, iii-iv.
7. Iturralde E, Adams RN, Barley RC, Bensen R, Christofferson M, Hanes SJ, *et al.* Implementation of depression screening and global health assessment in pediatric subspecialty clinics. *J Adolesc Health* 2017;61:591-8.
8. Delamater AM, de Wit M, McDarby V, Malik JA, Hilliard ME, Northam E, *et al.* ISPAD Clinical Practice Consensus Guidelines 2018: Psychological care of children and adolescents with type 1 diabetes. *Pediatr Diabetes* 2018;19 (Suppl 27):237-49.
9. Cameron FJ, Northam EA, Ambler GR, Daneman D. Routine psychological screening in youth with type 1 diabetes and their parents: A notion whose time has come? *Diabetes Care* 2007;30:2716-24.
10. Kroenke KM, Spitzer RL. The PHQ-9: A new depression diagnostic and severity measure. *Psychiatr Ann* 2002;32:509-15.
11. Ruiz MA, Zamorano E, García-Campayo J, Pardo A, Freire O,

- Rejas J. Validity of the GAD-7 scale as an outcome measure of disability in patients with generalized anxiety disorders in primary care. *J Affect Disord* 2011;128:277-86.
12. Thabrew H, McDowell H, Given K, Murrell K. Systematic review of screening instruments for psychosocial problems in children and adolescents with long-term physical conditions. *Glob Pediatr Health* 2017;4:2333794X17690314.
13. Young-Hyman D, de Groot M, Hill-Briggs F, Gonzalez JS, Hood K, Peyrot M. Psychosocial care for people with diabetes: A position statement of the American Diabetes Association. *Diabetes Care* 2016;39:2126-40.
14. Kalin NH. The critical relationship between anxiety and depression. *Am J Psychiatry* 2020;177:365-7.

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