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Evaluation of an eating disorder screening and care pathway implementation in a general mental health private inpatient setting

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Abstract

Background General mental health inpatient units hold a valuable place in the stepped system of care, and for identification and treatment of people with eating disorders (EDs) or disordered eating behaviours (DEBs). This study aimed to pragmatically evaluate an evidence-informed screening and care pathway, alongside a staff education program, implemented to improve identification and treatment access for consumers with EDs and DEBs, with co-occurring psychiatric conditions, on a general mental health ward.

Methods A mixed methodology design was mapped to the RE-AIM implementation framework. It encompassed medical record audits across two 3-month time points pre and post implementation of the pathway, and key informant consumer and health professional interviews.

Results Process and implementation data were compared for three-month periods pre (2019, $n=348$) and post-implementation (2021, $n=284$). Post-implementation, intake SCOFF screening occurred in 94.7% of admissions. People with ED/DEBs diagnoses were 35 times more likely to have a SCOFF score ≥ 2 (OR = 35.2, $p<.001$) with the odds of identifying previously undiagnosed DEBs 3.3 times greater ($p=.002$). Post-implementation, for those with an ED/DEB, dietitian referrals ($p<.001$) and micronutrient supplementation ($p=.013$) were more likely. For those with weight and height data, both absolute (-1.1 kg ± 2.2 vs. 1.3 kg ± 2.3; $p<.001$) and percentage weight change were significantly higher post-implementation with similarities across BMI categories. Universally, consumers and health professionals expressed that the service had "changed care for the better" encouraging therapeutic relationships, mediated by trust, that resulted in better consumer outcomes. 50 health professionals undertook tailored ED and meal support therapy education. They noted that their knowledge and confidence improved allowing value to be seen in understanding EDs and the role for care within general mental health.

Conclusions This study demonstrated that an articulated screening and care pathway could be feasibly implemented in general mental health. The evaluation demonstrated advances in ED detection and management

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with noted improvements in management access, care planning, physical monitoring and weight gain outcomes. Understanding stakeholders' experiences of new care practices enabled the identification of enablers and barriers for implementation, and avenues to optimise care for consumers with EDs in the general mental health setting.

Plain English summary

This study looked at how to improve the identification and treatment of people with eating disorders or disordered eating behaviours in general mental health inpatient units. We wanted to see if a new screening and care pathway, along with educating staff, could make a positive difference. We checked medical records and interviewed consumers and health professionals before and after implementing these changes. After the changes, nearly all admissions were screened for eating disorders, and high scores were linked to actual eating disorders. The chances of finding disordered eating behaviours were also higher. People with eating disorders were more likely to be referred to a dietitian and have micronutrient supplements after the changes. There were also positive changes in weight for those with available data. Both consumers and health professionals said the service had improved care, building better relationships and trust. Examining and understanding people's experiences helped identify how to make care even better for those with eating disorders in general mental health settings.

Keywords Eating disorders, Implementation, Care pathways, Screening, Disordered eating behaviours

Background

Eating disorders (EDs) or disordered eating behaviours (DEB) frequently coexist in people with other psychiatric conditions. DEBs include a wide spectrum of eating pathologies, such as dietary restriction or restraint, binge eating or compensatory behaviours, which may occur as part of the clinical presentation of a diagnosed ED, or at lower severities that does not meet the criteria for an ED [1]. Research suggests that comorbid psychiatric conditions may be present in between 58 and 95% of individuals with EDs with depression, mood and anxiety disorders, substance abuse, trauma, and personality disorders commonly reported comorbidities [2–4]. Potential reasons for this co-existence may include shared risk factors, such as genetic predisposition, neurobiological irregularities and environmental influences [5]. EDs and psychiatric comorbidities may have a reciprocal relationship, whereby the presence of one impacts the pathology, treatment and outcomes of the other [3]. EDs may also develop as a coping mechanism to deal with another psychiatric condition [4, 5]. Concurrent psychiatric conditions have been found to increase ED symptom severity, maintain maladjusted behaviours and amplify negative health outcomes [3, 6]. Some of the significant medical comorbidities associated with EDs, may lead to complications across all systems, including cardiac, metabolic, gastrointestinal, and reproductive [3, 4].

Early detection and treatment of EDs is essential to maximise health outcomes with potential impact on symptoms and treatment effectiveness [7, 8]. Despite its importance, studies consistently show that EDs and DEBs often go undetected and untreated due to lack of awareness or knowledge among healthcare providers, misdiagnosis or attribution of symptoms, stigma challenges in communication or disclosure by people with EDs, and systemic barriers such as limited access to specialised ED care or screening tools in health settings [9–11]. Such circumstances may lead to inadequate treatment for the individual's ED, thereby posing a risk of detrimental effects on their health and wellbeing.

In Australia, the multidisciplinary management of EDs has traditionally been siloed into specialised ED private and public ED inpatient and community units, or private individual or practitioner groups. Increasingly there is recognition that the identification, treatment and management of EDs is required in general health services [9]. General mental health inpatient units are an opportune place for identification and management of people with EDs or DEBs that may otherwise go undetected or treated. Identifying people with concurrent EDs or DEBs within a general acute mental health unit allows a cohesive assessment of, and personalised management plan for, EDs with other psychiatric comorbidities. There is a dearth of publications addressing implementation studies in this space in real world settings [12].

Recognising the lack of detection and treatment of EDs for people with concurrent psychiatric conditions on their inpatient wards, Epworth Clinic, a general mental health inpatient unit, conducted a needs analysis examining ED and DEB assessment and management. This highlighted a number of gaps and limitations including absence of ED identification, insufficient physical health monitoring, sentinel events related to physical deterioration, and a lack of staff confidence and education in EDs. Although the Epworth Clinic service does not include a specialised EDs program, EDs such as anorexia nervosa, bulimia nervosa and other specified feeding or eating disorder (OSFED) were found to be common comorbid conditions amongst people admitted to the service. In response, a dedicated team sought to implement a whole-of-unit, innovative model of care, to better support consumers and clinicians. Using the knowledge to action

implementation science framework [13], the quality project sought to design, implement and evaluate evidence based, best practice, multidisciplinary ED screening and care pathway within the clinic to improve identification and treatment access for people admitted with ED or DEBs to optimise health outcomes for people experiencing EDs or DEBs [14–16].

The aim of this study was to evaluate the pragmatic implementation of the multidisciplinary evidence-informed screening and care pathway to improve identification and treatment of people admitted with ED or DEBs on the general mental health wards. The outcomes will provide further understanding of implementing an ED screening and treatment model within general mental health settings and support evidence-based decision-making and continuous improvement.

Methodology

The study consisted of a pragmatic pre and post mixed methods implementation evaluation. The design was informed by the RE-AIM framework [17] and the standards for quality improvement reporting excellence (SQUIRE) guidelines [18] (Additional file 1). Combining qualitative and quantitative methods, was deemed to provide a comprehensive understanding of the implementation process, its impact, and the factors influencing success or challenges.

This study was conducted at the Epworth Clinic, Epworth Health Care, Melbourne, Australia. The clinic is a comprehensive 63 bed mental health services providing inpatient mental health programs, delivered by a multidisciplinary team committed to the provision of contemporary mental health care utilising a recovery-orientated approach.

Ethical approval was granted by Monash Health Human Research Ethics Committee RES-21-0000-314 L) and Epworth Healthcare Ethics Committee (Reference: EH2020-663; 2/8/2021).

New model of care

The multidisciplinary screening and care pathway included ED screening at pre-admission interview, referral for ED assessments, ED support plans informed by best practice, including current Australian ED best practice [14–16], and staff education (Fig. 1). Pathway development and implementation was overseen by a team including dietetic lead, director of clinical services, psychiatrist, nurse unit manager, mental health intake lead and nurse specialist. The Epworth Clinic has two wards, Wards A and B. The first tranche of the quality pathway delivered focused on Ward A, with the clinical pathway embedded in the ward and the staff eligible for ED education. Those with identified EDs requiring additional care were allocated to Ward A at pre-admission intake.

Screening

Screening at pre-admission intake was implemented using the SCOFF questionnaire, a low burden 5-question screening tool that is validated in specialist and primary care settings [19, 20]. A score of 2 or more positive responses triggered referral for a detailed clinical assessment by an ED specialised dietitian and notification was made to the admitting psychiatrist. A subgroup of patients was admitted for delivery of transcranial magnetic stimulation (TMS) and had a planned length of stay ≤ 3 days. Due to the short admission and time limitations around application of the ED care pathway, notification was made to the admitting psychiatrist only.

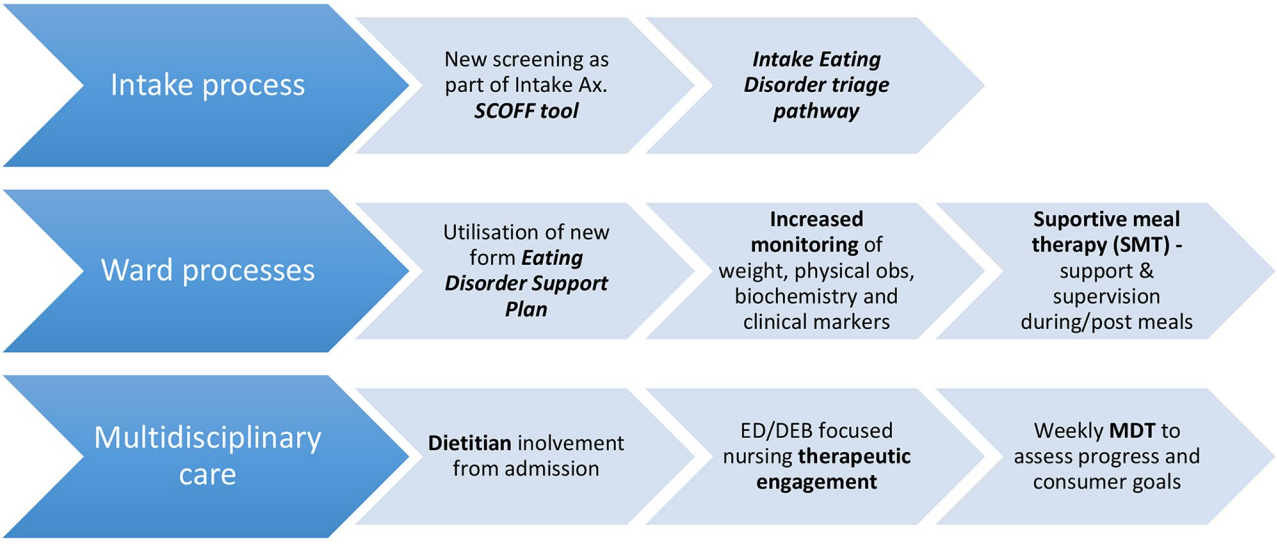

Fig. 1 Intake and care pathway summary

ED clinical assessment

The referral to an ED specialised dietitian and consultant psychiatrist included review, confirmation of diagnosis (psychiatrist) and subsequent development of an individualised treatment plan, according to current Australian ED best practice [14–16]. The dietitian completed a comprehensive dietetic assessment, utilising clinical judgement, Eating Disorder Examination Questionnaire (EDE-Q) [21] and discussion with the treating team.

ED care pathway

People with a diagnosis of Anorexia Nervosa, Bulimia Nervosa, Other Specified Feeding or Eating Disorder (OSFED) or significant DEBs, were eligible for the care pathway. People with a diagnosis of Binge Eating Disorder or Avoidant Restrictive Food Intake Disorder were provided with evidenced based management but were excluded from the current program due to differing best practice clinical requirements, and limited resources within the current model of care. The intention is to develop a care pathway for these diagnoses once the current care pathway has been implemented and evaluated.

The care pathway involved multidisciplinary team care from the point of admission. Dietitians and nurses worked with people to individualise a standardised and documented ED support plan which ensured the patient was well informed regarding and agreeable to the management plan. Regular dietetic reviews were conducted to reassess individual goals and progress and nurses provided ED/DEB focused therapeutic engagement.

The care pathway set parameters around physical monitoring included biochemistry, postural physical observations, and fasting and post-prandial blood glucose levels. It also stipulated processes for measuring weight, and nutritional or electrolyte supplementation for individuals diagnosed with malnutrition or identified as at high-risk of refeeding syndrome. Group supportive Meal Therapy (SMT) in a private room was provided to people who required additional support around meal and snack times. New documentation, which summarised the ED care pathway in a checklist format, was utilised and placed in the person's file, to ensure all elements of the care pathway were considered and implemented if deemed beneficial.

Health professional education

All permanent nursing and allied health staff employed on the Ward A and intake staff were offered education with three modules covering different aspects of ED care and support. Those directly involved in the facilitation of SMT, a more specialised subgroup, also completed module 4 (see description below). Health professional education focused on improving clinical nurse and relevant allied health professional's knowledge and skills in: screening and assessment, knowledge of evidence-based interventions to improve management of EDs, and understanding of the key elements in the ED care pathway.

- Module 1: ED Overview and Best Practice Education in five x 30-minute modules, facilitated by clinic dietitians and delivered in person or video recording.
- Module 2: Overview of the ED Care Pathway in regular staff in-services.
- Module 3: The Foundations of Eating Disorders eLearning Program: Inside Out Institute (60 min).
- Module 4: Meal Support in the Hospital Setting eLearning package: Inside Out Institute (120 min).

Implementation evaluation framework

A pragmatic mixed methods evaluation, based on the RE-AIM model [17] was planned with the components of interest being implementation, adoption, reach, and effectiveness. Maintenance will be assessed in subsequent evaluations. Additional file 2 outlines the RE-AIM evaluation mapped to each intervention domain: health professional education; ED screening; and ED care pathway. 'Reach' included data on penetration and participation in each intervention domain, which is how many people were engaged, and was assessed through staff education records and the medical record audit. 'Adoption' related to the staff willingness to initiate the quality changes in each intervention domain and was assessed through staff education records and staff interviews. 'Implementation' included data on the uptake of the quality changes and was measured through staff education records, medical record audit, and consumer and staff interviews. 'Effectiveness' related to the intervention domains impact on consumer and health professional outcomes and was assessed with medical record audit, and consumer and staff interviews.

Data collection

Medical record and administrative dataset audit

Interrogation of the medical records and health services administrative datasets was conducted for people admitted to Epworth Clinic from the 1st July 2021 to 30th September 2021, following health professional education and implementation of the care pathway. Comparison data were interrogated from the equivalent time frame in 2019 before the COVID-19 pandemic. De-identified data was entered in an Excel spreadsheet using fields related to patients': admission and demographic characteristics; SCOFF screening; ED/DEB management and care pathway; clinical monitoring and clinically significant events (see Additional file 3).

Health professional education evaluation

Health professional education evaluation included records of attendance and health professional interviews. Education had commenced prior to the evaluation planning and development.

Consumer and health professional interviews and focus groups

A qualitative, descriptive research methodology [22, 23] using face-to-face semi- structured interviews and focus groups was employed to obtain in-depth data from two groups of key informants, consumers and health professionals.

Consumer recruitment

People with a diagnosis of Anorexia Nervosa, Bulimia Nervosa or OSFED, who received care as per the care pathway during the evaluation period of 1st July 2021 to 30th September 2021, and provided informed consent were eligible for a face-to- face semi-structured interview. A clinical nurse specialist or allied health practitioner, who had not been involved with the person's therapeutic treatment, approached people within 3–4 days of discharge to identify those who were willing to participate and provide information and consent documents for consideration. The timing of interviews was tailored according to the individual's recovery trajectory, to minimise any additional stress being placed on participants. Recruitment and interviews were undertaken by mental health clinicians with expertise in working with people with acute and chronic mental illness. An interview guide (Additional file 4) was informed by the literature and the RE-AIM frameworks and covered feedback on the experience of ED related care including therapeutic engagement with staff and support received at mealtimes. Perspectives and experiences on ED care pathway including screening at admission and eating disorder support plans were explored. Recommendations for improvement of ED care were also investigated. Interviews were recorded with agreement of participants or interview notes during and following interview if not. Oral recordings were transcribed. Opportunity to review interview transcripts for clarification, deletion or addition was offered.

Seven consumers were assessed to be eligible for interview and provided consent. All identified as female ($n=7$), with a mean age of 31.4 years (range 22–54 years) and a mean length of stay of 31 days (range 13–33 days). ED related diagnoses included Anorexia Nervosa ($n=5$), OSFED ($n=1$) and DEB ($n=1$). No consumers declined involvement. Interview lengths ranged from 7 to 40 min.

Health professional recruitment

All permanent nursing, allied health and visiting medical staff employed on the intervention ward and the ED intervention implementation team were eligible for interview or focus group. Both methods were employed to suit participants and maximise uptake. For example, focus groups were suggested for nurses during or at end of shift. Health professional recruitment, interviews and focus groups were conducted by an experienced qualitative researcher (JW) with no relationship with the ward health professionals. Individual interviews were targeted for the implementation team including dietetic lead and clinicians, director of clinical services, allied health program manager, nurse unit manager and enrolled nurse specialist ($n=6$). Interviews or focus groups were targeted for health professionals targeted including admitting psychiatrists ($n=2$–5), allied health clinicians ($n=2$–4), associated nurse unit managers ($n=2$–4) and permanent nursing staff ($n=10$). Nursing and allied health staff were invited in person or during ward meetings and provided with hard copies and/or digital plain language and consent documents. Medical staff were either invited in person or via email. Interviews were conducted in ward meeting rooms and were recorded with permission. Interview questions (Additional file 4) included knowledge and experience of the staff education, ED screening and ED care pathway, facilitators and barriers for implementation, perceptions of changes to person-centred care, recommendations for improvement and perception on program sustainability. Interview recordings were transcribed.

Eighteen health professionals consented to interview or focus group including mental health nurses ($n=9$), health professionals involved in administration ($n=3$), allied health ($n=5$) and psychiatrist ($n=1$). Two psychiatrists declined. The mean mental health experience was 7.8 years (range 2.0 to 23.6 years) and employment at Epworth Clinic 4.8 years (range 2.0–25.2 years). Interviews numbered nine and focus groups one with three participants and three dyads. Interview lengths ranged from 19.5 to 39.3 min and focus groups 13.1 min to 24.5 min.

Data analysis

Statistical analysis

Quantitative data were analysed with IBM SPSS Statistics v28 (Armonk, NY, USA: IBM.Corp). Categorical variables were summarised descriptively using frequencies and percentages and continuous variables were summarised as mean, median and range depending on the underlying data distribution. Distributions of categorical admission characteristics were compared using Chi-square Tests of Independence and continuous admission characteristics using Independent T-Tests. Where Levene's

Test indicated heteroscedasticity ($p<.05$), robust t-tests were used. Binary logistic regression tested the degree to which the implementation of the ED/DEB care pathway was associated with the prevalence of clinical care activities and association between the SCOFF (score ≥ 2) and the prevalence of ED/DEB. Mann-Whitney U Test compared the frequency of weight monitoring between pre- and post-implementation cohorts.

Inferential statistical analyses explored potential impact of ED/DEB care pathway implementation on the clinical outcomes of admissions. Percentage weight change was compared between pre- and post-implementation with an Independent Samples T-Test. The prevalence of irregular health parameters and sentinel events in admissions involving ED/DE were compared between pre- and post-implementation with the Chi-square Test of Independence Test and Fisher's Exact Test. Effect sizes were calculated using Cohen's d for Independent Samples T-Tests, Cohen's r for Mann-Whitney U Tests, and phi for 2×2 contingency tables (Chi-Square Tests of Independence, Fisher's Exact Test).

Qualitative analysis

Content and thematic qualitative analysis using the analysis framework published by Baun & Clark (2006) [24] was used to analyse the transcripts of the semi-structured interviews and focus groups. Data immersion, coding, category creation, and thematic analysis were used to find patterns of meaning across data sets. The researchers used an inductive approach to derive themes through interpretations of the raw data [25].

Results

A total of 632 (pre and post intervention) inpatient records for people admitted to the Epworth Clinic for inpatient care were audited, 50 health professionals undertook the educational intervention and 7 consumers, and 18 health professionals were interviewed. The key informant interviews with consumers and health professionals elicited four key themes:

Theme 1: Health professional knowledge and confidence improved allowing value to be seen in understanding EDs and the role for care within general mental health.

Theme 2: Screening for ED/DEBs at the intake stage is critical to identify at risk people.

Theme 3: Implementation of an articulated and documented care pathway augmented usual care.

Theme 4: Recognition that embedding new models of care are a "journey" and evolution.

Themes 1–4 are described below, in unison with relevant quantitative findings. Additional data and supporting quotes are contained in Additional file 7.

Staff education

Fifty health professionals from Ward A completed the staff training program modules 1–3 including 27 mental health nurses, 19 allied health and four intake clinicians and 38 completing module 4 including 26 mental health nurses and 12 allied health. This represented 100% of the permanent mental health nursing staffing.

Theme 1: Health professional knowledge and confidence improved allowing value to be seen in understanding EDs and the role for care within general mental health

In the thematic analysis of interview and focus group data health professionals reported previously being "scared", "frightened" and "concerned" about working with consumers with ED/DEBs. The combined physiological and psychiatric components of EDs were previously seen by some to be outside the remit of a general mental health clinician due to the lack of skills and training to develop a therapeutic relationship. Some reported that ED/DEBs had previously been ignored, with priority for the admitting condition.

> *I think the fear is doing something wrong and making it worse or positively reinforcing negative behaviour thinking you're actually affected when challenging it.... that's come from a recognition over time that in focusing on this particular treatment priority we were ignoring, unintentionally but ignoring the management of the significance of actually other coexisting parts of the presentation. (Health professional [HP] 12)*

The ED training was viewed as a key element in improving clinician confidence in supporting the unique physical and mental health challenges of consumers with ED/DEBs. Additionally, the training was seen to provide baseline knowledge that needed to be extended through additional training and clinical supervision.

> *I think the care is better, and I feel more confident as a clinician implementing things, because I've got a policy and had the training. (HP 1)*

> *There are definitely areas that we're still developing, but I think, staff feel a lot more confident in dealing with it and that mentality shift has happened, where people are not throwing their hands up going "Oh no, not that". They are actually stepping up and trying to work with it and achieve goals with them. (Focus group 3, HP 2)*

Implementation of the Eating disorders pathway into clinical practice

Medical record audits

Inpatient data were compared for three-month periods pre (2019, $n=348$) and post implementation (2021, $n=284$) (Table 1). Total admissions involved 226 (65.0%) of consumers identifying as female with a mean age of 49.9 years and a median length of stay of 11 days. Using the admitting psychiatrist admission diagnosis, the most prevalent diagnosis was depressive illness (79.0%) with ED (inclusive of all ED diagnoses) noted as an admission diagnosis in 3.3% of cases. Admissions involving anxiety disorders (phi=0.09) and PTSD (phi=0.15) were significantly more prevalent in the post-implementation group. TMS patients with a hospital stay ≤3 days ($n=121$, 19.1%) were excluded from further care pathway treatment and evaluation. A total sample of $n=287$ pre-implementation and $n=224$ post-implementation remained for post screening analysis. Additional file 5 outlines the admission characteristics with TMS patients with ≤3 days hospital stay removed.

Eating disorder screening and referral

Post-implementation, SCOFF screening of the total sample occurred in 94.7% ($n=269$) of admissions (Fig. 2). Forty admissions (14.1%) exhibited a positive SCOFF score (≥2) and 229 (85.1%) a negative score (<2). Those with a positive SCOFF score on admission were 35 times more likely to be identified with an ED or DEB during admission compared to those with a negative SCOFF score (OR=35.2, 95%CI (14.8–83.3), $p<.001$).

Theme 2: Screening for ED/DEBs at the intake stage is critical to identify at risk people.

Screening for ED/DEBs at the intake stage was viewed by both consumers and health professionals as critical in identifying at risk people. For a couple of the people not previously identified, this was a reported as a relief to have their ED recognised by clinicians.

> *The fact that (it was identified) and the dietitian came to me. For example during [other facility] stays ….I didn't eat for the month I was in there. Um, and nobody picked up on it. (Consumer 3)*

Many health professionals noted that the recognition of ED or DEBs allowed a better understanding of the person's health picture and triggered person-centred care guided by best practice principles.

> *I think in the past a lot of people that have been missed. There are clients who have actually said, 'No one has picked up on my eating disorder in the past, and I've had this for 15 years,' …It's very clear that identifying these clients is very important, and that's what (this work) has done. (HP 2)*

> *If I have a client that has been picked up by the screen at the start, that's helped me to inform me to*

Table 1 Total sample admission characteristics

Admission characteristics	Pre- implementation, 2019 ($n=348$)	Post-implementation, 2021 ($n=284$)	Total admissions ($n=632$)	*p*-value
Female sex, *n* (%)	226 (64.9%)	185 (65.1%)	411 (65.0%)	1.0[a]
Age, mean (*SD*)	49.9 (16.2)	49.9 (15.6)	49.9 (15.9)	.997[c]
Ward, *n* (%)				
A	190 (54.6%)	155 (54.6%)	345 (54.6%)	1.0[a]
B	158 (45.4%)	129 (45.4%)	287 (45.4%)	
Admission diagnoses, *n* (%)				
Eating disorder	12 (3.4%)	9 (3.2%)	21 (3.3%)	1.0[a]
Depressive disorder	265 (76.1%)	234 (82.4)	499 (79.0%)	.069[a]
Anxiety disorder	55 (15.8%)	65 (22.9%)	120 (19.0%)	.031[a]
Personality disorder	52 (14.9%)	30 (10.6%)	82 (13.0%)	.131[a]
Bipolar disorder / mania	41 (11.8%)	37 (13.0%)	78 (12.3%)	.725[a]
PTSD	24 (6.9%)	47 (16.5%)	71 (11.2%)	<.001[a]
Schizophrenia / schizoaffective disorder / psychosis	31 (8.9%)	12 (4.2%)	43 (6.8%)	.030[a]
Adjustment disorder / grief	16 (4.6%)	8 (2.8%)	24 (3.8%)	.339[a]
Alcohol / substance use	12 (3.4%)	9 (3.2%)	21 (3.3%)	1.0[a]
Other diagnosis	9 (2.6%)	13 (4.6%)	22 (3.5%)	.254[a]
TMS ≤ 3 days, *n* (%)	61 (17.5%)	60 (21.1%)	121 (19.1%)	.297[a]
Length of stay, *Mdn* (*IQR*)	10 (18)	11(18)	11 (17)	.911[b]

Note [a]Chi-square Test of Independence, continuity correction applied, [b]Independent Samples T-Test, equal variances assumed; [c]Independent Samples T-Test, equal variances not assumed

Note "Admission diagnoses" is that which was recorded on admission by the admitting psychiatrist

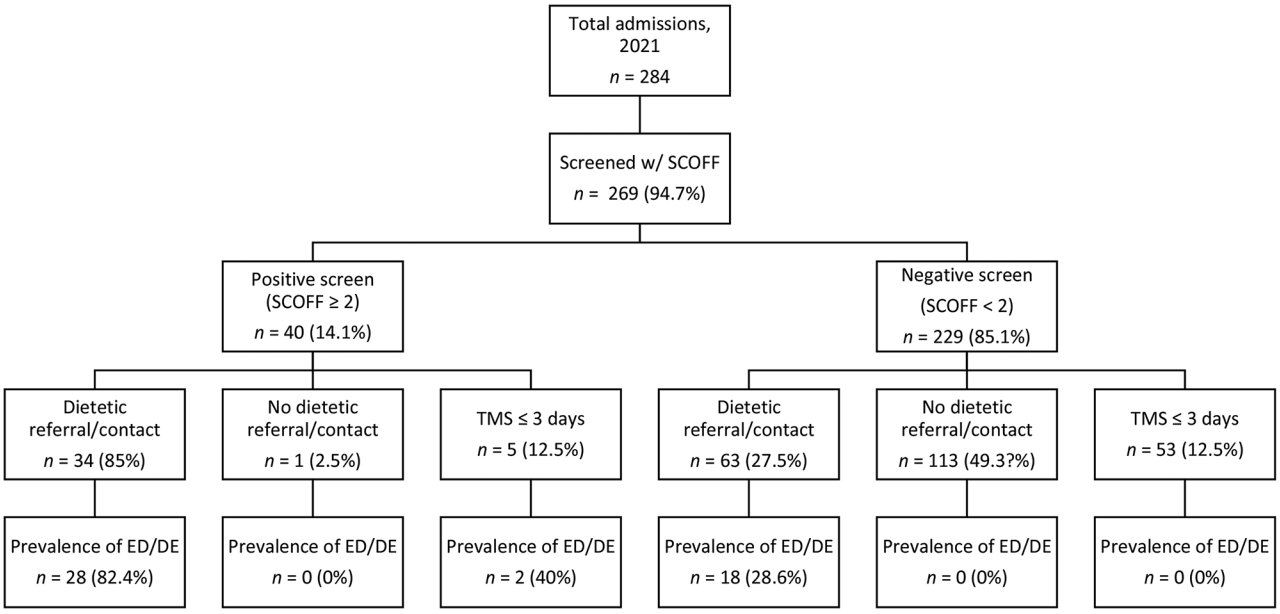

Fig. 2 Post implementation SCOFF screening and ED/DEB identification

Table 2 ED/DEB identification and care pathway components

ED/DEB identification	Pre- implementation, 2019 (*n* = 287)	Post-implementation, 2021 (*n* = 224)	Odds ratio	95%CI	*p*-value
ED	27 (9.4%)	23 (10.3%)	1.1	0.6–2.0	.745[a]
DEB	10 (3.5%)	24 (10.7%)	3.3	1.6–7.1	.002[a]
Management outcome	**(*n* = 37)**	**(*n* = 47)**			
Referral to dietitian	20 (54.1%)	47 (100%)	n.a.	n.a.	< .001[b]
MR2G during admission	n.a.	6 (12.8%)	n.a.	n.a.	n.a.
Dietitian verbal meal plan	14 (37.8%)	18 (38.3%)	1.0	0.4–2.5	.966[a]
Dietitian written meal plan	6 (16.2%)	13 (27.7%)	2.0	0.7–5.8	.218[a]
Supportive meal therapy	2 (5.4%)	6 (12.8%)	2.6	0.5–13.5	.268[a]
Micronutrient supplements charted	11 (29.7%)	27 (57.4%)	3.2	1.3–7.9	.013[a]

Note n.a. – not applicable; [a]Binary logistic regression; [b]Chi-square Test of Independence with continuity correction applied

go, "Oh, okay, so this is something in the background alongside the anxiety or depression that I can work with this client on." It has changed my practice in terms of how I'm working one-on-one with clients. (HP 1)

While the SCOFF screening was seen to allow identification of more people it was acknowledged that other methods of clinical observation were required to identify those not identified at screening.

There's often a component of the eating disorder that they like or see as part of themselves, or that they don't want to give up on. And I think when they are telling us that they are not eating, that they're binging, that they're purging, you know, these are really intelligent patients. They know that we're going to try and stop that behaviour and I think that's petrifying for them. (HP 5)

Implementation of the care pathway

While identification of an ED was not significantly different following implementation, identification of DEBs were three times more likely (OR = 3.3, 95%CI (1.6–7.1), $p = .002$), (Table 2). In a total of 84 admissions (pre-implementation, $n = 37$, 12.9%; post-implementation, $n = 47$, 21.0%) the need for ED/DEB management was identified. People with ED/DEB (TMS ≤ 3 days stay excluded) were significantly younger than those without (37.4 ± 13.7 versus 52.6 ± 15.9 years, $p < .001$) and more likely to identify as female (92.0% versus 60.7%; $p < .001$). (Additional file 6). They also had a lower admission BMI (25.0 ± 5.6 versus 29.8 ± 7.8, $p < .001$), and longer inpatient length of stay (23.0 + 21.6 versus 16.1 + 13.7, $p < .001$) than those without ED/DEB.

Admissions involving ED/DEB were significantly more likely to be referred to a dietitian ($p < .001$) or to have undergone micronutrient supplementation ($p = .013$) in the post-implementation period, compared to the

Table 3 Clinical monitoring with identified ED or DEB

Clinical monitoring	Pre-implementation, 2019 (*n* = 37)	Post-implementation, 2021 (*n* = 47)	*p*-value
Weight			
Not recorded	16 (43.2%)	16 (34.0%)	.233[a]
Admission only	5 (13.5%)	2 (4.3%)	
Weekly	11 (29.7%)	17 (36.2%)	
Bi-weekly	5 (13.5%)	12 (25.5%)	
Biochemistry			
Not recorded	16 (43.2%)	19 (40.4%)	.970[b]
On admission	5 (13.5%)	4 (8.5%)	.498[a]
During admission	13 (35.1%)	24 (51.1%)	.216[b]
Blood glucose			
Requested in MR2G	n.a.	0 (0%)	n.a.
During admission	5 (13.5%)	3 (6.4%)	.292[a]
Blood pressure			
Requested in MR2G	n.a.	7 (14.9%)	n.a.
During admission	2 (5.4%)	15 (31.9%)	.006[b]
Heart rate			
Requested in MR2G	n.a.	7 (14.9%)	n.a.
During admission	2 (5.4%)	18 (38.3%)	.001[b]

Note n.a. – not applicable; [a]Fisher's Exact Test; [b]Chi-Square Test of Independence, continuity correction applied

pre-implementation period (see Table 2). There was no significant difference in the likelihood of admissions involving verbal meal plans, written meal plans, or supportive meal therapy between the pre- and post-implementation study periods.

Clinical monitoring in admissions with identified ED/DEB is described in Table 3. There was a statistically significant increase in blood pressure ($p = .006$) and heart rate monitoring ($p = .001$) in the post-implementation period relative to the pre-implementation period. The prevalence of weighing, biochemistry and blood glucose monitoring did not significantly differ between pre- and post-implementation periods.

There was no significant difference in the prevalence of irregular pathology results or in the frequency of MET / Code Blue calls between intervention periods. For those with weight and height data, both absolute (-1.1 kg ± 2.2 versus 1.3 kg ± 2.3; $p < .001$) and percentage weight change were significantly higher post-implementation with similarities across BMI categories (Table 4).

Theme 3: Implementation of an articulated and documented care pathway augmented usual care

Pathway implementation allowed EDs to be discussed and treated rather than ignored by both consumers and health professionals. The articulated and documented process was seen to provide a common purpose and commonality of language allowing improved consistency and cohesion of clinical care in comparison to previous practice.

> *A lot of the time we would get people coming in and it would be, "Oh, they're here for their depression. They're not here for their eating disorder." That part of their condition wasn't being managed well, ... their recovery is going to be not nearly as well as if most things are managed at once. And we had no system in place to be able to manage that. Basically, to bring the system into place where we could actually provide that support for them as well was going to be a huge benefit to them. (HP 5)*

This consistency of care was seen by both consumer and health professional to provide guidance for support and clinical direction. Further, the formalised process and written care plans were mentioned by some health professionals as a means to elevate confidence and a mechanism for providing shared care.

> *With this pathway being here, there's an agreement and consistency. The biggest thing they face with eating disorders is consistency. That's what we lacked....*

Table 4 Clinical outcomes pre and post pathway implementation

Health parameters	Pre-implementation, 2019	Total tests pre-	Post-implementation, 2021	Total tests post-	*p*-value
Blood tests with irregular results	13 (61.9%)	21	25 (86.2%)	29	.099[a]
Hypoglycaemia	2 (40%)	5	3 (100%)	3	.196[b]
Clinically significant postural changes					
Blood pressure	1 (11.1%)	9	4 (23.5%)	17	.628[b]
Heart rate	2 (100%)	2	12 (66.7%)	18	1.0[a]
Met call/Code Blue called	6 (16.2%)	37	7 (14.9%)	47	1.0[a]
Weight change kg, *Mean* (*SD*)	-1.1 (2.2)	22	1.3 (2.3)	36	< .001[c]
%Weight change kg, *Mean* (*SD*)	-1.7 (3.5)	21	0.01 (0.03)	36	.004[d]
Underweight BMI	-1.3 (4.7)	3	0.1 (0.03)	2	-
Healthy weight BMI	-2.4 (3.5)	8	0.02 (0.03)	16	-
Overweight/obese BMI	-1.6 (3.6)	9	0.01 (0.03)	18	-

Note [a]Chi-square Test of Independence, continuity correction applied; [b]Fisher's Exact Test; [c]Independent Samples T-Test, equal variances assumed [d]ANCOVA, controlling for LOS

so, it gives that better treatment consistency for what they need. (HP 6)

So I really liked how the nurses, like, introduced me to a lot of things and just made me feel really like, "We're here for you" …I really like how they do check ins. (Consumer 5)

Conversely, two consumers pointed out the continued lack of consistency and language between staff providing the management, particularly in the SMT.

The consistency around like different nurses have different ways of working. And I think sometimes it makes eating more difficult than it already is. (Consumer 3)
Any praise for eating, because that to an eating disorder patient feels really bad. It feels infantilising. It feels like you don't want to eat anymore because it's praising your recovery, which I know sounds backwards. (Consumer 5)

A few consumers reported that having dietetic involvement and a documented ED framework for management that provided direction for health professionals allowed them to receive the appropriate support, stating *"I had the right support in the right place at the right time."* (Consumer 1), and,

When the eating disorder gets too loud, or I follow through …I see why they're…why that is needed, because it's kind of like the end goal that I'm working towards. And it's an agreed plan that is made together with me, not just prescribed by the professional. (Consumer 3).

The SMT was viewed by some consumers to be of benefit by normalising their eating behaviours and for others it was initially confronting but provided insight into the own eating behaviours. The inconsistency in the food provided by food service was viewed as a challenge.

I think what, initially, I felt like didn't work for me was at the meal support within a group setting and picking up the kind of behaviours that other patients were doing was quite triggering. But I think after a while that did help me, I guess, notice that these are the behaviours that sometimes I do myself. And I'm not aware of it. ….Because in the beginning I felt like it was very unhelpful, and very challenging. But now, I feel like it's making it easier, and I guess normalising eating as well. (Consumer 3)

Universally consumers and health professionals expressed that the service had "changed care for the better" allowing therapeutic relationship, mediated by trust, that resulted in better consumer outcomes.

But for the first time since she'd been here, she had consistent management of it and was contemplating actually seeing a dietician. That's huge for somebody who's had an eating disorder for ten plus years, who's incredibly unwell…at that particular point, she was the best I'd ever seen her. So, when she got discharged, it was actually a positive thing, not a self-discharge. I think it gave opportunity for that particular person. (HP 6)

And

Actually, in myself, my body feels better. … obviously my energy and mood and stuff
fluctuates, and I do get tired here, but I don't feel like very sick anymore. I think that level of trust, it's a really fine line, you know, to trust someone, like especially a dietitian, to introduce a new food to you. (Consumer 5)

Future directions

Theme 4: Recognition that embedding new models of care are a "journey" and evolution

The model of embedding ED care pathways into general mental health was viewed by many as a valuable model for treating and managing EDs with concurrent psychiatric disorders without a singular focus on the ED.

If I was in an environment where I have to eat five times a day, but everyone I talk to has an eating disorder it wouldn't help. So I actually like that there's lots of diverse disorders here…You might be feeling that day, "My eating disorder's been pretty good today. Today I want to learn about depression." It's not so eating disorder every single day because that's, it's not realistic for recovery. (Consumer 5)
A lot of people don't and won't go to a particular eating disorder unit as such, so for them to be able to come to a place like this is good. (HP 5)

Conversely, some health professionals resisted the concept of integrating ED management into general medical care questioning whether ED care was "out of scope" and whether the service was to be labelled an ED unit or not. One participant commented, "I have heard whispers of, "But this isn't why I'm in mental health."(HP 1). One consumer also voiced that they only wanted to speak with certain professionals about the ED only.

I don't think it's the nurse's role to actually check on you and how your eating disorder is going. You can

bring it up and talk about it a little bit, but I think a nurse in general, that's not their role, so. I don't think it's that necessary. I don't know what kind of like advice or support they'd be able to give to someone, because they don't have that full understanding or full training in it if you get what I mean. (Consumer 5)

HPs acknowledged that it takes time to implement new processes, and this was a "journey" that was evolving and would take time. They recognised that all clinicians needed to move forward and problem solve together.

There's only so much you can really get from the in-services, so now the experience is coming through it's a lot better. (Focus Group 3, HP1)
The biggest piece of work is changing the thinking around how we can conceptualise it individually and as a team. (HP 12)

Health professionals recognised that the care pathway resulted in the identification of more people with DEBs and EDs which, in turn, required additional resourcing, particularly for dietetic and nursing time. This was seen to place pressure on the ward resources and reduce the time health professionals could spend with all their people.

...There... is a significant spike in people being identified which were essentially referrals and we still only have the same amount of dietitian hours. (HP 2)
I think understanding how difficult it is for the patient to change their behaviour. But also that nursing staff who are working with..., a maximum of kind of 16 patients down there, that they're not getting time to spend with these patients to understand their formulation behind the eating and then actually why it is such a difficult condition for them. And so I really feel for them in that they have to do the difficult stuff but then perhaps they're not getting that time to sit down with a patient and really kind of understand the depth of the difficulty. (HP 5)

One key element that consumers identified for improvement was additional ED education resources ED education and dedicated ED eating spaces. The lack of explanation about the pathway implementation, such as meal supported, resulted in anxiety which may have been prevented with additional discussion. Further one consumer identified the need for adaptation to the ED protocols to allow individual autonomy around activities following meal times.

The first night that I had meal support I didn't know what it actually meant, like I didn't know if it meant in my room or in the dining room or with... like what did meal support mean and what, like is someone just going to sit right next to me, staring and telling me what to do with every step for like, and because I felt like that's what was going to happen I was very kind of against it because I thought it was going to be a lot worse than what it was. (Consumer 4)

I completely understand, especially for someone who might have something like bulimia, but I think it should be a gradual release of independence. So when you're first admitted wait outside the nurses station for an hour, but you should also be allowed to just go outside, or go do colouring in in a nearby room, or go sit out in that lounge area. (Consumer 5)

Suggestions for elements of the program that needed ongoing work included: more dietetic resourcing; education for new staff; embedding formal ED processes into hospital systems; dedicated room for supportive meal therapy; outpatient ED services; and improvements in food service provision. The lack of consistency and agility with food provision was reported to be a major barrier to implementing nutrition plans causing anxiety and uncertainty for consumers.

Because like the portion has been quite varied, and sometimes when, I understand when things are not available, or the food that we've agreed with the dietician isn't available, there is a replacement. But at the same time, it also stresses me out because I then have to make a decision again. Yeah. And I think by keeping the consistency it will be helpful. (Consumer 3)

Acknowledging the need for the health professional knowledge and skills to evolve, both consumers and health professionals recommended continued ED training and supervision sessions to refine clinical engagement and management and receive feedback.

And then some supervision, I think, formally or informally, for the psychologist or the dietitians, or the nursing staff. And then that's the other trick that I think we could support a little bit more is having an EDs portfolio team onboard. (HP 5)

The two key enablers for creating and embedding the ED screening, care pathway and training were perceived to be the committed project team and the resources provided for staff education.

So definitely, if these other people hadn't been involved, you can't just do it with one person trying to do it. It's not going to work. And I think the involvement of everybody, … then yeah, it worked well. (HP 9)

Discussion

This mixed methods study used a pragmatic approach to evaluate the implementation of ED and DEB screening and care pathway into practice. The outcomes showed a new model of ED care for people with psychiatric comorbidities could be feasibly implemented in a general mental health inpatient setting. This process demonstrated that more people at risk of ED or DEB could be identified, allowing them to obtain structured person-centred care during an admission. Further, health professional training and an articulated care pathway in ED care improved staff confidence to build a therapeutic relationship with consumers with ED. Clinical monitoring procedures were more frequent and for those with weight and height data, both absolute and percentage weight change were significantly higher in the post-implementation period. The implementation of this new pathway and model of care was seen to be evolving with both consumers and health professionals offering suggestions for continual improvement. This study augments the evidence base for supporting evidence-based decision-making and continuous improvement for EDs / DEBs management within general mental health units.

In this study both health professionals and consumers acknowledged that screening protocols implementation, as part of routine clinical practice, helped identify people at risk that may otherwise be overlooked, leading to earlier intervention and treatment. Some consumers noted that while they had experienced long term disordered eating symptoms, these had not been detected in prior admissions and acknowledged that identification and management of their ED was a significant step forward for them in their recovery. The triage SCOFF screening positive score showed significant association (OR=35.2) with an ED or DEB during admission, however there was an 8% (n=19/229) false negative for the SCOFF score affirming the need for additional expert assessment during an admission [26]. Pre-admission screening increased the identification of DEBs three-fold compared to baseline. The identification of DEBs is clinically important as people with subthreshold EDs show levels of distress and impairment comparable to people with fully diagnosed EDs [27]. Early intervention is crucial to prevent the progression of the disorder and reduce longer-term risks. This study was consistent with others that have shown that integrating routine screening for EDs into the assessment and treatment protocols of mental health and other settings may increase detection rates [26, 28]. Further study is required to refine screening protocols for individuals with co-occurring mental health conditions across a range of hospital and community settings.

Of interest, some consumers and health professionals spoke about a preference for management in a general mental health environment, in preference to an ED unit, as this allowed better integration of mental health management. This finding is consistent with research suggesting that people are more likely to seek treatment if there is acknowledgement and reduction of bias in relation to EDs [29]. As the demographics of people with EDs continues to change [30], ED detection and care pathways are crucial in wider hospital and community care settings. By implementing specific care pathways, a structured and comprehensive approach can be created that takes into account unique individual needs. Additional work is needed to define the parameters for safe practice within general mental health or health settings for those with EDs with acknowledgement that physical deterioration may require further specialist care. Further research is required to define pathways to provide a more supportive and understanding environment where healthcare professionals are trained to address the specific challenges associated with eating disorders across a range of settings. Given that increased resourcing may be required for health professional education and care pathway development and implementation, economic evaluation studies are required to investigate cost effectiveness to quantify the costs of implementing the pathway and measuring the benefits in terms of health improvements [31]. EDs are associated with substantial economic and social burden [32] and economic evaluation can provide cost-benefit data to allow health services and regions to prioritise funding for interventions that offer the greatest health and economic benefits.

Given the prevalence of co-occurring EDs with other psychiatric conditions, it is crucial for mental health professionals to possess the skills and confidence to build a therapeutic relationship with people with EDs. The health professionals in this study acknowledged that they had felt apprehensive about creating a therapeutic relationship with individuals with EDs in the past and that the ED education and articulated care pathway provided additional capability and self-efficacy. This was consistent with previous research that demonstrated concerns included the complex and multifaceted nature of EDs, the severity of medical complications associated with these conditions, the challenges of managing food-related behaviours and attitudes, and the emotional distress that may arise in caring for individuals with EDs [33]. Furthermore, people with EDs in our study and others acknowledged the importance of clinicians and health services being proactive and able to adapt health

management to empower people to take control of their ED and overall health management [34]. Given the occurrence of EDs in the community further work is required to understand how ED education could be incorporated into further education for health professionals in different setting with different health states that focuses not only on knowledge, tailoring health management and building therapeutic relationships for holistic care but also increasing awareness of bias and stigma for people with EDs [33].

The use of an implementation science evaluation framework and mixed methodology to evaluate the implementation of an ED care pathway in a general mental health unit offers a comprehensive understanding of the topic but comes with challenges related to complexity, evaluation time frame, and single study site. Using both types of data, allowed the validation and triangulation of findings. Due to the focus on implementation and the data collection time frame, further data on the maintenance phase and long-term effects of the new model of care will be examined in future studies. Due to the three-month data collection time frame, the number of interviews with people with EDs was limited with a greater number of health professionals providing data. While the interviewees provided some powerful insights, more data will be required to further understand individual experiences and the longer-term challenges or benefits of ED identification and ongoing management. The single study site and context specific quality changes may limit the generalisability of findings but the overall strategies and findings could provide learnings for other settings.

Conclusion

This study demonstrated that an articulated screening and care pathway could be feasibly implemented in general mental health and improve ED detection and management with noted improvements in management, access, care planning, physical monitoring and weight gain outcomes. Understanding stakeholders' experiences of new care practices enabled the identification of enablers and barriers for implementation, and avenues to optimise care for consumers with EDs in the general mental health setting. Integrating eating disorder care pathways into a general mental health units can improve the overall quality of care, enhance treatment outcomes, and promote a more compassionate and informed approach to the complex needs of individuals with eating disorders and concurrent psychiatric problems.

Abbreviations

DEB	Disordered eating behaviour
ED	Eating disorder
OFSED	Other Specified Feeding or Eating Disorder
SMT	Supervised meal therapy
TMS	Transcranial magnetic stimulation

Supplementary Information

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Supplementary Material 1

Supplementary Material 2

Supplementary Material 3

Supplementary Material 4

Supplementary Material 5

Supplementary Material 6

Supplementary Material 7

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Author contributions

AK conception of the ED model of care including health professional education; implemented program; design of the evaluation, data acquisition, analysis and interpretation; review of manuscript. AH conception of evaluation; review of manuscript. SH conception of ED model of care; supervision of program implementation. KG conception of ED model of care; implementation of program; review of manuscript.DK data analysis; review of manuscript. LV implementation of program. JW design of the evaluation; supervision and undertaking of the evaluation, data acquisition, analysis and interpretation; draft of the manuscript. All authors read and approved the final manuscript.

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Data availability

Data is provided within the manuscript or supplementary information files.

Declarations

Ethics approval and consent to participate

Ethical approval was granted by Monash Health Human Research Ethics Committee RES-21-0000-314 L) and Epworth Healthcare Ethics Committee (Reference: EH2020-663; 2/8/2021) and the study was conducted in accordance with the latest Declaration of Helsinki guidelines. All participants were volunteers who gave informed written consent before participating in this study.

Consent for publication

Not applicable.

Clinical trial registration

This was a quality project implementing evidence-based care into general mental health inpatient care. Therefore, clinical trial registration was not required.

Competing interests

The authors declare no competing interests.

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