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Proposing a two-stage screening approach to distinguish between transient and enduring postnatal depressive symptoms: A prospective cohort study

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ABSTRACT

Background: Screening for perinatal depression using the Edinburgh Postnatal Depression Scale (EPDS) improves detection and increases health service utilization. However, previous studies with antenatal samples indicate that positive screenings might reflect transient distress that resolves without intervention, raising concerns about over-pathologizing typical postnatal responses and inefficiencies in referral practices. Therefore, distinguishing between transient and enduring depressive symptoms for appropriate referrals to secondary services is crucial, highlighting the need for a refined screening practice.

Objectives: We aimed to assess the prevalence of transient distress among postnatal women who initially screened positive on the EPDS and evaluate the effectiveness of a refined two-stage screening approach. Three research questions were addressed: Can the "transient phenomenon" be replicated in a postnatal sample? Can initial screening data predict transient status? What are the implications of adopting a two-stage screening approach?

Methods: In a prospective cohort study, 427 postnatal women in Copenhagen who scored above the cut-off on their initial EPDS screening (EPDS-1) underwent a second screening (EPDS-2) 1–4 weeks later, without intervention in between. We analyzed the predictive power for transient versus enduring distress using EPDS-1 total scores, responses to item 10 ("self-harm item"), parity, maternal age, and a history of depression. Three screening scenarios were compared for their clinical and ethical implications: (i) a traditional single screening approach where all individuals screening positive at EPDS-1 are directly referred to secondary services, (ii) a simple two-stage approach where all positive screenings at EPDS-1 undergo a second screening before referral, and (iii) a refined two-stage screening approach where selected criteria determine immediate referral or further screening.

Results: Among women who screened positive, 29.3 % displayed transient distress with a clinically meaningful decrease in EPDS scores. An EPDS-1 score of 15 or more was the most robust predictor of enduring symptoms (OR = 6.28, 95 % CI 3.5–11.8; Absolute Risk = 90.4 %) and was used along with a positive score on item 10 as indicators of immediate referral in scenario-iii. The

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refined two-stage approach reduced unnecessary referrals by 24 %, directly referred 60 % of women with enduring symptoms, and effectively managed suicidal risk.
Conclusions: A substantial proportion of postnatal women experience transient symptoms that are distinguishable from enduring symptoms through a refined two-stage screening strategy. This approach significantly improves referral efficiency and minimizes over-pathologization, enhancing clinical practice in perinatal mental health.

What is already known

- A substantial proportion of pregnant women who screen positive for depression using the EPDS experience transient symptoms that resolve without treatment, and this may also be true for postpartum women.
- Current screening guidelines typically recommend referral to secondary services after a single positive EPDS screening, potentially leading to unnecessary referrals.
- There is limited knowledge on the clinical implications of implementing a two-stage screening approach to differentiate between transient and enduring symptoms.

What this paper adds

- This study finds that around one third of postnatal women with positive EPDS screenings exhibit transient symptoms that resolve within a few weeks.
- Findings show that information from the initial screening can predict whether symptoms are likely to be transient or enduring.
- A refined two-stage screening approach significantly reduces unnecessary referrals and ensures timely care for women with enduring symptoms.

1. Introduction

Universal screening for perinatal depression with a validated screening tool enhances detection, referral, and health service utilization (Reilly et al., 2020; van der Zee-van den Berg et al., 2017; Waqas et al., 2022); and evidence shows that universal screening can lower depression rates in perinatal populations (O'Connor et al., 2016). Such evidence has led the World Health Organization (WHO, 2022) and national health authorities in many countries to recommend routine screening for depression and mental distress in the perinatal period. The Edinburgh Postnatal Depression Scale (EPDS; Cox et al., 1987) is a widely adopted screening tool, validated across various languages and demographics (Hewitt et al., 2010; Levis et al., 2020), and is found to be acceptable to both parents and healthcare professionals (El-Den et al., 2015).

Screening guidelines generally recommend referral to secondary clinical services for further evaluation and possible intervention following a positive EPDS screening in primary care (e.g., Austin, Highet, and Expert Working Group, 2017, updated 2019; American College of Obstetricians and Gynecologists, 2018; World Health Organization, 2022). Likewise, in Denmark where the present study is based, the Danish Health Authority recommends systematic screening for perinatal depression using the EPDS by public health visitors (Sundhedsstyrelsen, 2019). However, the appropriateness of referral to secondary services after a single positive screening may be questioned. Some researchers (e.g., Agostini et al., 2019; Matthey, 2010) argue that a single high score on the EPDS might reflect transient symptoms of emotional distress, warning that immediate referral could lead to unnecessary worry in parents and strain on clinical services with many referrals based on false positive screenings. Aiming to inform screening guidelines, this study investigates implications of a single screening versus a two-stage screening approach in postpartum women. The objective is to distinguish between transient and enduring symptoms to minimize unnecessary referrals for transient distress while ensuring prompt support for those with enduring depressive symptoms. Transient distress is defined as a positive EPDS screening followed by a score below the cut-off within 1–4 weeks without interim intervention. Enduring symptoms are defined as a positive EPDS screening followed by a second positive screening 1–4 weeks later.

1.1. Transient distress in the perinatal period

Previous studies show that for a relatively large proportion of pregnant women, a positive screening results on the EPDS may reflect temporary non-clinical distress (Agostini et al., 2019; Matthey, 2016). In a study of 161 pregnant women, Matthey and Ross-Hamid (2012) found that about 50 % ($n = 25$) of those scoring above cut-off on the EPDS at a routine screening, scored below cut-off 1- 4 weeks later without intervention between the two screenings. Of the women who no longer scored above cut-off at the second screening, 80 % had a clinically meaningful drop in their scores (defined as at least 3 points on the EPDS), suggesting that the change in score could not be explained by measurement error but reflected a real change in the women's mood. The study was conducted early in pregnancy (mean GA age = 14 weeks) and the women explained improvements in initial high EPDS by factors such as diminishing morning sickness, acceptance of pregnancy, and reassuring test results showing healthy fetal development. However, the 'transient

distress phenomenon' not only applies to early pregnancy. In another study ($N = 84$), Agostini et al. (2019) found that about 40 % of the women screening positive (EPDS score 10 or more, being the validated Italian cut-off) at a routine screening in their third trimester had transient symptoms. Around three-quarters of those initially scoring above cut-off, and who then scored below the cut-off at a second screening showed a clinically meaningful drop in their score, suggesting true mood improvements. A similar finding was reported by Usuda et al. (2017) in the second trimester. Finally, a more recent large-scale study ($N = 3235$) found that nearly two-thirds of women who scored above cut-off (defined as 10 or higher) in pregnancy (of which the majority were screened in the third trimester) did not screen positive again postpartum (Koire et al., 2022). Of note, this study lacked data on whether participants received treatment in the interim, making it difficult to draw definitive conclusions about the proportion of women experiencing transient symptoms.

To our knowledge, no previous study has specifically examined proportions of women with transient symptoms in postnatal populations, an aim of the present study. Yet, a few older studies indicate that a substantial proportion of postnatal women who score above cut-off at a routine screening postpartum will indeed score below cut-off a few weeks later without any professional intervention. In a longitudinal epidemiological study ($N = 772$) investigating postnatal depression among German mothers, 17 % ($n = 139$) of the sample scored above cut-off on the EPDS (10 or more, being the validated German cut-off) 6–8 weeks after delivery (Ballestrem et al., 2005). All women were screened a second time three weeks later, and among those who screened positive on the first screening, only 20 % ($n = 28$ of 139) scored above cut-off on both occasions. While the authors reported that all these 28 mothers fulfilled criteria for depression, they did not report how many of the mothers who only scored above cut-off at the first screening were clinically depressed. In a Swedish community sample ($N = 1655$), 12 % ($n = 196$) of the women scored above cut-off (12 or more, being the validated Swedish cut-off) two months after delivery, and 36.7 % ($n = 72$) of these women continued to score above cut-off when screened again one month later (Wickberg and Hwang, 1996). Hence, in these two postnatal samples, a substantial proportion of the women screening positive at the first screening in fact had transient symptoms (79.9 % and 63.3 % respectively). t is worth noting that none of these studies reported how many of the women in the 'transient group' experienced a clinically meaningful decrease in symptoms. Thus, it is possible that a number of the women in the 'transient group' only had a one-point change in score from just at the cut-off score to just below cut-off, and possibly still fulfilled criteria for a depression diagnosis.

Support for the notion that a positive EPDS routine screening result may reflect transient symptoms of distress also comes from validation studies of the EPDS showing that the positive predictive value (PPV; the probability that people with a positive screening result truly have the condition) for detecting clinical depression may be rather low. While the PPV reported in the original validation study was 75 % (Cox et al., 1987), an individual participant meta-analysis of data from 58 samples, including both postnatal and pregnant participants, reveals that EPDS PPVs ranges from 26 % to 69 % using a cut-off of 11 or higher (Levis et al., 2020). The 'transient distress phenomenon' could therefore potentially be explained in terms of lack of accuracy of the EPDS, overestimating the postnatal depression prevalence, which is often the case with many for short, easy-to-implement screening-tools (Thombs et al., 2020).

At the same time, mood changes are part of the normal adaptation to parenthood (McMahon, 2022), and the high proportions of scores below cut-off when repeated a few weeks later, may in fact represent typical mood changes in the postnatal period. As noted in the EPDS manual (Cox et al., 2014), a single high score does not necessarily reflect that the mother has depression: "She may simply have a bad day, for example, because of sleeplessness or temporary emotional or task overload" (p. 69). Therefore, the manual recommends a second administration of the EPDS within a few weeks following the first positive screening result before referral to relevant clinical services. Nevertheless, this practice is rarely implemented in screening programs (e.g., Austin, Highet, and Expert Working Group, 2017, updated 2019; Swedish National Board of Health and Welfare, 2016; American College of Obstetricians and Gynecologists, 2018).

For clinical, ethical as well as economic reasons, inappropriate referrals to secondary services should be avoided if possible. Being referred to a specialist due to 'possible mental illness' may create perceived stigma as well as unnecessary worry and anxiety in new parents. In addition, such a practice may contribute to the overpathologizing of typical struggles and challenges in the transition to parenthood. Furthermore, economic analyses show that a single-postnatal depression screening approach is not cost-effective and results in an inefficient use of healthcare services (Littlewood et al., 2018). Conversely, as postnatal depression can have significant consequences, not only for the mother, but also for her partner and the child (Letourneau et al., 2012; Paulson et al., 2016), unnecessary prolonged time between identification and follow-up should also be avoided when a woman is in fact experiencing enduring symptoms of depression.

In this context, Matthey (2016) explored if information from the initial routine screening can help determine whether a pregnant woman is likely to have enduring or transient symptoms. Building on the earlier study by Matthey and Ross-Hamid (2012), Matthey added 79 pregnant women to the sample (total $N = 240$; of which 61 screened positive at the initial screening) and found that women with enduring symptoms scored significantly and clinically meaningfully higher (by at least 3 points on the EPDS) on the initial screening compared to those with transient symptoms. Despite this, the study failed to identify a 'secondary' threshold to effectively differentiate between transient and enduring status. Further, while women with enduring distress were significantly more likely to fulfill criteria for depression, endorsement of item 10 (the 'self-harm' item) did not predict transient or enduring status. However, the mothers' own expectations of their future mood improvement somewhat predicted the outcomes of the second screening. The inability to establish a secondary cut-off and the non-predictive nature of item 10 could be attributed to the relatively small sample size, which might have lacked statistical power to detect such nuances. In the present paper, which is based on a substantially larger sample, we extend this research by examining factors that can be readily identified during the initial routine EPDS screening (EPDS-1), aiming to predict whether a woman will also screen positive in a subsequent screening conducted a few weeks later (EPDS-2).

1.2. Current study

The objective of this study is to investigate the transient phenomenon in the postnatal period and explore the practical and clinical implications of implementing a two-stage versus a single screening approach. The study is based on a sample of mothers who all scored above the cut-off during routine EPDS screenings performed by public health visitors around two months postpartum. The results have significant implications for refining screening program guidelines and making informed clinical decisions, particularly in determining the need for a second screening and its impact on the wait times for mothers who experience enduring symptoms. Specifically, we addressed the following Research Questions (RQs)

RQ1. *Can the "transient phenomenon" be replicated in a postnatal sample?*

Based on the reviewed literature, we expected that a substantial proportion of women screening positive on their first routine EPDS screening might not do so in a subsequent screening a few weeks later without any intervening treatment. Based on our consensus opinion, we defined a 'substantial proportion' as at least one of four women scoring above the cut-off at EPDS-1. To ensure that the transient phenomenon was not merely an artifact of the time between screenings, we examined whether the number of days between EPDS-1 and EPDS-2 predicted transient/enduring status. Further, to ensure that women categorized as 'transient' experienced a genuine improvement in their mood, we investigated how many women in the transient group would experience a clinically significant decrease in symptoms (defined as at least 3 points on the EPDS; Matthey, 2012), and whether women in this group were less likely to fulfill diagnostic criteria for depression compared to women categorized as 'enduring'.

RQ2. *Can information available at a first routine screening predict transient status?*

Following Matthey (2016), we examined factors that may potentially predict whether a woman is likely to show transient or enduring symptoms. We focused on variables easily identifiable in a busy, real-life setting, such as a home visit by a health visitor or during a routine clinic check, without the need for additional, time-consuming assessments or information that could inadvertently contribute to stigma. Based on previous research (Matthey, 2016; Morse et al., 2022; Iwata et al., 2016; Silverman et al., 2017), we explored the following variables as predictors of enduring status: EPDS-1 score, endorsement of item 10 (the self-harm item) at EPDS-1, maternal age, parity, and a history of depression.

RQ3. *What are the implications of adopting a two-stage screening approach?*

This research question investigates the consequences of different screening strategies by comparing three hypothetical scenarios: (i) a single screening approach, (ii) a simple two-stage screening where all women scoring above the cut-off EPDS-1 undergo a second screening, and (iii) a refined two-stage screening approach. In the third scenario, we applied criteria based on the findings of RQ2 to decide which women should be immediately referred to secondary services after EPDS-1 and which should receive a second screening. We assessed the effectiveness of these strategies in terms of reducing unnecessary referrals of women with transient symptoms to secondary services and decreasing the wait time for women with enduring symptoms before referral.

2. Methods

The study was part of a larger study, the Copenhagen Infant Mental Health Project, which included a treatment trial (Væver et al., 2016) and a validation study of the Danish EPDS (Smith-Nielsen et al., 2018). The current study is a secondary investigation using data from this project running from 2015 – 2020 and was designed as a prospective cohort study.

2.1. Setting

In Denmark, all families with an infant are offered routine home visits by a public health visitor—a specialized nurse who provides support and guidance on topics such as child development, health, and parenting. While the number of home visits may vary slightly between municipalities, families typically receive four visits during the first year postpartum (Wüst et al., 2020). The Danish Health Authority recommends systematic detection of postnatal depression using a validated screening tool (Sundhedsstyrelsen, 2019), and 99 % of municipalities use the Edinburgh Postnatal Depression Scale (EPDS) as part of their health visiting program (Rambøll, 2021). The public health visiting service is well-implemented, with 97–99 % of all first-time parents receiving home visits during the postpartum period (Poulsen and Brot, 2011; Wüst et al., 2020). In most municipalities, mothers are screened for postnatal depression using the EPDS around two months postpartum, and a register-based study of EPDS screenings conducted from 2000 to 2017 across 55 municipalities found that 9 % of mothers screened positive during the first months postpartum.

In addition to public health visiting services, Denmark provides all citizens with free access to general practitioners (GPs). After a positive screening, the health visitor can refer the mother to her GP for further assessment. The GP can initiate treatment or refer the mother to specialized mental health services if needed. Additionally, many local municipalities offer mothers' groups or postpartum depression support groups that do not require a referral from a GP, providing further free community-based support options.

The Copenhagen Infant Mental Health Project was conducted in collaboration with public health visitors in the municipality of Copenhagen, where the EPDS has been routinely administered during the standard visit around two months postpartum for nearly two decades. The EPDS is integrated into the health visitor's digital records system, allowing parents to complete the questionnaire directly on the health visitor's laptop or tablet. The score is calculated immediately, reducing the risk of calculation errors. If a screening is missed or deemed relevant by the health visitor, a mother may be offered screening during a subsequent visit. This approach is

reflective of the broader national emphasis on early identification and support for postnatal mental health concerns across Denmark.

2.2. Procedure

During the project period, mothers in Copenhagen who scored positive on the EPDS at the two-month screening (EPDS-1) were invited to participate in the study. The health visitor recorded in the digital records system whether the mother was interested in being contacted by the research team. Once a week, the municipality of Copenhagen shared data with the research team on mothers who screened positive and agreed to participate. The project coordinator then contacted these mothers, providing additional information about the study and offering a home visit by a psychologist from the project team. According to the project protocol, the home visit was to occur as soon as possible after the project coordinator established contact with the participant. However, for various reasons, the home visit could take place anywhere from a few days to several weeks after the health visitor conducted EPDS-1: The project coordinator could receive the list of interested participants the day after EPDS-1 was completed and contact them immediately, but it could also take up to a week between EPDS-1 and when the coordinator received the list. Additionally, scheduling a home visit could be challenging due to the availability of both the participant and the psychologists who were part of the project team. Finally, planned home visits could be postponed due to illness or other unforeseen circumstances.

During the home visit, a second EPDS screening (EPDS-2) was administered. The EPDS-2 screening was administered according to the recommendations in the EPDS-manual (Cox et al., 2014) where the woman was asked to fill out the questionnaire herself without interruption. Afterward, the psychologist conducted a diagnostic interview including assessing history of depression. As it was part of the home visit to assess for eligibility for participating in the intervention trial, no intervention was offered between EPDS-1 and EPS-2. Socio-demographic data including maternal age and parity, were collected using an electronic survey sent to the participants prior to the home visit (please refer to Table 1 for an overview of socio-demographic variables). All participants gave informed written consent to participate in the study before any data were collected.

2.2.1. Participants

Participants for the current project were women initially enrolled in the Copenhagen Infant Mental Health Project (Væver et al., 2016). At the outset of the Copenhagen Infant Mental Health Project, no Danish validation of the EPDS had been conducted, and based on the available literature (Hewitt et al., 2009), women with an EPDS-1 score of 10 or more were invited to the project. However, the Danish validation study (Smith-Nielsen et al., 2018) and a comprehensive individual participant meta-analysis involving 15,557 participants from 58 primary studies (Levis et al., 2020) indicated that 11 or more was the most appropriate cut-off for detecting depression. Consequently, only mothers with a score of 11 or more were included in the final dataset for this analysis.

As the original dataset included mothers with an EPDS-2 score conducted only a few days or several weeks after EPDS-1, in this study, only women who underwent a second screening (EPDS-2) 6 or more days or 28 or fewer days after EPDS-1 were included in the current dataset. This interval was decided as it balances the need to observe potential changes in transient symptoms on the one hand

Table 1
Sample characteristics ($N = 427$).

Variable	Value
Child sex, female, % (*n*)	49.6 (207)
Mother's age at birth, *M* (SD)	31.9 (4.8)
Missing, % (*n*)	3.6 (15)
Parity, % (*n*)	
Primiparous	64.6 (276)
Multiparous	23.9 (102)
Missing	11.5 (49)
Origin, % (*n*)	
Danish	76.6 (327)
Immigrant	8.7 (37)
Descendant	1.6 (7)
Missing	13.1 (56)
Current relationship status, % (*n*)	
Married or in a relationship	81.3 (347)
Single	4.7 (20)
Other	0.9 (4)
Missing	13.1 (56)
Educational level, ISCED, % (*n*)	
Level 1–3 (lower secondary or less)	7.7 (33)
Level 4–5 (post-secondary or short-cycle tertiary)	8.0 (34)
Level 6 (Bachelor or equivalent)	34.7 (148)
Level 7–8 (Master, equivalent or more)	35.8 (153)
Missing	13.8 (59)
EPDS-1 total score, *M* (SD)	14.8 (3.3)
EPDS-2 total score, *M* (SD)	13.0 (4.7)
Days between EPDS-1 and EPDS-2, *M* (SD)	14.8 (6.1)

Note. ISCED = International Standard Classification of Education by UNESCO.

without unduly delaying further assessment for those potentially suffering from depression on the other hand. Additionally, any participant with a missing EPDS-2 score was excluded. In summary, the eligible criteria for the present study were: At least 18 years of age, the mother had an infant between 2 and 10 months of age (inclusion criteria for the Copenhagen Infant Mental Health Project) an EPDS-1 screening conducted by her health visitor of 11 or more, and an EPDS-2 screening administered 6–28 days after EPDS-1. For the sample used in this study, the Mean number of days between EPDS-1 and EPDS-2 was 14.8 ($SD = 6.1$).

Of the 828 mothers included in the original dataset, 218 scored 10 at EPDS-1 and were excluded, and an additional 205 were excluded because their EPDS-2 screening occurred outside the acceptable time frame and the EPDS-2 score was missing for 15 mothers. The final dataset used in the current study comprised 427 mothers from Copenhagen, each with an EPDS-1 score of 11 or higher.

2.3. Measures

2.3.1. Edinburgh postnatal depression scale (EPDS)

The EPDS is a brief self-report instrument to screen for postpartum depressive symptoms (Cox et al., 1987). It consists of 10 items inquiring after the respondent's feelings and moods over the previous week (e.g., in the past 7 days…. I have felt sad or miserable). Answers, which range from *never/not at all* to *yes, most of the time/quite a lot*, are scored 0–3 based on level of endorsement; the maximum EPDS score is 30. Item 10 has special relevance for the current study: "in the past 7 days… the thought of harming myself has occurred to me". Though it has been found that the majority of women endorsing this item are not acutely suicidal (Kim et al., 2015), endorsement of this item has in previous studies been identified as a marker of longer-term psychiatric vulnerability in both mothers and their children (Iliadis et al., 2018; Paul et al., 2021). The EPDS is widely used in research (Levis et al., 2020). By 2010, it was the postnatal depression screening tool most used internationally, with 53 validation studies in 26 countries (Hewitt et al., 2010). It is widely used by Danish health visitors to screen women for depressive symptoms in the ante- and postnatal period during routine home visits (Rambøll, 2021), although various concerns have been raised about the EPDS (Matthey and Agostini, 2017). The EPDS has demonstrated good psychometric properties, with strong internal consistency (Cronbach's alpha = 0.835), a sensitivity of 79.2 %, and a specificity of 94.4 % at a cut-off of 11 or more for detecting Major Depression (Smith-Nielsen et al., 2018).

2.3.2. Structural clinical interview for the DSM-5 (SCID-5)

The SCID-5 is a semi-structured interview based on which clinical diagnoses from the Diagnostic and Statistical Manual for Mental Disorders, 5th Edition (DSM-5) can be made. In the current study it was used to assess whether mothers had current major depression disorder and to assess history of depression. The SCID-5 is considered the 'gold standard' for assessing Depression. All interviewers were female clinical psychologists who had been trained to conduct the SCID-5 and received ongoing supervision throughout the project period. They were also trained to distinguish depressive symptoms from symptoms common to postpartum mothers (e.g., sleep problems) that are not necessarily indicative of depression, as research has shown that new mothers are liable to being over-diagnosed with depression (Matthey and Ross-Hamid, 2011). Interviews were audio-recorded for subsequent supervision. To ensure inter-rater reliability, a randomly selected subset of 70 interviews was rated by a certified SCID-5 interviewer with no knowledge about the mothers and who was blind to the mother's EPDS-2 score and the diagnose made by the interviewer. Inter-rater agreement for DSM-5 diagnostic status (no depression vs. major) was 90.2 %, $\kappa = .89$ ($p < .001$), indicating excellent inter-rater reliability (Fleiss et al., 2013).

2.4. Analytical strategy and statistical analyses

'Transient symptoms' was defined as a score above cut-off at EPDS-1 combined with a score below cut-off at EPDS-2. 'Enduring symptoms' was defined as a score above cut-off at both EPDS-1 and EPDS-2. Following Matthey (2016), a clinically significant decrease in symptoms was defined as a 3 point decrease on the EPDS from EPDS-1 to EPDS-2.

Analytical procedures were conducted in R (R Core Team, 2016). In total, 58 cases (13.4 %) had missing data on one or more of the predictor variables: current depression diagnosis ($n = 7$), past depression diagnosis ($n = 9$), maternal age ($n = 15$), and/or parity ($n = 49$). Missing data was handled using case-wise deletion. Further, we examined differences in EPDS-1 and EPDS-2 scores between subjects without missing data and with missing data on one or more predictors using independent samples *t*-tests.

To address RQ1, descriptive statistics (percentages) were calculated. Further, a logistic regression was used to examine the association between the number of days between EPDS-1 and EPDS-2 and transient/enduring status. In case of a significant association, the remaining logistic regression analyses would be controlled for the number of days between screenings. In addition, a logistic regression was conducted to examine the association between transient/enduring status and clinical depression. Odds Ratios (ORs) were derived from the logistic regression to examine the strength of the associations.

To address RQ2, possible associations between transient/enduring status and predictor variables (EPDS-1 total score, endorsement of item 10, history of depression, maternal age, and parity) were assessed using chi-square tests or Pearson correlations depending on whether the predictor variable was categorical or continuous. In addition, for the binary predictor variables, absolute risk (AR) was calculated. The predictor variables that were significantly correlated with transient/enduring status were entered as predictors in a logistic regression to determine the relative strength of the associations using ORs.

For associations between binary variables in RQ1 and RQ2, statistically significant ORs were interpreted according to the following criteria: ORs between 1.5 and 3.5 indicate weak associations, ORs between 3.5 and 9.0 indicate moderate associations, and ORs of 9.0 or more indicate strong associations (Hopkins, 2002; Watson, 2014).

To address RQ3, we examined the quantitative implications of our findings from answering RQ1 and RQ2, with an eye to (a)

limiting the number of women with transient symptoms referred to secondary services and (b) limiting the number of women with enduring symptoms, who would need to wait for their second screening before referral. Thus, we compared three hypothetical scenarios: (i) a single-screening approach, (ii) a simple two-stage screening approach where all women scoring above the cut-off at EPDS-1 are referred for a second screening, and (iii) a refined two-stage screening approach where results from RQ2 were used to determine criteria for direct referral to secondary services after EPDS-1, and for those who should be offered a second screening before referral. Only predictors with odds ratios (ORs) indicating at least a moderate association with transient/enduring status were considered clinically relevant for immediate referral in the refined two-stage screening approach. However, for ethical reasons, a score item $10 \neq 0$ was selected a priori as indicating the need for immediate referral in the refined two-stage screening approach.

For RQ3, qualitative descriptions based on Rosenthal (1996) were used to interpret differences in percentages. Specifically, a difference of 7–18 percentage points indicates a small difference, 18–30 percentage points indicates a moderate difference, 30–45 percentage points indicates a large difference, and a difference of 45 percentage points or more indicates a very large difference.

P-values less than 0.05 were considered statistically significant.

2.4. Ethical approval

The project was approved by the Institutional Ethical Review Board of the Department of Psychology at the University of Copenhagen (Reference Number: #2015–10). Informed written consent was obtained from all participants. The consent process included an information sheet that explained the study's purpose, procedures, and participants' rights. Participants were informed that their involvement was entirely voluntary and that choosing not to participate would not affect their access to public social and health services. Additionally, they were assured that they could withdraw from the study at any time without any negative consequences.

3. Results

Sociodemographic information is reported in Table 1. As shown, the sample was relatively well-resourced, with 70.5 % of mothers holding a Bachelor's degree or higher and 81.3 % living in stable relationships. Maternal age was also reflective of a relatively mature cohort. There were lower EPDS-1 scores among the participants with missing data on one or more predictor variables ($t(88.74) =$

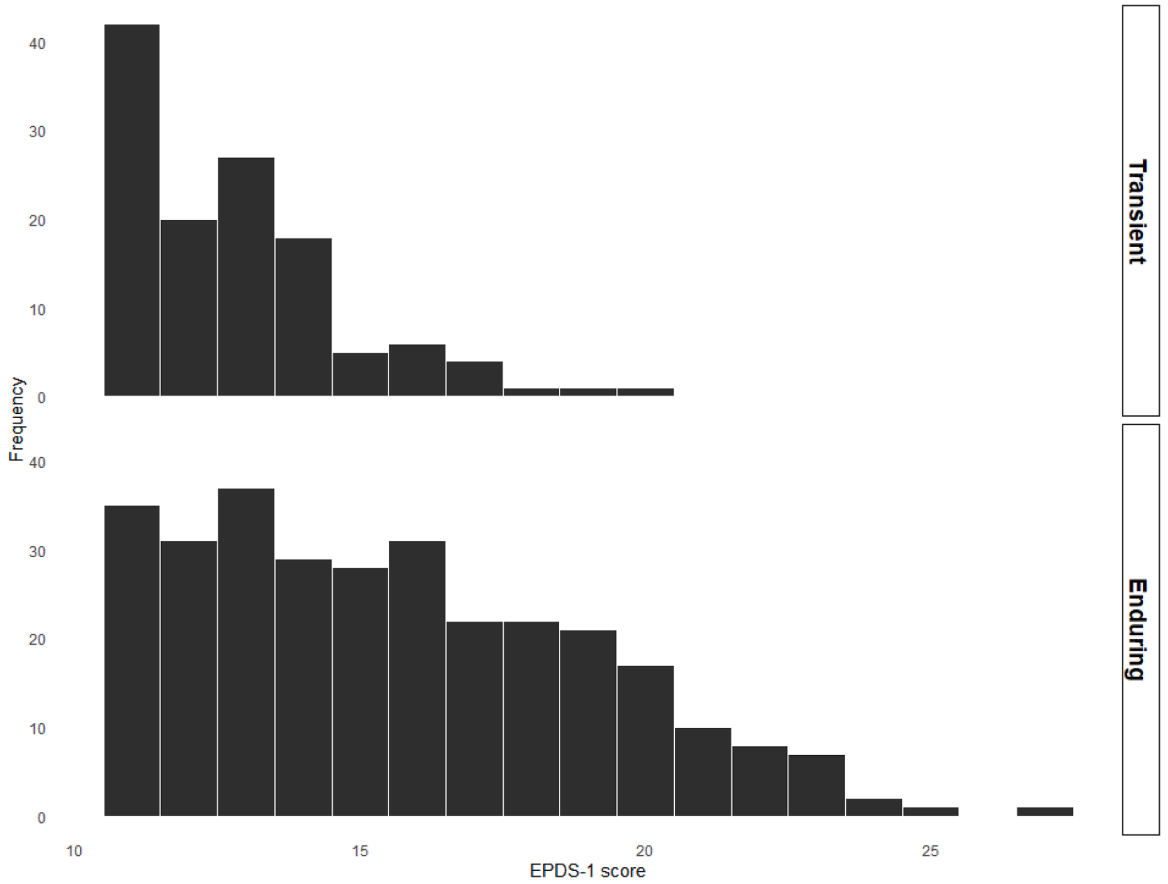

Fig. 1. Distribution of EPDS-1 scores in women with transient and enduring symptoms.

−2.43, $p = .017$; Mean difference = −0.96) and EPDS-2 ($t(76.43) = -3.17$, $p = .006$; Mean difference = −1.87).

3.1. Replication of the transient distress phenomenon in postnatal women (RQ1)

The results showed that 29.3 % ($n = 125$) of the women had transient symptoms. Among the women with transient symptoms, 82.4 % ($n = 103$) had a clinically significant decrease in symptoms, i.e. 3 points or more, between the two screenings. Further, for each additional day between screenings, the odds of being in the enduring group decreased by 3.7 % (OR = 0.963; 95 % CI = 0.931, 0.997, $p = .032$), suggesting that longer intervals between screenings were associated with a slightly decreased likelihood of being classified as enduring. Hence, the remaining analyses were adjusted for the number of days between screenings.

Among the 298 women with enduring symptoms for whom depression diagnostic status was available, 68.8 % ($n = 205$) fulfilled diagnostic criteria for Major Depression, whereas this was the case for 15.6 % ($n = 19$) of the women with transient symptoms. The logistic regression analysis showed that after controlling for days between screenings the odds for fulfilling criteria for depression were 11.7 times ($CI_{95\%} = 6.9, 20.8$, $p < .001$) higher for women with enduring symptoms compared to women with transient symptoms, indicating a strong association between enduring status and clinical depression.

3.2. Predictors of transient/enduring status (RQ2)

The distribution of EPDS-1 total scores in transient and enduring women is displayed in Fig. 1. While a large proportion of women in both groups had an EPDS-1 score between 11 and 14, in the transient group, there is a large drop in the proportion of women with an EPDS-1 score from 14 to 15. Therefore, we explored whether we could use a score of 15 or more as a 'secondary cut-off' to predict whether a woman is more likely to show enduring or transient symptoms after the first screening.

Firstly, we examined possible associations between predictor variables and transient/enduring status using chi-square tests and calculated AR. Contingency tables and absolute risks are displayed in Table 2 for binary variables.

The results showed that transient/enduring status was significantly associated with an EPDS-1 score of 15 or more ($\chi2(1) = 61.27$, $p < .001$). While 14.4 % ($n = 18$) of the women in the transient group scored 15 or more at EPDS-1, this was true for 56.3 % ($n = 170$) of the women in the enduring group. For women who scored 15 or more at EPDS-1, the AR of having enduring symptoms was 90.4 % whereas it was 55.2 % if the woman scored below 15 at EPDS-1.

Furthermore, endorsement of item 10 at EPDS-1 was significantly associated with transient/enduring status ($\chi2(1) = 8.63$, $p = .003$). While 20.2 % ($n = 61$) of the women with enduring symptoms endorsed item 10 at EPDS-1, this was true for 8.0 % ($n = 10$) of the women with transient symptoms. The AR of having enduring symptoms given an endorsement of item 10 at EPDS-1 was 85.9 %, whereas it was 67.7 % among women who did not endorse item 10 at EPDS-1.

History of depression was also significantly associated with transient/enduring status ($\chi2(1) = 12.34$, $p < .001$). We found that 39.3 % ($n = 48$) of the women with transient symptoms had a history of depression, whereas this was true for 58.8 % ($n = 174$) of the women with enduring symptoms. The AR of having enduring symptoms given a history of depression was 78.4 %, whereas it was 62.2 % among women without a previous depression.

Finally, parity ($\chi2(1) = 5.22$, $p = .022$) was significantly associated with transient/enduring status. Among the women with transient symptoms, 81.9 % ($n = 86$) were primiparous, and this was the case for 69.6 % ($n = 190$) of the women with enduring symptoms. For primiparous women, the AR of having enduring symptoms was 68.8 % while it was 81.4 % for multiparous women.

There was no significant correlation between transient/enduring status and maternal age ($r = 0.06$, $p = .23$).

To examine the relative strength and estimate effect sizes for the significant predictors, they were entered into a logistic regression model with days between screenings as control variable. In the logistic regression, the only significant predictor was an EPDS-1 score of 15 or more; the odds of scoring 15 or more at EPDS-1 were 6.28 times higher for women with enduring symptoms compared to women with transient symptoms. Results are displayed in Table 3.

3.3. Implications of a hypothetical two-stage screening practice (RQ3)

In comparing (i) a single screening approach, with two hypothetical approaches (ii) a simple two-stage screening approach, and (iii) a refined two-stage screening approach, for scenario (iii), we used EPDS-1 equals 15 or more, since this was identified as a robust predictor of transient/enduring status and endorsement of item 10 (possible suicidal ideation), due to ethical reasons, as indicators of a

Table 2
2 × 2 contingency tables displaying the association between binary predictor variables and transient/enduring status with row percentages.

		Transient	Enduring
EPDS-1 score of 15 or more ($n = 427$)	Yes	18 (9.6 %)	170 (90.4 %)
	No	107 (44.8 %)	132 (55.2 %)
Endorsement of item 10 at EPDS-1 ($n = 427$)	Yes	10 (14.1 %)	61 (85.9 %)
	No	115 (32.3 %)	241 (67.7 %)
History of depression ($n = 418$)	Yes	48 (21.6 %)	174 (78.4 %)
	No	74 (37.8 %)	122 (62.2 %)
Parity ($n = 378$)	Primi	86 (31.2 %)	190 (68.8 %)
	Multi	19 (18.6 %)	83 (81.4 %)

Table 3
Results from logistic regression analysis examining predictors of transient/enduring status ($n = 372$).

	b	*SE*	*z*	*p*	OR	95 % CI OR
15 or more at EPDS-1	1.84	0.31	5.95	< 0.001	6.28	3.51, 11.84
Endorsement of item 10 at EPDS-1	0.41	0.43	0.95	.342	1.51	0.67, 3.75
Past depression	0.47	0.26	1.85	.065	1.60	0.97, 2.65
Parity	0.50	0.31	1.63	.102	1.66	0.92, 3.09
Days between screenings	−0.03	0.02	−1.53	.126	0.97	0.92, 1.00

Note. Predictor variables were coded as follows: past depression = 1, no past depression = 0; EPDS-1 ≥ 15 = 1, EPDS-1 < 15 = 0; Endorsement of item 10 on EPDS-1 = 1, No endorsement of item 10 on EPDS-1 = 0. EPDS = Edinburgh Postnatal Depression Scale; OR = Odds ratio; CI = confidence interval.

need for direct referral to secondary services after a score above cut-off on EPDS-1.

Compared to the single screening approach, a simple two-stage screening approach would reduce the proportion of referrals by 29.3 percentage points, since none of the women with transient distress would be referred to secondary services in this scenario. At the same time, all women with enduring symptoms would wait for a second screening before referral.

In comparison, a refined two-stage screening approach where EPDS-1 = 15 or more and/or item 10 ≠ 0 are used as criteria for direct referral, would reduce the proportion of referrals by 23.5 percentage points compared to a single screening approach, since 78.4 % of the women with transient distress would not be referred to secondary services. Further, in this scenario, 21.6 % (corresponding to 6 % of the entire sample) of the women with transient distress are referred to secondary services, while the proportion of women with enduring distress that would have to wait for a second screening is reduced by 60 percentage points when compared to scenario ii. Thus, compared with the single screening approach, both two-stage screening approaches (scenarios ii and iii) result in a moderate reduction in the proportion of women with transient distress referred to secondary services; however, the refined two-stage screening approach (scenario iii) results in a very large reduction in the proportion of women with enduring distress that are required to wait for a second screening before referral and a moderate increase in the proportion of women with transient distress referred to secondary clinical services as compared with the simple two-stage screening approach. Finally, in the refined two-stage screening approach, the proportion of women with transient distress who are referred to secondary services is reduced by 78 % when compared to the single screening approach (scenario i). The three screening approaches are depicted in Fig. 2.

4. Discussion

The objective of the present study was to investigate whether a substantial proportion – defined as at least one in four women – who screen positive on the EPDS during routine postnatal screenings exhibit transient distress, thus replicating findings from antenatal samples (Agostini et al., 2019; Matthey and Ross-Hamid, 2012). Additionally, we aimed to identify indicators of transient and enduring distress and apply these to explore the clinical and practical implications of implementing immediate referral (single screening approach) versus delayed referral (two-stage screening approach) for further evaluation and treatment.

Firstly, we found that roughly a third of the women scoring above cut-off on a routine EPDS screening at around two months postpartum did not continue to do so when screened again a few weeks later without intervening treatment, suggesting that they

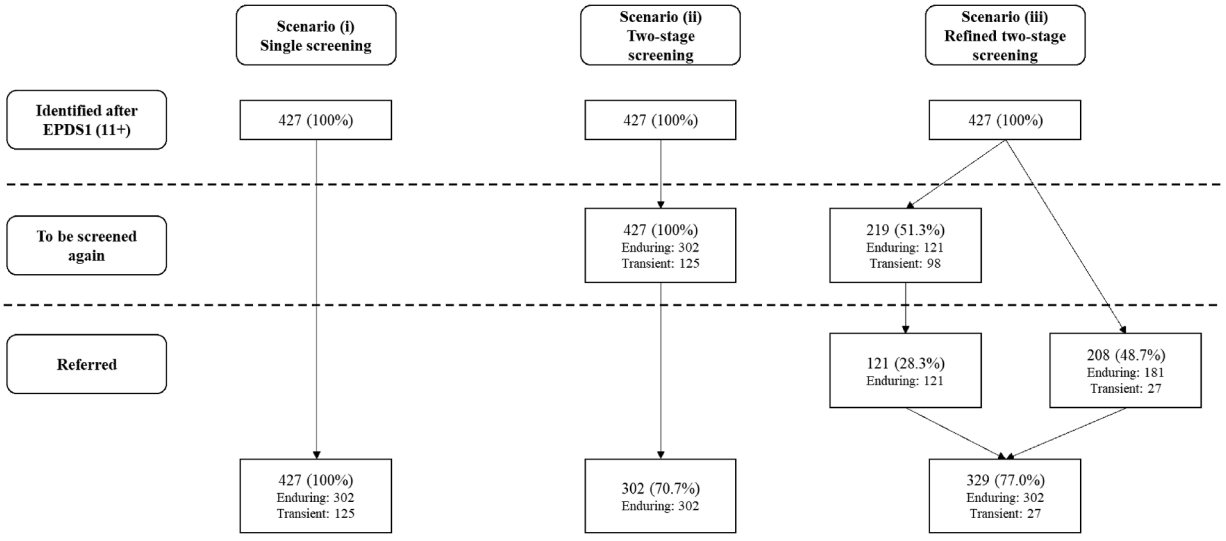

Fig. 2. Flow chart of the three screening approaches reflected by three hypothetical scenarios, *N* (%).
Note. Percentages represent proportions relative to the entire sample ($N = 427$).

experienced transient postnatal distress (RQ1). In line with previous studies (Agostini et al., 2019; Matthey and Ross-Hamid, 2012), we found that the vast majority of women with transient distress experienced a clinically significant drop (3 points or more) in their score from EPDS-1 to EPDS-2, suggesting that, for the majority of women with transient symptoms, reflected genuine changes in mood rather than measurement errors. Further, the odds of fulfilling the criteria for Major Depression was almost 12 times lower for women with transient distress compared with women with enduring distress, corresponding to a strong association between transient/enduring distress distinction and depression status.

Although the proportion (29.3 %) of women with transient distress in our study was lower than the 40 % observed in the third trimester by Agostini et al. (2019), and the 50 % in early pregnancy reported by Matthey and Ross-Hamid (2012), our findings confirm that a substantial number of women scoring above the cut-off during routine EPDS screening indeed experience transient distress in the postnatal period. The differences in rates of transient distress between our study and these previous studies may be attributed to the different timing of screenings (antenatal vs. postnatal) and differences in sampling strategies and sizes. While the previous studies were conducted during pregnancy, our study focused on a postnatal sample. It is possible that mood fluctuations are more prevalent during pregnancy than in the postnatal period. Indeed, some authors suggest that pregnancy is a particularly sensitive time for mood variability (Bowen, et al., 2012) and Markon et al. (2021) found a trend toward rapid mood changes around 20 weeks of gestation in a normative sample of pregnant women. Another possible explanation for the differences in findings is that the relatively larger proportion of women who screened positive at EPDS-1 included in our study provides a more accurate representation of those experiencing distress during the postnatal period. Unlike previous studies that included all women screened during routine assessments (corresponding to EPDS-1 in our study) regardless of their scores, our study exclusively included mothers who scored above the cut-off during the routine screening conducted by the health visitor. Our results are based on a sample of 417 women who all screened positive at a routine screening conducted by their health visitor, compared to 22 out of 84 (Agostini et al., 2019) and 31 out of 212 (Matthey and Ross-Hamid, 2012) women screening positive at EPDS-1. While our study, based on a larger sample, may provide more precise estimates due to increased statistical power, we cannot definitively conclude that the differences in findings are solely attributable to this factor. Future research comparing antenatal and postnatal screening results within the same population and cultural context would be needed to clarify this.

Secondly, following up on previous research (Matthey 2016), we explored how information available during the initial EPDS screening (EPDS-1) can distinguish between transient and enduring distress (RQ2). Five potential predictors were examined: total EPDS-1 score, response to item 10 (potential suicidal ideation), maternal age, parity, and history of depression. We prioritized variables that can be quickly and easily assessed, aiming to provide healthcare professionals with practical tools for making effective referral decisions in busy clinical settings. The EPDS-1 score of 15 or more emerged as a particularly robust predictor, with an absolute risk of 90.4 % for enduring symptoms, and demonstrating a moderate to strong association with enduring distress (OR 95 % CI: 3.51, 11.84), even when taking into account the number of days between EPDS-1 and EPDS-2 as well as a history of depression, endorsement of item 10, and parity. In contrast, item 10, history of depression, and parity were only significantly associated with transient/enduring status when examined individually. While these findings align with previous studies (Iwata et al., 2016; Matthey, 2016; Morse et al., 2022; Silverman et al., 2017), they were no longer significant predictors when entered into the logistic regression model. Finally, in contrast to what might be expected from previous studies on postpartum depression risk factors (e.g., Iwata et al., 2016; Silverman et al., 2017), maternal age was not significantly associated with enduring symptoms in our sample. One possible explanation for this is the relatively mature and well-resourced nature of the sample. With a mean maternal age of 32 years and 71 % of the mothers holding at least a Bachelor's degree, the women in our study may have had more socioeconomic stability and access to resources such as education and healthcare. These factors could mitigate some of the risks typically associated with maternal age. Additionally, 81 % of the participants were in stable relationships, which may provide additional emotional and practical support, potentially buffering against the development of enduring symptoms regardless of maternal age.

Thirdly, aiming at informing screening programs, we investigated the clinical implications of implementing either (i) a traditional single-screening approach commonly used in Denmark and other countries, (ii) a simple two-stage screening approach, or (iii) a refined two-stage screening approach (Fig. 2). Given its robust predictive power, an EPDS-1 score of 15 or more was utilized as a criterion for immediate referral in the refined two-stage screening approach, along with the endorsement of item 10, chosen a priori for ethical considerations, despite its weak association with transient/enduring status. As a history of depression approached significance in the logistic regression model and was associated with an elevated absolute risk of enduring symptoms (78.4 % among women with a history of depression vs. 62.2 % among those without), it could be argued to include this as a criterion for immediate referral. However, its practical use as a referral criterion is problematic. Almost 40 % of women with transient distress also reported a history of depression, suggesting that using this criterion could lead to an unnecessary increase in referrals and potentially cause undue concern for women experiencing typical postnatal mood fluctuations. Furthermore, emphasizing a history of depression may shift focus away from the current clinical presentation. For these reasons, we opted not to include a history of depression as a criterion for immediate referral.

The simple two-stage screening approach could moderately reduce referrals to secondary clinical services by about one-third, because it prevents referrals of women with transient distress. However, it also implies that all women, including those experiencing enduring distress - constituting the majority of those screening positive at EPDS-1- undergo a second screening before being referred. Considering the potentially severe negative impact of delayed treatment for postnatal depression on mothers and their families, this delay introduces significant ethical and clinical concerns, suggesting that this approach may not be optimal. Conversely, the refined two-stage approach ensures that 60 % of women with enduring distress are directly referred to secondary services, which is a substantial reduction of those who would have to wait for a second screening. Crucially, none of the remaining 40 % who would wait for a second screening had endorsed item 10 at EPDS-1, indicating no immediate suicidal risk. Additionally, this approach leads to a

substantial decrease in referrals of women with transient distress, with around 80 % not being referred unnecessarily, which aligns with reductions seen in the simple two-stage scenario.

In summary, implementing a refined two-stage screening approach could significantly optimize the management of postnatal depression by ensuring timely care for those with enduring symptoms and reducing unnecessary referrals for those with transient distress. This method not only leverages robust predictive indicators to make immediate referrals but also incorporates the potential to refine screening processes further through additional clinical judgments, such as asking probing questions about expected mood improvement. Such questions, as suggested by Matthey (2016), highlight the critical role of nuanced understanding and comprehensive training among healthcare providers, ensuring a balanced approach that minimizes the risks of over-pathologizing while addressing the critical needs of those with significant symptoms.

In many countries, barriers such as societal expectations of maternal strength, immigration status, financial constraints, and systemic discrimination significantly hinder access to mental health services (Webb et al., 2021), making treatment uptake a substantial challenge. Although these barriers may be less pronounced in Denmark due to its universal healthcare system and extensive social support structures, it remains critical to balance adequate treatment provision with resource allocation. Our focus on distinguishing between transient and enduring depressive symptoms aligns with the goal of avoiding unnecessary referrals, which could overburden the healthcare system. This approach must be considered in light of global variations in access to care, where the challenges in treatment uptake can vastly differ based on social and healthcare system contexts.

4.1. Limitations

A limitation of this study is that our sample predominantly consisted of well-educated mothers from urban Copenhagen living with a partner. This demographic homogeneity restricts the broader applicability of our findings to more diverse populations, potentially skewing results toward specific socioeconomic and cultural experiences that do not represent the general population. This limitation underscores the need for further research involving varied demographic groups to enhance the universality and relevance of the screening guidelines.

Since the EPDS assesses symptoms over the past seven days, the 1–4 week interval between EPDS-1 and EPDS-2 used in the current study may overlook emotional fluctuations occurring within this period. This implies that some participants categorized as having enduring depression might have experienced a temporary decrease in symptoms followed by an increase, indicating a relapse rather than consistently high symptoms. The lack of data between EPDS-1 and EPDS-2 prevents us from exploring these potential fluctuations, which is a limitation of the current study.

Another limitation is the proportion of missing data (13.4 %) in some predictor variables, particularly parity. Participants with missing data scored slightly higher on EPDS-1 and EPDS-2, which may indicate a small bias in the findings. This is primarily a concern in analyses for RQ2, where we explore predictor variables other than EPDS-1 score and endorsement of Item 10. In contrast, the proportion of missing data for RQ1 and RQ3 is maximally 3.5 %, which is unlikely to significantly affect our conclusions. Nonetheless, this should be considered when interpreting the results.

5. Conclusions

This study reaffirms that a substantial proportion of postnatal women who initially screen positive on the EPDS may experience transient distress, mirroring findings from antenatal samples. Further, our findings advocate for a refined two-stage screening, which not only promises to reduce the strain on secondary clinical services but also mitigates the psychological impact of potentially over-pathologizing normal postnatal mood fluctuations. However, the successful implementation of this strategy depends on its feasibility and acceptability, requiring input from both mothers and healthcare providers. Importantly, the approach must remain sensitive to the urgency of care for women with enduring symptoms to prevent long-term negative consequences. Future research should aim to refine and test this screening approach across more diverse populations, ensuring it is effective and adaptable. Further investigation into additional predictive indicators of transient/enduring distress could also help improve the accuracy of ante- and postnatal depression screening, enhancing its overall clinical utility.

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Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this work the authors used ChatGPT in order to proofread the manuscript. After using this tool, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

Data Availability: Data are available from the Data Management and Information Security department at the Department of Psychology, University of Copenhagen (contact via legal@samf. ku.dk) for researchers who meet the criteria for access to confidential data. Data cannot be shared publicly because the dataset involves subjects who did not explicitly consent to the publication of their pseudonymized data with is required to comply with the Danish Data Protection Act.

CRediT authorship contribution statement

Johanne Smith-Nielsen: Writing – review & editing, Writing – original draft, Validation, Supervision, Project administration, Methodology, Investigation, Data curation, Conceptualization. **Ida Egmose:** Writing – review & editing, Writing – original draft, Validation, Methodology, Investigation, Formal analysis, Conceptualization. **Stephen Matthey:** Writing – review & editing, Validation, Supervision, Methodology, Investigation, Conceptualization. **Maria Stougård:** Writing – review & editing, Resources, Project administration, Investigation, Data curation. **Sophie Reijman:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Conceptualization. **Mette Skovgaard Væver:** Writing – review & editing, Supervision, Methodology, Investigation, Funding acquisition, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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