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Screening instruments for eating disorders in pregnancy: Current evidence, challenges, and future directions

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Abstract

Pregnancy is a vulnerable period for eating disorder (ED) occurrence and maternal EDs are associated with heightened risk of adverse pregnancy and infant outcomes. This highlights the need to identify pregnant women with past or current EDs in order to offer appropriate support. However, there is a knowledge and practice gap on screening pregnant women for EDs. Clinical guidance is lacking in international treatment guidelines, which is unsurprising given that no validated ED screening tool specifically designed for use in antenatal populations exists. Moreover, data on the effectiveness of general population screening tools for identifying EDs in pregnant women are scarce. This article provides a synthesis of current evidence, treatment guidelines, and data on the diagnostic accuracy for screening for EDs in antenatal samples from three studies with different screening approaches. We outline recommendations for future steps to tackle the knowledge and practice gap on screening for EDs in pregnant women, including next steps for the development of a pregnancy-specific ED screener and the use of general mental health screeners to detect EDs during pregnancy. Up-to-date, the jury is still out as how to best identify current or past EDs in pregnancy. More research is needed to assess the efficacy of

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using general mental health screeners versus ED-specific screening instruments to detect ED in pregnancy. Additionally, clinicians have to be trained on how to assess and manage EDs during pregnancy.

Public Significance: Identifying pregnant women with eating disorders (EDs) is a public health concern which can be addressed using multiple approaches, including implementation of general and specific assessments within routine antenatal care, and training of healthcare professionals.

KEYWORDS
detection, eating disorders, identification, pregnancy, screening

1 | BACKGROUND

World Health Organization (WHO) and the United Nations Population Fund (UNFPA) are strong advocates of integrating maternal mental health approaches within existing maternal and child health policies, plans, and activities which aim to achieve the Millennium Development Goal 5: improving maternal health (World Health Organization, 2008). Several studies show substantially high prevalence rates of mental disorders during pregnancy (Howard et al., 2018; Mongan et al., 2019; Wallwiener et al., 2019). Much research has focused on screening for depression in pregnant women (Howard et al., 2018; O'Connor et al., 2016), whereas little attention has been paid to identifying eating disorders (EDs) in pregnancy. The prevalence of EDs during pregnancy ranges between 1.5% and 7.6% (Bye et al., 2020; Easter et al., 2013; Watson et al., 2013), with discrepancies largely attributable to differences in psychometric instruments employed and operationalized diagnostic criteria (Bannatyne et al., 2021; Bye et al., 2018). The prevalence of EDs has been estimated to be around 15% in pregnant women by a recent review (Bye et al., 2021). Even for women with no ED history, pregnancy may be a high-risk period for the onset of disordered eating symptomatology, and women in stable remission prior to pregnancy have a high relapse rate, especially in the early stages of pregnancy and postpartum (Sollid et al., 2021). Maternal EDs are associated with heightened risk of adverse pregnancy and infant outcomes, with risks varying between diagnostic groups and persisting among those in remission. However, for some pregnancy outcomes and in-utero developmental trajectories, risk has been shown to be higher in active as compared to previous ED (Doersam et al., 2022; Mantel et al., 2020). Common adverse outcomes comprise miscarriage, prematurity, low-birth weight, and infant feeding difficulties as well as negative consequences for child development (Bye et al., 2021; Mantel et al., 2020; Micali et al., 2011).

Hence, the risk of relapse and adverse maternal and infant outcomes underpin the clear need to identify active and previous EDs in pregnant women so that appropriate monitoring and support in accordance with clinical recommendations can be offered. This article outlines the main challenges of screening for EDs in pregnancy, presents previously unpublished data on the diagnostic accuracy of different screening approaches and discusses the findings in light of current evidence and clinical recommendations, with the goal of informing much needed future screening developments.

1.1 | Current evidence and major challenges related to eating disorder screening in pregnancy

As with other mental health conditions, there are generally different approaches to identifying EDs during pregnancy: the health care professional can either ask directly for an ED diagnosis or for current or previous core symptoms of an ED, for example, during an assessment conducted during routine antenatal care. Alternatively, self-report instruments aimed at assessing core symptoms of an ED can be used.

The main barriers to identifying EDs are poor rates of disclosure coupled with poor rates of enquiry in antenatal care (Bye et al., 2018). This is not isolated to EDs, but also applies to other mental health conditions. Survey data of 101 pregnant and postnatal women with active or past ED indicated that over 70% had not disclosed their ED to a health care professional involved in their antenatal care, mainly due to stigma and lack of opportunity (Bye et al., 2018). Conversely research with health care professionals ($n = 33$) suggests that a lack of evidence-based knowledge and training hinders the ability to effectively identify EDs in the perinatal period (Bye et al., 2018).

Considering these barriers, self-report (screening) instruments might be a more feasible, valid, and potentially more acceptable approach for antenatal services. For instance, antenatal screening for depression and anxiety based on such self-report tools is implemented in some health care systems and settings (Bhat et al., 2022). However, despite the need to identify EDs in the perinatal period, no screening tool specifically developed for use in antenatal populations is available (Bannatyne et al., 2021). An open question is whether it is appropriate to rely on established and widely used general population ED measures. A recent systematic review (Bannatyne et al., 2021) assessed the appropriateness of using traditional ED assessment instruments for use in a pregnancy context by identifying and evaluating the psychometric characteristics, that is, reliability (consistency) and validity (accuracy) of the Eating Disorder Examination (EDE), the Eating Disorder Examination Questionnaire (EDE-Q), the Eating Disorder

Inventory-2 (EDI-2), and the Disordered Eating Behavior Scale (DEBS) in pregnancy samples ($n = 1642$ participants; 8 articles included). Results revealed insufficient evidence to support the use of general measures of ED in pregnancy, since no study assessed screening accuracy (i.e., sensitivity and specificity) and only two studies reported criterion-related validity (Bannatyne et al., 2021). More research is needed to establish the sensitivity and specificity of screening tools for current EDs in pregnant women. The typical fluctuations in ED symptoms during pregnancy (Easter et al., 2015; Micali et al., 2007; Watson et al., 2013), as well as overlap between ED symptoms and pregnancy symptoms, such as nausea and hyperemesis, further complicate the identification of EDs during pregnancy and the use of general measures of EDs in antenatal populations (Bye et al., 2020). It is also problematic that there are no agreed criteria for defining maternal underweight in pregnancy and inadequate gestational weight gain (Claydon et al., 2018).

1.2 | Clinical guidelines on eating disorder screening in pregnancy

To the best of our knowledge, a guideline provided by the Australian National Eating Disorders Collaboration (NEDC), an initiative of the Australian Government, is the only guideline which explicitly recommends screening for EDs in pregnancy (National Eating Disorders Collaboration, 2015). The UK NICE ED guideline (National Institute for Health and Care Excellence (NICE), 2017) summarizes recommendations on conception and pregnancy for women with an ED, however, does not specify how to identify and assess EDs in antenatal samples. Other international guidelines on the treatment of EDs, for example, from Germany, France, and Spain recognize pregnancy as a vulnerable period, but they do not include recommendations regarding screening procedures or tools during pregnancy (Hilbert et al., 2017).

UK antenatal care provided by the National Health Service (NHS) is based on a set of NICE guidelines on antenatal and postnatal mental health (National Institute for Health and Care Excellence (NICE), 2014), and these recommend that all women should be routinely asked about current and history of serious mental illness, starting at their first contact with NHS maternity services. Women with EDs should be offered enhanced monitoring and support throughout pregnancy into the postnatal period and referred to specialist care if needed. However, detailed information on how to identify women with an ED and on screening for EDs in pregnancy is absent in these guidelines (National Institute for Health and Care Excellence (NICE), 2014).

The NEDC provides a checklist of psychological, physical and behavioral signs and symptoms of EDs in pregnancy and the postnatal period (National Eating Disorders Collaboration, 2015). NEDC suggests integrating ED screening as part of broader screenings, such as the initial pregnancy consultation or the 12- and 20-week fetal ultrasounds and recommends using the SCOFF questionnaire (Morgan et al., 1999) as a screening tool (National Eating Disorders Collaboration, 2015). NEDC suggests that the SCOFF questions could be used to elicit a discussion about potential disordered eating and that the items might be rephrased depending on the individual circumstances and might be followed by additional assessment questions (National Eating Disorders Collaboration, 2015) to obtain more detailed information.

The SCOFF questionnaire (Morgan et al., 1999) is a widely validated (Luck et al., 2002), brief screening tool for EDs which is recommended in the UK NICE guidance as supplementary to a comprehensive assessment of EDs (National Institute for Health and Care Excellence (NICE), 2017). However, recent research suggests its screening properties are inadequate, particularly in relation to Binge Eating Disorder (BED) and purging disorder, given they were not recognized EDs when the SCOFF was developed (Giel et al., 2022; Solmi et al., 2015). Furthermore, the SCOFF was developed for use in non-pregnant populations, so evaluating its application to antenatal populations is essential. To the best of our knowledge, only two published studies have used the SCOFF to assess symptoms of disordered eating in pregnant and post-partum women (Farrow & Blissett, 2005; Hubin-Gayte & Squires, 2012), however its ability to detect EDs was not compared with diagnostic interviews, which in the absence of validated screening tools for antenatal populations, remains the gold standard for establishing mental health diagnoses. Experts from an International Delphi study raised concerns that certain SCOFF items may overlap with typical pregnancy symptoms, resulting in high rates of false positives or false negatives (Bannatyne et al., 2018a).

2 | IDENTIFIED GAPS IN RESEARCH AND CLINICAL PRACTICE AND AIMS OF THE PRESENT WORK

Despite the evidence of increased risks, there is not yet a validated ED screening tool specifically designed for use in antenatal populations and there is a lack of published data on the effectiveness of general population screening tools for identifying EDs in pregnant women. It is important to evaluate these tools to inform future screening developments to ensure that women at risk are identified and offered appropriate care.

This article reports on the diagnostic accuracy of screening for EDs in antenatal samples in Germany and the UK from three different studies with different screening approaches. Study 1 evaluates the diagnostic accuracy of a brief general ED questionnaire which has not been used before in an antenatal sample. Study 2 evaluates a version of a general population screening tool which was specifically modified for use during pregnancy. In the absence of validated instruments, clinical assessment within routine healthcare (e.g., by gynecologists) plays a significant role for detection of mental health issues. Study 3 evaluates the agreement between self-reported ED history and clinician diagnosis. For the interpretation of results, we rely on the widely used guideline that a screening instrument is considered useful if sensitivity + specificity add up at least to 1.5 (Power et al., 2013). Related to diagnostic accuracy of a screening instrument in relation to a validated reference standard, a test is considered not useful with values <.5, while an accuracy of .9–1.0 is considered excellent, .8–.9 very good and .7–.8 as good (Simundic, 2009).

Based on the synthesis of current evidence, treatment guidelines and own data, we outline recommendations for future steps to tackle the knowledge and practice gap on screening for EDs in pregnant women.

3 | STUDY 1

3.1 | Data source

The screening data stem from the recruitment stage of an ongoing study investigating the impact of maternal EDs on pregnancy and child outcomes using fetal magnetoencephalography, questionnaires, and interviews (Doersam et al., 2022). The study was primarily advertised through resident gynecologists in Baden-Württemberg/Germany, women's hospitals, parenting magazines, and social media. The screening tool was available as part of the advertisement material for the study and based on this, women irrespective of their self-identified ED status were able to participate in the screening since 2019. Ethical approval was obtained from the ethics committee of the Medical Faculty Tübingen, Germany (2019/2018BO).

3.2 | Screening procedure

Women interested in the study were offered to complete an online screening for EDs via a link provided on the study advertising material, following which they were contacted by a researcher who administered a telephone screening. Upon providing written informed consent, women were enrolled into the study and a detailed baseline assessment, including the clinical expert interview EDE (Hilbert & Tuschen-Caffier, 2006), was conducted. We are presenting data on the self-reported online screening.

3.3 | Screening tool

The short version of the self-report Eating Attitudes Test (EAT-8, German version) was used to screen for behaviors and thoughts associated with EDs (Richter et al., 2016). It assesses disordered eating using eight items and a dichotomized response format (1 = "I agree somewhat", 0 = "I disagree somewhat"). To screen for active and past EDs, questions were asked in the present and past tense. In a German representative sample (n = 2527; 53.4% females; aged 14–95 years; Richter et al., 2016) the EAT-8 achieved very good item characteristics, very good reliability (α = .85), and mid-range correlations with the EDs subscale of the ICD-10 Symptom Rating (ISR-E; r = .59; Tritt et al., 2015) and the SCOFF questionnaire (r = .43) (Morgan et al., 1999). Using a more liberal cut-off (1 for men; 2 for women), the EAT-8 showed satisfactory sensitivity (77%) and specificity (77%) and satisfactory values for positive (59%) and negative predictive value (89%) in reference to the ISR-E (Richter et al., 2016). A cut-off value of 2 is considered a positive screening for an ED (Richter et al., 2016).

3.4 | Validation instrument

We used the EDE (Hilbert & Tuschen-Caffier, 2006) to diagnose active ED diagnoses according to DSM-IV (American Psychiatric Association, 1994). The EDE was adapted to also assess lifetime diagnoses.

3.5 | Data analysis

SPSS version 21.0 was used for data analysis. The diagnostic test quality criteria sensitivity (true-positive-rate), specificity (true-negative-rate) and accuracy were calculated with formulas taken from Sachs (Sachs, 1999).

3.6 | Results

N = 1533 individuals opened the EAT-8 in the online window (Figure 1). Forty-seven of these (3%) completed the online questionnaire in full, and 41 women (2.7%) provided their contact details. Two women returned the printed questionnaire with contact details. N = 49 women completed the EAT-8 between the 7th and 38th week of gestation (20.79 ± 7.97) with a mean EAT-8 sum score of 3.69 ± 2.73 (range: 0–8). Of the 49 respondents, 5 women (10.2%) reported an ED history, 22 women (44.9%) reported no ED history, and 3 women (6.1%) reported disordered eating without having an ED diagnosis. ED status was missing in 19 (38.8%) women as they did not participate in the study (unclassified group). Therefore, test quality criteria calculations were available for n = 27 individuals (Table 1). The liberal and conservative (cut-off scores showed very good sensitivity (100%). Specificity and accuracy were low for the cut-off score of 2, and moderate for the cut-off score of 3 (Table 1). Including the whole sample (n = 49), and setting the cut-off value at 3, 59.2% (n = 29) respondents were at increased risk of having an ED history. Using the more liberal cut-off value of 2, 69.4% (n = 34) belonged to the high-risk group. The ED (7.60 ± 0.55), non-ED (2.36 ± 1.71), disordered eating (5.00± 1.73), and unclassified group (4.0 ± 3.04) differed significantly in EAT-8 sum scores using nonparametric tests (H =13.865, df = 3, p = .003).

3.7 | Limitations

Our index group was very small; hence our results are preliminary. The screening tool was disseminated via different channels; thus, we cannot confirm that all responders were pregnant women, which is a common limitation of online research. However, of the 49 individuals who completed the questionnaire, 42 were identified as pregnant. Pregnancy was confirmed for all women whose data was used for the test quality assessment. The range of gestational age at assessment was broad which is a limitation due to typical fluctuation of ED symptoms in different periods of pregnancy.

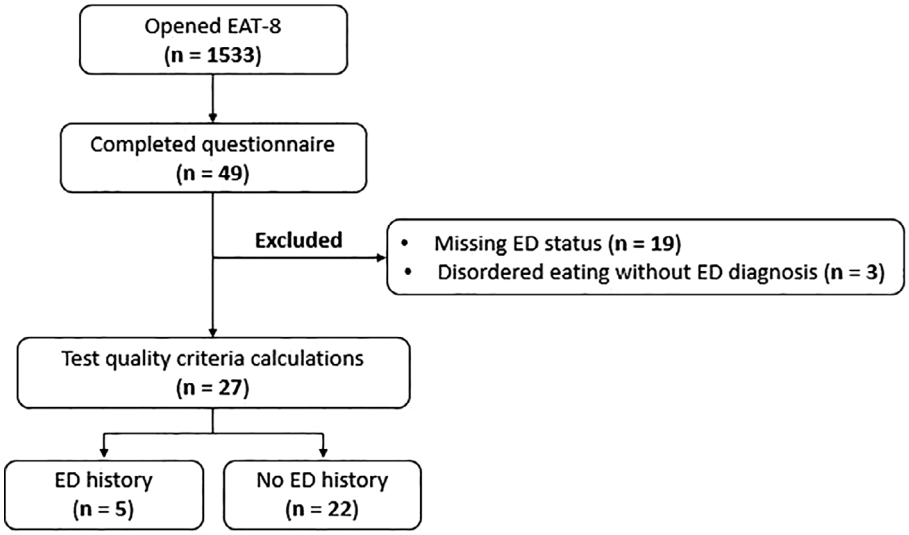

FIGURE 1 Available screening data from Study 1

TABLE 1 Agreement and diagnostic test quality criteria of the EAT-8 in pregnant women for two different cut-off scores as validated with the Eating Disorder Examination (EDE)

EAT-8 score	ED	No ED	
2	5	14	19
<2	0	8	8
	5	22	27
3	5	9	14
<3	0	13	13
	5	22	27
	Cut-off 2		Cut-off 3
Sensitivity	1		1
Specificity	0.36		0.59
Accuracy	0.48		0.67

Abbreviations: EAT, Eating Attitudes Test; ED, eating disorder.

3.8 | Conclusions

The EAT-8 was made available to a large number of interested individuals, but many did not complete it. This could partly be due to length of the instrument or due to individuals feeling that the EAT-8 was not relevant for them. EAT-8 questions are unspecific for a pregnancy context, resulting in insufficient specificity and accuracy for both cut-off values. However, a cut-off of 3 showed the best sensitivity, specificity, and accuracy.

4 | STUDY 2

4.1 | Data source

Data were obtained from the WEll-being in pregnancy stuDY (WENDY), a cross-sectional survey using a stratified sampling method to recruit women from women's first antenatal appointment at an NHS maternity service in London (UK; Howard et al., 2018). All women >16 years who were positive on a routine antenatal depression screen and a random selection of women who were negative were approached to participate between November 2014 and June 2016. Women provided written informed consent before the start of the study interview. Ethical approval for WENDY was granted by the National Research Ethics Service, London Committee–Camberwell St Giles (ref no. 14/LO/0075).

4.2 | Screening tool

A modified version of the SCOFF questionnaire (Morgan et al., 1999), was used comprised of five items with each item scored as one for "yes" and zero for "no." A score of two or more was considered indicative of ED, but not diagnostic. As discussed, the SCOFF may not be effective at identifying BED and purging disorder given they were not recognized diagnostic categories when the SCOFF was developed (Solmi et al., 2015) and the limited applicability and overlap of pregnancy symptoms with some of the items (Bannatyne et al., 2018a; Bannatyne et al., 2018b). Therefore, with input from perinatal ED experts, following qualitative research findings from our group (Taborelli et al., 2016), quantitative findings from our studies (Easter et al., 2013) and feedback from pregnant women with ED, modifications were made to the SCOFF. Item 1 was modified so it would capture: (1) the broader range of purging behaviors beyond self-induced vomiting; (2) engaging in purging behaviors for the purpose of weight maintenance or weight loss rather than solely due to a feeling of being "uncomfortably full," given that the latter is not reliably assessed in pregnancy, and (3) lifetime purging behaviors, as these typically improve during pregnancy while distorted ED cognitions persist (Easter et al., 2013; Easter et al., 2015; Micali et al., 2007). Item 3 is not appropriate for an antenatal sample, so it was modified to capture excessive concern over gestational weight gain, which is a common

concern for women with current and remitted ED (Easter et al., 2013). Furthermore, considering early gestational weight gain may conceal pre-pregnancy low-weight, an additional item was added to capture potential concern from others about recent low weight. Thus, the modified-SCOFF comprises six items (see Supplementary Box S1). Given the modifications to the SCOFF, a total score was obtained and an optimal cut-off for this modified version to detect lifetime ED in an antenatal sample was selected based on the findings.

4.3 | Validation instrument

A "gold standard" diagnostic interview—the Structured Clinical Interview for DSM-IV and DSM-IV-TR Axis I (SCID-I-Research Version) ED module (First et al., 2002), was used to determine lifetime diagnoses of ED.

4.4 | Data analysis

All data were analyzed using STATA 15 (StataCorp, 2017). Sampling weights accounted for the stratified sampling method (Pickles et al., 1995), based on the total number of women attending antenatal booking appointments during the recruitment period (906/287 for depression screen positives and 9057/258 for depression screen negatives) (Howard et al., 2018). Unweighted and weighted rates of "true" and "false" positives and "true" and "false" negatives on the modified-SCOFF, using a range of cut-offs for cases, were tabulated for lifetime ED to calculate sensitivity, specificity, positive predictive value, negative predictive value, likelihood ratio (positive), and likelihood ratio (negative). The optimal cut-off value on the modified-SCOFF to accurately discriminate between cases and non-cases of lifetime ED was selected based on weighted sensitivity, specificity, positive predictive value, and negative predictive value.

4.5 | Results

A total of 10,004 women attended antenatal booking appointments at the study setting, 41 did not have a response to the antenatal depression screen, resulting in a base population of 9963 women (99.6%). A total of 545 women were recruited to WENDY, 522 of whom provided responses to the modified-SCOFF (96%). One woman had missing SCID data. Women with available SCOFF data were similar to the WENDY sample and the base population on sociodemographic characteristics. The range of total scores on the modified-SCOFF were 0–6, with a median of 0 (IQR 0–4). Using a total score cut-off of ≥2 (which was selected as optimal for diagnostic accuracy using weighted performance), there were 96 (18%) modified-SCOFF positives and 426 (82%) modified-SCOFF negatives (Tables S1 and S2). In accordance with a previous analysis (Bye et al., 2020), the present study looked at lifetime EDs.

Fifty (11.7%) modified-SCOFF negatives (<2) and 53 (55.8%) modified-SCOFF positives (≥2) met diagnostic criteria for a lifetime ED (Table 2). After adjustment for weighting, lifetime ED was estimated to occur in 797 (9.7%; 95% CI 7%–14%) modified-SCOFF negatives and 710 (49.0%; 95% CI 35%–63%) modified-SCOFF positives (Table S3). Using a cut-off of ≥2, the unweighted sensitivity was .52, specificity .90, positive predictive value .56, negative predictive value .88, likelihood ratio (positive) 5.12 and likelihood ratio (negative) .54 (Table S4). Using a cut-off of ≥2, weighted sensitivity was .47, specificity .91, positive predictive value .49, negative predictive value .90, likelihood ratio (positive) 5.19, and likelihood ratio (negative) .58 (Table 3).

TABLE 2 2 × 2 tables of lifetime ED by modified-SCOFF status for different cut-off values

N (%)	Modified-SCOFF negative (<4) *N* = 510	Modified-SCOFF positive (≥4) *N* = 11
No lifetime ED	417 (81.8%)	1 (9%)
Lifetime ED	93 (18.2%)	10 (90.1%)
	Modified-SCOFF negative (<3) *N* = 485	**Modified-SCOFF positive (≥3) *N* = 36**
No lifetime ED	411 (84.7%)	7 (19.4%)
Lifetime ED	74 (15.3%)	29 (80.6%)
	Modified-SCOFF negative (<2) *N* = 426	**Modified-SCOFF positive (≥2) *N* = 95**
No lifetime ED	376 (88.2%)	42 (44.2%)
Lifetime ED	50 (11.7%)	53 (55.8%)
	Modified-SCOFF negative (<1) *N* = 301	**Modified-SCOFF positive (≥1) *N* = 220**
No lifetime ED	269 (89.4%)	149 (67.7%)
Lifetime ED	32 (10.6%)	71 (32.3%)

Abbreviation: ED, eating disorder.

4.6 | Limitations

Sampling weights based on a screen for depression rather than ED may have resulted in biased findings. Although data were available on active ED, the prevalence of which has been published elsewhere (Bye et al., 2020), low prevalence precluded the ability to conduct tabulations for active ED, this warrants further research. Although the modifications to the SCOFF described above were appropriate, the changes will require additional validation, and the findings may not necessarily translate to the screening abilities of the SCOFF. The DSM-5 version of the SCID was not available at the time of the study and the version used was not designed to assess DSM-5 (American Psychiatric Association, 2013) diagnoses.

4.7 | Conclusions

The modified-SCOFF is more effective at correctly identifying non-cases of lifetime ED than correctly identifying cases. Thus, it may be useful to rule out the presence of an ED as part of a comprehensive

TABLE 3 Weighted performance of the modified-SCOFF for detecting lifetime ED for different cut-off values for lifetime ED

Cut-off	Sensitivity	Specificity	Positive predictive value	Negative predictive value	Likelihood ratio (positive)	Likelihood ratio (negative)
≥4	0.08	1.00	0.98	0.86	229	0.92
≥3	0.25	0.98	0.68	0.88	11.3	0.77
≥2	0.47	0.91	0.49	0.90	5.19	0.58
≥1	0.62	0.67	0.26	0.90	1.85	0.58

Abbreviation: ED, eating disorder.

assessment (National Institute for Health and Care Excellence (NICE), 2017).

5 | STUDY 3

5.1 | Data source

Data stems from the randomized-controlled clinical trial Mind:Pregnancy (Mueller et al., 2020) which investigates the efficacy of an eHealth intervention for pregnant women with high mental distress. Ethics approval was obtained by the committee at the Medical Faculty of the University of Heidelberg (S-744/2018). Women were recruited via their gynecologist if they were >18 years and <29 weeks of gestation.

5.2 | Screening procedure

Within the Mind:Pregnancy study, screening for affective symptoms in the second trimester among pregnant women has been systematically implemented in gynecological practices in south Germany as well as in the women's university hospitals in Heidelberg and Tuebingen. The Edinburgh Postnatal Depression Scale (EPDS; Cox et al., 1987) was used for screening, and in case of an elevated EPDS score > 9, women were offered consultation by a trained clinician from psychosomatic medicine. Before consultation, women were asked in a self-report questionnaire to report active or previous mental disorders, including EDs.

5.3 | Screening tool

No validated self-report instrument was used for ED screening, but women were asked in written form if they had ever received a diagnosis of an ED, and if yes, to indicate which ED diagnosis they had received.

5.4 | Validation process

During the psychosomatic consultation, a clinical assessment was conducted by trained clinicians to assess mental health history and to diagnose mental health disorders based on clinical diagnoses. This clinical assessment was based on an interview guideline for history taking on active and previous mental illness.

5.5 | Data analysis

SPSS version 21.0 was used for data analysis. The diagnostic test sensitivity (true-positive-rate), specificity (true-negative-rate) and accuracy were calculated.

5.6 | Results

Five thousand two hundred and ninety-nine pregnant women were screened with the EPDS and 21,76% (N =1153) showed high mental distress (EPDS score ≥ 9). Five hundred and thirty-six women participated in the psychosomatic consultation and diagnostic assessment. Mean age of the sample was 31.9 years (SD = 4.91, range 18–45) and women were on average 21 weeks pregnant during the assessment. A current or previous mental disorder was reported by 44% (n = 237) and 71 women reported that they had a history of ED before pregnancy. Four patients reported currently suffering from an ED. A clinical diagnosis of ED was assigned to 17 women. Therefore, rater quality criteria calculations were available for n = 536 individuals (Table 4). The sensitivity of the diagnostic assessment and the self-report were very low, as was the accuracy. Specificity for diagnostic assessment and the self-report was very good.

5.7 | Limitations

Assessment of diagnostic accuracy was focused on a pre-selected sample of women with elevated mental distress due to the study design (Mueller et al., 2020), and screening outcomes for ED in nonselected women might be different. No validated ED screening tool or assessment instrument was used.

5.8 | Conclusions

Assessment by a trained mental health clinician revealed by far more ED cases in pregnant women than based on self-report of a prior

TABLE 4 Agreement and diagnostic test quality criteria for active and past ED diagnosis between self-reported ED history (S) and clinical assessment (C) in pregnant women

Active ED	ED (S)	No ED (S)	
ED (C)	0	17	17
No ED (C)	4	515	519
	4	532	536
Past ED	**ED (S)**	**No ED (S)**	
ED (C)	13	4	17
No ED (C)	58	461	519
	74	465	536
	Active		**Past**
Sensitivity	0.00		0.18
Specificity	0.96		0.99
Accuracy	0.48		0.88

Abbreviation: ED, eating disorder.

diagnosis. Self-report screening on a known previous diagnosis was found to be inadequate to detect active ED in pregnancy, however, if an ED was not diagnosed, the self-report has a very good specificity and can be used for screening out unaffected women. Notably, accuracy to detect past EDs was considerably higher and very good.

6 | DISCUSSION

Screening for active and previous EDs in pregnant women is important clinically due to comparably high prevalence (Bye et al., 2020; Easter et al., 2013; Watson et al., 2013) and potential adverse outcomes of EDs during and following pregnancy for mother and child (Bye et al., 2021; Mantel et al., 2020; Micali et al., 2011). The aim of the present article is to outline the knowledge and practice gap on screening pregnant women for EDs, and to discuss current evidence and novel data on different screening approaches aimed at informing recommendations for effective screening.

Our three studies utilized different screening approaches for EDs in antenatal samples in Germany and the UK: the general ED questionnaire EAT-8 (Richter et al., 2016) via online dissemination in an unselected sample (Study 1), a modified-SCOFF (Morgan et al., 1999; Study 2) and self-reported ED history (Study 3) in preselected samples with elevated scores on other screeners for mental health burden (Howard et al., 2018; Mueller et al., 2020). Our findings align with recent aggregated evidence (Bannatyne et al., 2021) and confirm that there are no available screening instruments that can be recommended for antenatal samples. Related to screening pregnant women for previous EDs, the options based on validated instruments are limited as most focus on current symptoms (Lindvall Dahlgren & Wisting, 2016; Schaefer et al., 2021), which is especially important to consider given that most women will experience a temporary remission during pregnancy. However, the SCID (First et al., 2002) as a gold-standard approach is one of the few instruments including a lifetime perspective. Evidence from Study 3 supports the approach of using a more general screen for previous mental health issues including history taking by trained clinicians, which performed well at identifying pre-pregnancy EDs.

In the absence of specific screening instruments and given respondent burden, a feasible strategy is to rely on other screeners for mental health and to subsequently ask or screen identified women for EDs. This approach has been used by WENDY (Howard et al., 2018) and Mind:Pregnancy (Mueller et al., 2020) as reported in Studies 2 and 3. Both projects used screening tools for affective symptoms, which are the most common mental health issues in the general population and the most common comorbidity of EDs (Udo & Grilo, 2019), increasing the likelihood that women with other mental disorders are identified by this approach. However, there is also the risk of missing women with low affective symptoms and other mental health issues and it remains currently unknown how many pregnant women with EDs are identified using a broad mental health screener, hence additional research into the usefulness of this approach is needed.

This suggestion supports the need to integrate mental health assessment within routine antenatal care, as recommended by the UK NICE guidelines (National Institute for Health and Care Excellence (NICE), 2014). Active assessment by the health care provider is pivotal as only a minority of women are likely to voluntarily disclose a history of ED, for example, in a written document, as outlined in the data of Study 3. This might be due to various reasons, such as the ego-syntonic nature of some EDs and perceived stigma and shame (Bye et al., 2018). However, we also know that health care professionals may lack confidence in their abilities to address EDs in pregnancy (Bye et al., 2018). In the Mind:Pregnancy project as outlined in Study 3, trained psychologists conducted the clinical assessment in a preselected sample with elevated affective screening result (Mueller et al., 2020). Although gynecologists and midwives are experienced at engaging with women about difficult subject matters, they have to enquire about a range of conditions, and therefore, we would not expect such diagnostic precision as compared to mental health professionals. In order to effectively detect EDs during pregnancy, clinicians have to be trained on how to address ED diagnosis in routine care, and also, importantly, on care pathways and management if a woman reports ED symptoms. Such training efforts will also contribute to reducing stigma and to avoid that disclosure adds further stigma for individuals with an ED history.

Any screening strategy also needs to be evaluated in the context of balancing out risks, costs and benefits of screening especially in a vulnerable period such as pregnancy. For example, women identified as false positives might undergo unnecessary assessments, screening might be costly, and it might require extra time and resources during health care appointments. The disease/condition being screened for should be sufficiently common and impairing to warrant being detected; there should be good treatment options leading to good outcomes for the disease in question; and treatment should be available to the screened population (Birbeck, 2000). For EDs, there are good treatment options. Psychotherapy is the recommended first-line

treatment (Galbally et al., 2022; Giel et al., 2022; Treasure et al., 2015) and should be offered during pregnancy. Evidence suggests that women might be more motivated in pregnancy to change their ED behaviors, hence pregnancy can be an opportunity to engage women in treatment (Tierney et al., 2013; Venturo-Conerly et al., 2020). The UK NICE ED guidelines (National Institute for Health and Care Excellence (NICE), 2017) recommend that pregnant women with an ED should be offered evidence-based treatment. While this should be provided by a mental health expert, such resources may be limited. It is therefore important that they should also be provided education and monitoring of their mental and physical health peri- and postnatally by a health professional such as the GP or midwife.

The approach described above could be compared to use of a pregnancy-specific screening instrument to identify or measure EDs and their symptoms which is sensitive to the eating and weight-related changes that naturally occur during pregnancy (Bannatyne et al., 2018b). Participants of an international Delphi study recently agreed that the screening of disordered eating should be part of routine assessments in antenatal care for all women (Bannatyne et al., 2018a). The panel rated brief screening instruments (2–5 items) to be most feasible for implementation of routine screening of disordered eating, owing to their straightforward and time-saving application, limited training requirements and non-judgmental nature (Bannatyne et al., 2018a). In the endeavor to design a pregnancy-specific screening instrument, it could be a valuable next step to analyze the item pool from different general-population ED instruments which have been used in antenatal samples and to identify items with high sensitivity, separating women with and without ED. Integrating women's lived experience and the clinical perspective in the process of developing a screening tool and procedure is imperative, including views on specific question or item formulations and also for routine clinical assessment (Easter & Bye, 2018).

7 | CONCLUSIONS

In the absence of an antenatal screen, further research is needed to assess the efficacy of using general mental health screeners versus ED-specific screening instruments, to detect EDs in pregnancy. Additionally, clinicians have to be trained on how to manage ED diagnosis in routine care and care pathways should routinely be developed for EDs. There remains a need to explore the acceptability, usefulness, and feasibility of screening for ED in pregnancy from the perspectives of women with EDs and other key stakeholders, and to use this understanding to co-design and validate an ED screening tool with experts by experience and clinicians.

AUTHOR CONTRIBUTIONS

Annica Franziska Dörsam: Conceptualization; formal analysis; funding acquisition; investigation; writing – original draft; writing – review and editing. **Amanda Bye:** Conceptualization; data curation; formal analysis; investigation; writing – original draft; writing – review and editing. **Johanna Graf:** Formal analysis; writing – original draft; writing – review and editing. **Louise M Howard:** Funding acquisition; supervision; writing – review and editing. **Jana Katharina Throm:** Investigation; writing – review and editing. **Mitho Müller:** Data curation; writing – review and editing. **Stephanie Wallwiener:** Funding acquisition; supervision; writing – review and editing. **Stephan Zipfel:** Funding acquisition; supervision; writing – review and editing. **Nadia Micali:** Conceptualization; data curation; funding acquisition; supervision; writing – original draft; writing – review and editing. **Katrin Elisabeth Giel:** Conceptualization; funding acquisition; supervision; writing – original draft; writing – review and editing.

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CONFLICT OF INTEREST

None of the authors declares a conflict of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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