



BRAIN. Broad Research in Artificial Intelligence and Neuroscience

e-ISSN: 2067-3957 | p-ISSN: 2068-0473

Covered in: Web of Science (ESCI); EBSCO; JERIH PLUS (hkdir.no); IndexCopernicus; Google Scholar; SHERPA/RoMEO; ArticleReach Direct; WorldCat; CrossRef; Peeref; Bridge of Knowledge (mostwiedzy.pl); abcdindex.com; Editage; Ingenta Connect Publication; OALib; scite.ai; Scholar9; Scientific and Technical Information Portal; FID Move; ADVANCED SCIENCES INDEX (European Science

Evaluation Centre, neredataltics.org); ivySCI; exaly.com; Journal Selector Tool (letpub.com); Citefactor.org; fatcat!; ZDB catalogue; Catalogue SUDOC (abes.fr); OpenAlex; Wikidata; The ISSN Portal; Socolar; KVK-Volltitel (kit.edu)

2025, Volume 16, Issue 4, pages: 568-582

Submitted: August 14th, 2025 | Accepted for publication: October 23rd, 2025

Antepartum Depression Scale Construction Validation and Standardisation

Gheorghe Mihail Banariu*

Transilvania University of Braşov, Faculty of Medicine; Management and Strategies of Palliative Care (student); Faculty of Medicine, Ovidius University from Constanta, 900470 Constanta, Romania; 3 Romanian Forensic Scientist Association, Romania.
banariu.gheorghe@gmail.com,
<https://orcid.org/0000-0001-6841-3205>

George Neagoe

Hyperion University, Calea Călăraşi 169, 030615 Bucharest, Romania,
neagoe_george8@yahoo.com,
<https://orcid.org/0009-0001-4368-8744>

Mihaela Rus

Faculty of Law and Administrative Sciences, Ovidius University from Constanta, 900470 Constanta, Romania; The Institute of Philosophy and Psychology Constantin Radulescu Motru, Romanian Academy, Bucharest Romania.
psiholog_m@yahoo.com,
<https://orcid.org/0009-0002-4741-2742>

Cristian Delcea*

Department of Forensic Medicine, Iuliu Hatieganu University of Medicine and Pharmacy, 400012 Cluj-Napoca, Romania.
cristian.delcea.cj@gmail.com,
<https://orcid.org/0000-0003-0667-2898>

Adriana Campeanu

Faculty of Medicine, Ovidius University from Constanta, 900470 Constanta, Romania; General Directorate of Social Assistance and Child Protection, Constanta, Romania.
adrianacampeanu2003@yahoo.com

Silvia (Izvoranu) Onuc

Obstetrics & Gynaecology Department, Faculty of Medicine, Ovidius University from Constanta, 900470 Constanta, Romania; Sf. Apostle Andrei University Emergency County Hospital Constanta, 900591 Constanta, Romania. silviaizvoranu@yahoo.com,
<https://orcid.org/0009-0006-6372-3734>

Vlad Tica

Obstetrics and Gynecology Department, Faculty of Medicine, Ovidius University from Constanta, 900470 Constanta, Romania; Sf. Apostle Andrei University Emergency County Hospital Constanta, 900591 Constanta, Romania; Romanian Academy of Scientists, 50044 Bucharest, Romania. vtica@eeirh.org, <https://orcid.org/0000-0001-9000-4731>

* Corresponding Authors

Abstract: The Antepartum Depression Scale (ADS) is an innovative tool designed to comprehensively assess the psychological states of pregnant women, specifically targeting depression, melancholy, anxiety, and self-dysthymia. Unlike the existing scales, ADS integrates a multidimensional approach tailored to the unique psychological profile of pregnancy. Additionally, its adaptability to telemedicine ensures accessibility to psychological assessments via digital platforms, addressing the growing need for remote mental health care. Despite the critical importance of maternal mental health, there remains a gap in standardised pregnancy-specific depression assessments that are both clinically robust and telemedicine-compatible. The ADS was rigorously developed and validated to ensure its accuracy and reliability, making it a critical tool for the early detection and management of antepartum depression, even in resource-limited settings. **Methods:** A total of 850 pregnant women participated in the ADS validation study, with 650 completing a test-retest reliability analysis over a 14-day interval. The diverse Romanian sample ensured the demographic variability. Additionally, 200 participants completed the ADS along with Beck's Depression Inventory, Hamilton Anxiety Rating Scale, and Rosenberg's Self-Esteem Scale to assess construct validity. Psychometric properties were evaluated using internal consistency, test-retest reliability, and factor analysis. **Results:** The ADS demonstrated excellent internal consistency (Cronbach's $\alpha=0.897$), strong validity (The Kaiser-Meyer-Olkin=0.876), and robust correlations with the established scales. Notably, the mean depression scores increased significantly between tests, underscoring the scale's sensitivity to psychological changes during pregnancy. **Conclusions:** The ADS is a validated multidimensional tool that fills a critical gap in maternal mental health assessment by offering a pregnancy-specific, psychometrically sound instrument. Its applicability in both clinical and telemedicine settings supports early intervention, ultimately enhancing maternal mental health care and improving outcomes for pregnant women.

Keywords: antepartum depression scale (ADS); depression in pregnancy; validation and reliability; psychological assessment; early detection; maternal mental health; self-assessment tool; telemedicine adaptation.

How to cite: Banariu, G. M., Neagoe, G., Rus, M., Delcea, C., Campeanu, A., Onuc, S., & Tica, V. (2025). Antepartum depression scale construction validation and standardisation. *BRAIN. Broad Research in Artificial Intelligence and Neuroscience*, 16(4), 568-582. <https://doi.org/10.70594/brain/16.4/35>

1. Introduction

Depression during pregnancy, also referred to as antepartum or antenatal depression, is a major public health concern with long-term consequences for both mothers and children. It is typically characterised by persistent sadness, anxiety, fatigue, low self-esteem, and disturbances in sleep or appetite. Theoretical models, including the biopsychosocial and transactional frameworks (Lazarus & Folkman, 1984), highlight how hormonal fluctuations, perceived stress, and environmental strain may exceed a woman's coping capacity during pregnancy. The vulnerability–stress model (Zubin & Spring, 1977; Ingram & Luxton, 2005) further emphasises that biological or psychological predispositions, such as a family or personal history of mood disorders, interact with the demands of pregnancy to precipitate depressive symptoms. Beck's cognitive theory (1967) identifies maladaptive schemas—such as negative self-perceptions, catastrophising about motherhood and feelings of inadequacy—as factors that exacerbate stress and trigger depressive affect. Interpersonal (Weissman & Klerman, 1977) and attachment-based theories (Bowlby, 1969; Condon, 1993) underscore the role of relational contexts, where social isolation, marital dissatisfaction, or inadequate support heighten vulnerability, while maternal distress can disrupt prenatal bonding with implications for infant socioemotional outcomes (Miller et al., 2019; World Health Organization, 2022).

Existing diagnostic tools, such as the Beck Depression Inventory (BDI) and Hamilton Anxiety Rating Scale (HAM-A), were designed for general psychiatric populations and do not capture the specific psychological dynamics of pregnancy (Drapeau, Marchand, & Beaulieu-Prévost, 2012; Andrews & Slade, 2001). The Edinburgh Postnatal Depression Scale (EPDS), though widely used, was developed for postpartum contexts, insufficiently representing the spectrum of antepartum experiences, such as melancholy, self-esteem, and the interplay of anxiety with depressive symptoms (Richards, 2012). Moreover, evidence shows that the EPDS often reflects a multidimensional factor structure in which an anxiety subscale consistently emerges (Cuijpers et al., 2016; Smith-Nielsen et al., 2021), raising interpretive concerns if anxiety is not concurrently assessed.

To address these limitations, the Antepartum Depression Scale (ADS) was developed as a multidimensional, pregnancy-specific assessment tool. Grounded in integrated theoretical frameworks and informed by clinical expertise and patient feedback (Gulliver, Griffiths, & Christensen, 2010; Corrigan, 2004; Corrigan, Kerr, & Knudsen, 2005; Schnyder et al., 2017; Thornicroft et al., 2007; Andrade et al., 2014), the ADS evaluates depression, melancholy, anxiety, and self-esteem across 45 Likert-type items. The scale incorporates both positively and negatively worded items, with subscales allowing for nuanced assessment of melancholic features. Validation procedures confirmed high internal consistency, construct validity, and test–retest reliability.

Designed for both clinical and telemedicine contexts, the ADS enhances accessibility across diverse populations, including resource-limited settings (NHS Digital, 2023; APS Tests and Testing Expert Group, 2020; Mental Health Commission of Canada, 2020; Ministry of Health of Romania, 2023; World Health Organization, 2021; European Commission, 2022). By enabling early detection and supporting tailored interventions, the ADS contributes to improved maternal and neonatal health outcomes and represents a novel advancement in perinatal mental health assessment.

2. Materials and Methods

2.1. Participants

This study included 650 pregnant women who were evaluated twice at two-week intervals ($\pm$ one day). We collected data based on gestational week, trimester, and whether the participants lived in a rural or urban environment. All participants were recruited from Romania across two distinct phases to ensure a comprehensive demographic and temporal representation. The primary sample ($n = 650$) was collected over 18 months (June 2020 – December 2021), a period marked by heightened preventive measures and mobility restrictions due to the COVID-19 pandemic. This allowed the assessment of antepartum mental health under unique stress conditions. A secondary

sample ($n = 200$) was recruited between January 2022 and December 2023, after the relaxation of pandemic-related restrictions. This cohort was used specifically for the construct validity analysis, as participants completed the Antepartum Depression Scale (ADS) in conjunction with the Beck Depression Inventory, Hamilton Anxiety Rating Scale, and Rosenberg Self-Esteem Scale (Beck, Steer, & Brown, 1996; Hamilton, 1959; Rosenberg, 1965).

By spanning both the pandemic and post-pandemic periods, this study captured a broader spectrum of psychosocial dynamics affecting pregnant women. This study aimed to understand the unique challenges faced by pregnant women during this period and the impact of external factors, such as the pandemic, on their mental and physical health.

2.2. Data Analysis

Statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS) version 26. Categorical variables, including demographic characteristics and levels of depression, anxiety, and self-esteem, were described using frequencies (n) and valid percentages (%).

2.3. Procedure

This study employed paper-based questionnaires administered at family medicine clinics and ambulatory outpatient services. The Antepartum Depression Scale (ADS), comprising 45 items, was used to gather data from the participants. The participants underwent a second round of testing 14 days later ($\pm$ one day) during the subsequent consultations. Monitoring and treatment primarily occurred in small centres and family doctor offices due to hospital overcrowding. To assess correspondence with other validated tools, 200 pregnant women participated and completed the Antepartum Depression Scale (ADS), Beck's Depression Inventory, Hamilton Anxiety Rating Scale, and Rosenberg's Self-Esteem Scale in one sitting.

2.4. Materials and Instruments

The Antepartum Depression Scale (ADS) has emerged as a pivotal instrument within the field of maternal mental health, specifically designed to assess the emotional states of pregnant women, and has been linked to adverse fetal outcomes (Paulson & Bazemore, 2010), as previously demonstrated in the literature. The multidimensional approach encompasses key psychological constructs, including depression, anxiety, dysthymia, and melancholy. In the context of continuously declining birth rates in Romania (National Institute of Statistics, 2023; OECD, 2022) which remain below the European average, this scale has significant relevance (Eurostat, 2023a; Eurostat, 2023b; Eurostat 2023c). This study addressed the urgent need for precise tools that facilitate the identification and intervention of mental health issues during the antepartum period (Witt et al., 2011; Leis et al., 2013; Witt et al., 2010; Larsson, Sydsjö, & Josefsson, 2004; Fairbrother et al., 2016; Goodman, 2004; O'Hara & Swain, 1996; Stein et al., 2014). The development and validation of the ADS involved a rigorous methodological framework. To ensure the reliability and validity of the instrument, a series of robust validation methods was employed, each contributing uniquely to the scale's overall integrity (NHS Digital, 2023; (APS Tests and Testing Expert Group, 2020; Mental Health Commission of Canada, 2019; Ministerul Sănătății din România, 2023; World Health Organization, 2021; European Commission, 2022; National Institute of Statistics, 2023).

One of the cornerstone methods utilised was the Internal Consistency, evaluated using Cronbach's alpha coefficient (Norhayati et al., 2015; Parfitt & Ayers, 2014; Dennis & Hodnett, 2007; Robertson et al., 2004; Matthey et al., 2000; Dørheim et al., 2009). This statistical measure assessed the degree to which individual items within the scale correlated with the overarching construct of antepartum depression. A high Cronbach's alpha indicates that the items are homogeneous, effectively measuring the psychological construct of interest (Norhayati et al., 2015; Parfitt & Ayers, 2014; Matthey et al., 2000)

This step was crucial in affirming that the scale reliably captured the nuances of antepartum depression among pregnant women. In conjunction with internal consistency analysis (Goodman, 2004; O'Hara & Swain, 1996; Stein et al., 2014; Norhayati et al., 2015; Parfitt & Ayers, 2014; Dennis & Hodnett, 2007; Robertson et al., 2004; Matthey et al., 2000; Dørheim et al., 2009; Stewart & Vigod, 2016; Leach et al., 2016; Letourneau et al., 2012; Slomian et al., 2019) a correlation matrix was employed to explore the relationships between the scale items (Edward et al., 2015).

This method ensures coherence and construct validity by detecting items with either insufficient or excessive correlations. Such an analysis is crucial in refining the scale, as it allows researchers to discern which items may contribute redundantly or fail to align with the broader construct being measured. The assessment of est–retest reliability is another essential step in validating the ADS. By administering the scale to the same group of pregnant women at two different time points, researchers can evaluate the stability of the measurements over time. This method confirmed the temporal consistency of the instrument, underscoring its potential as a reliable tool for assessing antepartum depression in clinical settings. Furthermore, expert validation plays a critical role in the scale's development. Involving a clinical psychology expert to review both the items and the overall structure ensured that the instrument accurately measured the intended constructs. This engagement is vital for confirming that the scale effectively captures the complex interplay of emotional states that characterise antepartum experiences. Additionally, both content and criterion validity are integral to the standardisation process (Leach et al., 2016; Letourneau et al., 2012; Paulson & Bazemore, 2010).

Content validation involved a comprehensive analysis of existing depression tests, ensuring that the ADS adequately reflected relevant psychological constructs. Criterion validation, in contrast, compared ADS results with benchmark scores from established instruments, thereby reinforcing the scale's ability to accurately assess depression and related psychological dimensions. Parallel-forms reliability further strengthens the scale's overall reliability (Paulson & Bazemore, 2010; Rominov et al., 2016; Bradley & Slade, 2011; Buist et al., 2007). By randomising and analysing items, researchers ensured that no systematic variations existed between the different forms of scale. This rigorous approach reduces bias and the potential for misinterpretation of symptoms, enhancing the scale's applicability in diverse clinical contexts. Finally, the pilot testing and continuous revision phase (Leach et al., 2016; Thombs et al., 2014; Lamela et al., 2020; Aridi et al., 2023; Kumari et al., 2021) was crucial in refining the ADS prior to large-scale implementation. Preliminary data were collected through pilot testing, which allowed researchers to identify and address issues with the scale items. Feedback from this phase led to ongoing adaptation, ensuring that the instrument remained relevant and accurately reflected the emotional complexities of pregnancy. Item correlations were notably strong both within and across the various scales, reflecting robust reliability and construct validity. In conclusion, the Antepartum Depression Scale (ADS) stands as a validated and reliable psychological tool developed using a multifaceted approach. Its design and validation processes underscore its utility in assessing the emotional well-being of pregnant women, thereby contributing to informed clinical decision making. As the field of perinatal mental health continues to evolve, ADS provides a vital resource for enhancing maternal mental health support and fostering positive outcomes for both mothers and their infants.

3. Results

The initial reliability analysis revealed a Cronbach's alpha coefficient of 0.897, based on 45 items. This value exceeds the minimum acceptable threshold of 0.700, indicating that the scale demonstrates good internal consistency, as values above 0.800 are considered good, and values above 0.900 are deemed excellent.

A subsequent analysis of the retest data yielded a Cronbach's alpha coefficient of 0.858, reinforcing the finding of high internal consistency. Both the initial and retest results suggested that the reliability of the scale was good, as both values exceeded the 0.800 benchmark.

Table 1. Combined Reliability, Factor Analysis, and Inter-Item Correlation

Construct	Test (Cronbach's Alpha)	Retest (Cronbach's Alpha)	KMO	Validity Significance	Bartlett's Test (Chi ² , p)	Correlation (Test-Retest)
Depression	0.897	0.858	0.876	p=0.01	11131.77	0.886
Melancholy	0.876	0.851	0.810	p=0.01		0.876
Anxiety	0.851	0.830	0.810	p=0.01		0.851
Self-Esteem	0.896	0.870	0.810	p=0.01		0.896

3.1. Reliability Analysis

To complement the internal consistency analysis and to further illustrate the distribution of participants' responses, descriptive statistics were computed for the main psychological constructs assessed. These indicators provide information on central tendency, variability, and frequency distributions, offering a clearer understanding of the levels of depression, anxiety, and self-esteem within the sample. The results are summarized in Table 2, which presents the means, standard deviations, and percentage distributions across the respective categories.

Table 2. Depression, Anxiety, and Self-Esteem Score Distribution

N	200					
Missing	0					
Mean	30.53	Low Self-esteem	34	17.0	17.0	17.0
Std. Deviation	6.003	Moderate Self-esteem	162	81.0	81.0	98.0
Minimum	22	High Self-esteem	4	2.0	2.0	100.0
Maximum	45	Total	200	100.0	100.0	

3.2. Factor Analysis

The KMO (Kaiser-Meyer-Olkin) Measure of Sampling Adequacy was calculated to be 0.876, while Bartlett's Test of Sphericity yielded a chi-square value of 11131.766 (df = 990, Sig. = 0.000). These results indicate that the factor structure of the scale is robust, as a KMO value above 0.800 is considered good, and the significant p-value suggests that the items correlate sufficiently well to conduct a factor analysis. Similarly, the retest KMO value was 0.810, with Bartlett's test showing a significant chi-squared value of 8951.246 (df = 990, Sig. = 0.000). These outcomes further validated the internal consistency of the items in both the initial test and retest, suggesting that the scale had good validity and no multicollinearity issues.

Paired sample correlation analysis demonstrated strong correlations between the test and retest scores for various psychological constructs. For example, the correlations were 0.886 for depression, 0.876 for melancholy, 0.851 for anxiety, and 0.896 for self-esteem, all statistically significant ($p < 0.001$).

None of the correlation values exceeded 0.900, thus mitigating the risk of the items being perceived as identical.

3.3. Inferential Statistics

Table 3. Differences and Correlations Between Test and Retest

Construct	Mean Difference	Significance (p)	Correlation with Standard Scales (e.g., BDI)	Mean Test	Mean Re-Test
Depression	-7.668	<0.001	0.865	45.18	52.85
Melancholy	-4.642	<0.001	0.840	23.19	27.83
Anxiety	0.431	0.002	0.825	28.47	28.04
Self-Esteem	2.515	<0.001	0.850	24.70	22.18

The following analysis presents a detailed examination of the Antepartum Depression Scale (ADS) using various statistical techniques, including reliability assessments, factor analyses, paired sample comparisons, and item correlations within and across the various scales. This comprehensive approach provides insights into the scale's performance and capacity to effectively measure antepartum depression.

The means of the psychological constructs were compared between the test and retest conditions. The mean score for depression increased from 45.18 at baseline to 52.85 at retest. Similarly, melancholy increased from 23.19 to 27.83, and anxiety slightly decreased from 28.04 to 28.47. Notably, self-esteem declined from 24.70 to 22.18, indicating a significant difference in the construct across the two assessments.

Paired sample tests confirmed that the differences between the test and retest for depression (-7.668, $p < 0.001$), melancholy (-4.642, $p < 0.001$), and self-esteem (2.515, $p < 0.001$) were statistically significant. In contrast, anxiety showed a slightly positive change 0.431 ($p = 0.002$). These results suggest meaningful fluctuations in psychological states measured, emphasising the utility of ADS in monitoring emotional well-being over time.

Table 4. Kappa Coefficients for Agreement Between Test and Retest

Construct	Kappa Value	Significance (p)
Depression	0.865	<0.001
Anxiety	-0.305	<0.001
Self-Esteem	0.378	<0.001

All kappa coefficients were statistically significant ($p < 0.001$). For depression, $\kappa = 0.865$ indicated almost perfect agreement. For self-esteem, $\kappa = 0.378$ suggested fair agreement. By contrast, anxiety yielded a negative kappa value ($\kappa = -0.305$), indicating poor agreement and potential instability in this construct across the two assessments.

The kappa statistic indicated a significant agreement between the evaluators, suggesting a high degree of correspondence among the items within the assessment tools. Additionally, item correlations were notably strong, both within and across the various scales, reflecting the excellent fidelity of the tests.

Strong correlations with established instruments in the field, such as the Beck Depression Inventory (BDI) for depression, Hamilton Anxiety Rating Scale (HAM-A) for anxiety, and Rosenberg's Self-Esteem Scale for self-esteem, further underscore the robust theoretical foundation of these assessments and affirm their validity across different domains of mental health.

3.4. Descriptive Statistics (N=650)

Table 5. Descriptive Statistics (Grouped by Constructs)

Depression (Test and Retest)				
Severity Level	Test (%)	Number of Participants	Retest (%)	Number of Participants
Sub-optimal	3.38	22	0.62	4
Normal	75.54	491	51.69	336
Mild Depression	7.08	46	21.23	138
Moderate Depression	6.62	43	14.00	91
Severe Depression	7.38	48	12.46	81
Melancholy (Test and Retest)				
Severity Level	Test (%)	Number of Participants	Retest (%)	Number of Participants
Normal	13.54	88	1.69	11
Pseudo-Melancholy	30.46	198	10.62	69
Mild Melancholy	30.00	195	26.62	173
Moderate Melancholy	19.85	129	50.15	326
Severe Melancholy	6.15	40	10.92	71

Anxiety (Test and Retest)				
Severity Level	Test (%)	Number of Participants	Retest (%)	Number of Participants
No Anxiety	0.31	88	1.23	11
Mild Anxiety	21.54	198	28.92	69
Moderate Anxiety	53.54	195	48.31	173
High Anxiety	24.00	129	20.62	326
Severe Anxiety	0.62	40	0.92	71
Self-Esteem (Test and Retest)				
Severity Level	Test (%)	Number of Participants	Retest (%)	Number of Participants
Low Self-Esteem	30.77	88	72.31	11
Moderate Self-Esteem	67.38	198	26.46	69
High Self-Esteem	1.85	195	1.23	173

In the initial testing phase, the minimum depression score was 25 (subclinical level), while the maximum was 81 (severe depression), yielding a mean score of 45.18 (normal level). The distribution showed a positive skew, reflecting a concentration of participants with lower scores.

The distribution of depression levels revealed that 22 individuals (3.38%) fell into the suboptimal range, 491 (75.54%) exhibited normal levels, 46 (7.08%) experienced mild depression, 43 (6.62%) reported moderate depression, and 48 (7.38%) had severe depression.

During the retest, the minimum and maximum scores for depression were 28 and 88, respectively, with an average score of 52.85, indicating mild depression. The left skew of the curve also reflects a central tendency towards lower scores.

The retest results showed that four participants (0.62%) had suboptimal depression levels, while 336 (51.69%) were classified as normal, 138 (21.23%) were mildly depressed, 91 (14%) were moderately depressed, and 81 (12.46%) were severely depressed.

The minimum score for melancholy during the test was 11 (normal), with a maximum of 43 (severe melancholy), leading to a mean of 23.19 (mild melancholy). Again, the distribution was positively skewed, with most participants scoring at the lower end of the scale.

In terms of melancholy levels, the test results indicated that 88 participants (13.54%) had a normal level, 198 (30.46%) exhibited pseudo-melancholy, 195 (30%) reported mild melancholy, 129 (19.85%) had moderate melancholy, and 40 (6.15%) experienced severe melancholy.

In the retest phase, the melancholy scores ranged from a minimum of 14 to a maximum of 47, with a mean of 27.83 (moderate melancholy), maintaining a leftward skew.

The retest findings indicated that 11 individuals (1.69%) had normal levels of melancholy, 69 (10.62%) displayed pseudo-melancholy, 173 (26.62%) had mild melancholy, 326 (50.15%) reported moderate melancholy, and 71 (10.92%) had severe melancholy.

The anxiety scores during the test ranged from 18 (no anxiety) to 56 (severe anxiety), with a mean of 28.47 (moderate anxiety) and a positively skewed distribution.

The test results indicated that two participants (0.31%) reported no anxiety, 140 (21.54%) exhibited mild anxiety, 348 (53.54%) had medium anxiety, 156 (24%) experienced high anxiety, and four (0.62%) had severe anxiety.

In the retest, anxiety scores ranged from a minimum of 17 (no anxiety) to a maximum of 57 (severe anxiety), with an average of 28.04 (medium anxiety), showing a similar leftward skew.

During the retest, eight participants (1.23%) reported no anxiety, 188 (28.92%) exhibited mild anxiety, 314 (48.31%) had medium anxiety, 134 (20.62%) experienced high anxiety, and six (0.92%) reported severe anxiety.

Self-esteem scores ranged from a minimum of 13 (low self-esteem) to a maximum of 50 (high self-esteem), with a mean of 24.70 (moderate self-esteem), indicating a positively skewed distribution.

In terms of self-esteem, 200 participants (30.77%) reported low self-esteem, 438 (67.38%) medium self-esteem, and 12 (1.85%) high self-esteem.

During the retest, self-esteem scores ranged from 12 (low self-esteem) to 44 (high self-esteem), with a mean of 22.18 (medium self-esteem), again exhibiting a leftward skew.

The retest indicated that 470 participants (72.31%) reported low self-esteem, 172 (26.46%) exhibited medium self-esteem, and 8 (1.23%) had high self-esteem.

The overall mean depression score of the 200 participants indicated a severe level of depression across the sample. Among the participants, one (0.5%) showed no signs of depression, four (2%) had normal levels, six (3%) exhibited mild depression, 75 (37.5%) had moderate depression, and 114 (57%) had severe depression.

Given that the mean anxiety score of 29.15 exceeded a threshold of 17, the overall level recorded across the cohort can be classified as moderate to high. The frequency distribution by anxiety level was as follows: one person (0.5%) had a normal level, 24 (12%) had mild anxiety, 102 (51%) had moderate anxiety, and 73 (36.5%) had high anxiety.

The mean self-esteem score was 30.53, indicating a moderate level of self-esteem across the cohort. In terms of self-esteem levels, the 200 participants showed the following distribution: 34 individuals (17%) had low self-esteem, 162 (81%) had moderate self-esteem, and four (2%) had high self-esteem.

3.5. Statistical Conclusions

Analysis of the Antepartum Depression Scale (ADS) underscores its reliability and validity as a robust tool for measuring various psychological constructs related to antepartum experiences. With high Cronbach's alpha values and significant findings from factor analyses, the scale demonstrated strong internal consistency and valid measurement capabilities. Paired sample comparisons further highlighted significant changes in psychological states, providing crucial insights for practitioners working in the field of maternal mental health. This comprehensive evaluation affirms the importance of employing ADS for effective screening and intervention strategies for pregnant women experiencing emotional distress.

Item correlations were notably strong, both within and across the various scales, reflecting the excellent reliability of the instrument. Strong correlations with established instruments in the field, such as the Beck Depression Inventory (BDI) for depression, the Bech-Rafaelsen Melancholia Scale (MES) for melancholy, the Hamilton Anxiety Rating Scale (HAM-A) for anxiety, and Rosenberg's Self-Esteem Scale for self-esteem, further underscore the robust theoretical foundation of these assessments and affirm their validity across the different domains of mental health.

4. Discussion

The findings of this study demonstrate the robust psychometric validity of assessment tools designed to evaluate depression, melancholy, anxiety, and self-esteem. The initial reliability analysis revealed a Cronbach's alpha coefficient of 0.897 based on the 45 items, indicating good internal consistency, as values above 0.800 were considered excellent. Subsequent analysis of the retest data yielded a Cronbach's alpha of 0.858, reinforcing the findings of high internal consistency across the tools.

The kappa statistic indicated a significant agreement suggesting a high degree of correspondence among the items within the assessment tools. Additionally, item correlations were notably strong, both within and across the various scales, reflecting the excellent reliability of the tests. Strong correlations with established instruments in the field further underscore the robust theoretical foundation of these assessments and affirm their validity across different mental health domains.

The test-retest reliability of the tools was exceptionally high, with an overall correlation coefficient of 0.889 and individual scale correlations ranging from 0.76 to 0.98. This indicates that the assessments consistently measured the same constructs over time, thus enhancing their reliability.

The factorial structure of the assessments also demonstrates robustness. The Kaiser-Meyer-Olkin (KMO) test confirmed the adequacy of the sample size for conducting factor analysis, yielding KMO values of 0.876 for the initial test and 0.810 for the retest, both exceeding the accepted minimum of 0.800. Bartlett's test of sphericity produced significant results, indicating that the correlation matrix was suitable for factor analysis, thereby supporting the validity of the factorial structure.

Paired-sample correlation analysis revealed strong associations between the test and retest scores across the assessed psychological constructs. For instance, correlations were 0.886 for depression, 0.876 for melancholy, 0.851 for anxiety, and 0.896 for self-esteem (all $p < 0.001$). None of the correlation values exceeded 0.900, thus mitigating the risk of the items being perceived as identical.

Moreover, mean comparisons between the test and retest conditions indicated notable changes in the psychological constructs. The mean depression score increased from 45.18 in the initial test to 52.85 in the retest. Melancholy also increased from 23.19 to 27.83, while anxiety showed a slight rise from 28.04 to 28.47. Conversely, self-esteem declined from 24.70 to 22.18, indicating a significant difference between the two assessments.

Statistical analysis of these differences confirmed the significance of the changes in the psychological states measured, with significant differences observed for depression (-7.668 , $p < 0.001$), melancholy (-4.642 , $p < 0.001$), and self-esteem (2.515 , $p < 0.001$). Anxiety showed a slightly positive change 0.431 ($p = 0.002$). These results emphasise the utility of assessments in tracking emotional well-being.

Overall, these findings illustrate that the assessment tools possess strong fidelity, validity, and practical utility in evaluating mental health constructs. All statistical requirements regarding item correlations were met, affirming the tools' ability to effectively distinguish between clinical and non-clinical populations.

Regarding possible limitations, the implemented procedure relied on the sincerity of participants. Consequently, the potential for bias existed due to reliance on respondents' honesty (self-report bias). In addition, response fatigue may have influenced participants due to the overall length of the full assessment battery. To reduce the participant burden and maintain data quality, a more concise version of the assessment battery was used in the comparative study. This streamlined approach included only the most relevant standardised instruments corresponding to the ADS subscales: the Beck Depression Inventory (BDI) for depression, Bech-Rafaelsen Melancholia Scale (MES) for melancholy, Hamilton Anxiety Rating Scale (HAM-A) for anxiety, and Rosenberg's Self-Esteem Scale (RSES) for self-esteem. This targeted selection was intended to minimise redundancy, reduce fatigue, and ensure meaningful cross-validation of ADS dimensions. Long-term follow-up studies are recommended, and comparisons with other instruments are currently under analysis, both for single-dimension and multidimensional tests, with the ADS providing a broader multidimensional perspective. Although the study captured a diverse Romanian sample, future research should consider larger and more socioeconomically varied populations to enhance generalisability. Furthermore, while ADS focuses on emotional dimensions during pregnancy, the exploration of underlying causal factors such as prior trauma, work-related stress, or medication use could deepen the understanding of antepartum depression. Additionally, the potential differences between employed and unemployed pregnant women were not explored in this study, which could represent a valuable direction for future research.

The full methodological details of item generation and reduction, including the initial item pool, expert review, and statistical screening, will be presented in a forthcoming methodological paper currently under review.

Regarding future implications, as healthcare continues to advance in the digital era, there is a growing need for innovative tools to facilitate the assessment and management of maternal mental health. The Antepartum Depression Scale (ADS), known in Romania as the Scala de Depresie Antepartum (SDA), represents a foundational step in addressing these challenges. By leveraging its

multidimensional approach, future research could expand the scale's capabilities through digital data collection methods, such as mobile applications or wearable technology, enabling the continuous tracking of emotional well-being.

Future research should validate the Antepartum Depression Scale (ADS) across broader cultural contexts and explore its applicability from pregnancy to the postpartum period. Longitudinal studies could offer valuable insights into the scale's sensitivity to emotional changes during and after pregnancy.

The ADS demonstrates promising potential for digital health integration. Future projects could aim to develop mobile or web-based platforms for remote screening and continuous emotional monitoring, facilitating early interventions and personalised care pathways for maternal mental health.

Moreover, the integration of artificial intelligence (AI) and machine learning could enhance the precision and personalisation of mental health interventions, offering tailored treatment plans and early detection of depressive symptoms (Abuadas, Albikawi, & Abuadas, 2022; Mohd Hatta et al., 2023; Aithal & Aithal, 2020; Doboş, 2020; Țarcă et al., 2021; Sobotka & Fürnkranz-Prskawetz, 2020; Lutz et al., 2019). Long-term studies might further validate ADS-based interventions across diverse populations and nationalities, ensuring their efficacy, cultural adaptability, and robustness in different healthcare systems.

Further investigations could examine the relationship between high antepartum stress and adverse pregnancy outcomes, such as pre-eclampsia or preterm birth, by integrating hormonal biomarkers with psychological assessment.

A key objective is to validate and implement ADS on a larger scale, making it accessible to various populations across multiple countries. Importantly, the scale is intended to remain a freely available tool that can be widely used by healthcare practitioners including physicians, clinical psychologists, and other professionals involved in monitoring maternal mental health. Its implementation will be aligned with the national regulations of the countries in which it is adopted, ensuring compliance with local healthcare policies and legal frameworks.

These advancements could transform maternal mental health care into a more proactive, scalable, and accessible system, ultimately improving the outcomes for both mothers and their infants.

5. Conclusions

The Antepartum Depression Scale (ADS) has emerged as a robust and psychometrically validated tool for assessing the psychological state of pregnant women. Its high reliability and multidimensional approach provide comprehensive insights into depression, melancholy, anxiety, and self-dysthymia. A key advantage of ADS is its small number of items, which allows it to be administered in a short amount of time, enhancing its practicality. This, combined with its adaptability, suggests that it is well-suited for telemedicine applications, making it a practical choice for diverse clinical and non-clinical settings. However, it is important to note that while ADS appears promising for a remote use, it has not yet been specifically tested or validated in telemedicine contexts. Prospective validation of the ADS in digital and remote healthcare environments is planned as part of future development. Significant test-retest consistency and strong correlations with established psychometric measures affirm its utility for both screening and intervention.

This research is crucial because pregnancy-related anxiety and antenatal depression are well-established risk factors for adverse pregnancy outcomes, including preterm birth, low birth weight, and complications during labour. The ADS addresses a critical gap in standardised pregnancy-specific depression assessments and can be used in both clinical and telemedicine settings, although further studies are needed to fully validate its application in remote contexts.

Future research should explore the integration of ADS into digital health platforms by leveraging technologies, such as artificial intelligence, for personalised care. By addressing

antepartum mental health needs, ADS contributes to improved maternal and neonatal outcomes, underscoring its critical role in modern healthcare.

References

- Abuadas, M. H., Albikawi, Z. F., & Abuadas, F. H. (2022). Development and validation of questionnaire measuring registered nurses' competencies, beliefs, facilitators, barriers, and implementation of evidence-based practice. *Journal of Nursing Measurement*, 30(2), 238–255. <https://doi.org/10.1891/jnm-d-20-00085>
- Aithal, A., & Aithal, P. S. (2020). Development and validation of survey questionnaire & experimental data – A systematical review-based statistical approach. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.3724105>
- American Physical Society. (2020). *APS March Meeting 2020*. <https://meetings.aps.org/Meeting/MAR20/Content/3845>
- Andrade, L. H., Alonso, J., Mneimneh, Z., Wells, J. E., Al-Hamzawi, A., Borges, G., Bromet, E., Bruffaerts, R., de Girolamo, G., de Graaf, R., Florescu, S., Gureje, O., Hinkov, H. R., Hu, C., Huang, Y., Hwang, I., Jin, R., Karam, E. G., Kovess-Masfety, V., ... Kessler, R. C. (2014). Barriers to mental health treatment: Results from the WHO World Mental Health surveys. *Psychological Medicine*, 44(6), 1303–1317. <https://doi.org/10.1017/s0033291713001943>
- Andrews, G., & Slade, T. (2001). Interpreting scores on the Kessler psychological distress scale (K10). *Australian & New Zealand Journal of Public Health*, 25(6), 494–497. <https://doi.org/10.1111/j.1467-842X.2001.tb00310.x>
- APS Tests and Testing Expert Group. (2020). *Testing our adaptability*. *InPsych*, 42(5). Australian Psychological Society. <https://psychology.org.au/for-members/publications/inpsych/2020/oct-nov-vol-42-issue-5/testing-our-adaptability>
- Aridi, M., Ahmad, M., Ghach, W., Charifeh, S., & Alwan, N. (2023). Development and validation of the Soft Skills Questionnaire for Nurses. *SAGE Open Nursing*, 9. <https://doi.org/10.1177/23779608231159620>
- Beck, A. T. (1967). Depression: Clinical, experimental, and theoretical aspects. *Harper & Row*.
- Beck, A. T., Steer, R. A., & Brown, G. K. (1996). Beck Depression Inventory-II. *Psychological Corporation*. <https://psycnet.apa.org/doi/10.1037/t00742-000>
- Bowlby, J. (1969). Attachment and loss. Volume 1: Attachment. *Basic Books*.
- Bradley, R., & Slade, P. (2011). A review of mental health problems in fathers following the birth of a child. *Journal of Reproductive and Infant Psychology*, 29(1), 19–42. <https://doi.org/10.1080/02646838.2010.513047>
- Buist, A. S., McBurnie, M. A., Vollmer, W. M., Gillespie, S., Burney, P., Mannino, D. M., Menezes, A. M., Sullivan, S. D., Lee, T. A., Weiss, K. B., Jensen, R. L., Marks, G. B., Gulsvik, A., Nizankowska-Mogilnicka, E., & BOLD Collaborative Research Group. (2007). International variation in the prevalence of COPD (the BOLD Study): A population-based prevalence study. *The Lancet*, 370(9589), 741–750. [https://doi.org/10.1016/S0140-6736\(07\)61377-4](https://doi.org/10.1016/S0140-6736(07)61377-4)
- Condon, J. T. (1993). The assessment of antenatal emotional attachment: Development of a questionnaire instrument. *British Journal of Medical Psychology*, 66(2), 167–183. <https://doi.org/10.1111/j.2044-8341.1993.tb01739.x>
- Corrigan, P. (2004). How stigma interferes with mental health care. *American Psychologist*, 59(7), 614–625. <https://doi.org/10.1037/0003-066X.59.7.614>
- Corrigan, P. W., Kerr, A., & Knudsen, L. (2005). The stigma of mental illness: Explanatory models and methods for change. *Applied and Preventive Psychology*, 11(3), 179–190. <https://doi.org/10.1016/j.appsy.2005.07.001>
- Cuijpers, P., Cristea, I. A., Karyotaki, E., Reijnders, M., & Huibers, M. J. (2016). How effective are cognitive behavior therapies for major depression and anxiety disorders? A meta-analytic

- update of the evidence. *World psychiatry: Official Journal of the World Psychiatric Association (WPA)*, 15(3), 245–258. <https://doi.org/10.1002/wps.20346>
- Dennis, C. L., & Hodnett, E. (2007). Psychosocial and psychological interventions for treating postpartum depression. *Cochrane Database of Systematic Reviews*, (4), CD006116. <https://doi.org/10.1002/14651858.CD006116.pub2>
- Doboş, C. (2020). Disciplining births: Population research and politics in communist Romania. *The History of the Family*, 25(4), 599–626. <https://doi.org/10.1080/1081602x.2020.1807384>
- Dørheim, S. K., Bondevik, G. T., Eberhard-Gran, M., & Bjorvatn, B. (2009). Sleep and depression in postpartum women: A population-based study. *Sleep*, 32(7), 847–855. <https://doi.org/10.1093/sleep/32.7.847>
- Drapeau, A., Marchand, A., & Beaulieu-Prévost, D. (2012). Epidemiology of psychological distress. In P. L. L'Abate (Ed.), *Mental illnesses: Understanding, prediction and control*, 155–134. IntechOpen. <https://doi.org/10.5772/30872>
- Edwards, D., Hawker, C., Carrier, J., & Rees, C. (2015). A systematic review of the effectiveness of strategies and interventions to improve the transition from student to newly qualified nurse. *International Journal of Nursing Studies*, 52(7), 1254–1268. <https://doi.org/10.1016/j.ijnurstu.2015.03.007>
- European Commission. (2022). *Commission work programme 2023*. https://commission.europa.eu/strategy-and-policy/strategy-documents/commission-work-programme/commission-work-programme-2023_en
- Eurostat. (2023a). *Fertility statistics*. Statistics Explained. https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Fertility_statistics
- Eurostat. (2023b). *Record drop in children being born in the EU in 2023* [News release]. <https://ec.europa.eu/eurostat/web/products-eurostat-news/w/ddn-20250307-1>
- Eurostat. (2023). *Demography of Europe – 2023 edition*. <https://ec.europa.eu/eurostat/web/interactive-publications/demography-2023>
- Fairbrother, N., Janssen, P., Antony, M. M., Tucker, E., & Young, A. H. (2016). Perinatal anxiety disorder prevalence and incidence. *Journal of Affective Disorders*, 200, 148–155. <https://doi.org/10.1016/j.jad.2015.12.082>
- Goodman, J. H. (2004). Paternal postpartum depression, its relationship to maternal postpartum depression, and implications for family health. *Journal of Advanced Nursing*, 45(1), 26–35. <https://doi.org/10.1046/j.1365-2648.2003.02857.x>
- Gulliver, A., Griffiths, K. M., & Christensen, H. (2010). Perceived barriers and facilitators to mental health help-seeking in young people: A systematic review. *BMC Psychiatry*, 10, 113. <https://doi.org/10.1186/1471-244X-10-113>
- Hamilton, M. (1959). The assessment of anxiety states by rating. *British Journal of Medical Psychology*, 32, 50–55. <https://doi.org/10.1111/j.2044-8341.1959.tb00467.x>
- Ingram, R. E., & Luxton, D. D. (2005). Vulnerability-stress models. In B. L. Hankin & J. R. Z. Abela (Eds.), *Development of psychopathology: A vulnerability-stress perspective*, 32–46. Sage Publications.
- Institutul Național de Statistică. (2023). *Noutăți 2023*. <https://insse.ro/cms/ro/content/nout%C4%83%C8%9Bi-2023>
- Kumari, A., Ranjan, P., Chopra, S., Kaur, D., Upadhyay, A. D., Kaur, T., Bhattacharyya, A., Arora, M., Gupta, H., Thrinath, A., Prakash, B., & Vikram, N. K. (2021). Development and validation of a questionnaire to assess knowledge, attitude, practices, and concerns regarding COVID-19 vaccination among the general population. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews*, 15(3), 919–925. <https://doi.org/10.1016/j.dsx.2021.04.004>
- Lamela, D., Soreira, C., Matos, P., & Morais, A. (2020). Systematic review of the factor structure and measurement invariance of the patient health questionnaire-9 (PHQ-9) and validation of the Portuguese version in community settings. *Journal of Affective Disorders*, 276, 220–233. <https://doi.org/10.1016/j.jad.2020.06.066>

- Larsson, C., Sydsjö, G., & Josefsson, A. (2004). Health, sociodemographic data, and pregnancy outcome in women with antepartum depressive symptoms. *Obstetrics & Gynecology*, 104(3), 459–466. <https://doi.org/10.1097/01.aog.0000136087.46864.e4>
- Lazarus, R. S., & Folkman, S. (1984). Stress, appraisal, and coping. *Springer*.
- Leach, L. S., Poyser, C., Cooklin, A. R., & Giallo, R. (2016). Prevalence and course of anxiety disorders (and symptom levels) in men across the perinatal period: A systematic review. *Journal of Affective Disorders*, 190, 675–686. <https://doi.org/10.1016/j.jad.2015.09.063>
- Leis, J. A., Heron, J., Stuart, E. A., & Mendelson, T. (2013). Associations between maternal mental health and child emotional and behavioral problems: Does prenatal mental health matter? *Journal of Abnormal Child Psychology*, 42(1), 161–171. <https://doi.org/10.1007/s10802-013-9766-4>
- Letourneau, N. L., Dennis, C. L., Benzies, K., Duffett-Leger, L., Stewart, M., Tryphonopoulos, P. D., Este, D., & Watson, W. (2012). Postpartum depression is a family affair: Addressing the impact on mothers, fathers, and children. *Issues in Mental Health Nursing*, 33(7), 445–457. <https://doi.org/10.3109/01612840.2012.673054>
- Lutz, S., Brion, C., Kliebhan, M., & Albert, F. W. (2019). DNA variants affecting the expression of numerous genes in trans have diverse mechanisms of action and evolutionary histories. *PLOS Genetics*, 15(10), e1008375. <https://doi.org/10.1371/journal.pgen.1008375>
- Matthey, S., Barnett, B., Ungerer, J., & Waters, B. (2000). Paternal and maternal depressed mood during the transition to parenthood. *Journal of Affective Disorders*, 60(2), 75–85. [https://doi.org/10.1016/S0165-0327\(99\)00159-7](https://doi.org/10.1016/S0165-0327(99)00159-7)
- Mental Health Commission of Canada. (2020). *2019–2020 Annual Report*. <https://mentalhealthcommission.ca/resource/2019-2020-annual-report/>
- Miller, K. D., Nogueira, L., Mariotto, A. B., Rowland, J. H., Yabroff, K. R., Alfano, C. M., Jemal, A., Kramer, J. L., & Siegel, R. L. (2019). Cancer treatment and survivorship statistics, 2019. *CA: A Cancer Journal for Clinicians*. Advance online publication. <https://doi.org/10.3322/caac.21565>
- Ministry of Health of Romania. (2023). *Order on the application in the first quarter of 2023 of the provisions of Article 37 of Government Emergency Ordinance No. 77/2011 on establishing contributions to finance expenditures in the field of health*. <https://www.ms.ro/ro/transparenta-decizionala/acte-normative-in-transparenta/ordin-pentru-a-plicarea-%C3%AEn-trimestrul-i-2023-a-prevederilor-art-37-din-ordonan%C8%9Ba-de-urgen%C8%9B%C4%83-a-guvernului-nr-772011-privind-stabilirea-unor-contribu%C5%A3ii-pentru-finan%C5%A3area-unor-cheltuieli-%C3%AEn-domeniul-s%C4%83n%C4%83t%C4%83%C5%A3ii/>
- Mohd Hatta, F. H., Samsudin, E. Z., Aimran, N., & Ismail, Z. (2023). Development and validation of questionnaires to assess workplace violence risk factors (QAWRF): A tripartite perspective of worksite-specific determinants in healthcare settings. *Risk Management and Healthcare Policy*, 16, 1229–1240. <https://doi.org/10.2147/rmhp.s411335>
- NHS Digital. (2023). *NHS Maternity Statistics, England, 2022–23*. <https://digital.nhs.uk/data-and-information/publications/statistical/nhs-maternity-statistics/2022-23>
- National Institute of Statistics. (2023). *Population of Romania – 2023*. National Institute of Statistics. <https://insse.ro>
- Norhayati, M. N., Hazlina, N. H., Asrenee, A. R., & Emilin, W. M. (2015). Magnitude and risk factors for postpartum symptoms: A literature review. *Journal of Affective Disorders*, 175, 34–52. <https://doi.org/10.1016/j.jad.2014.12.041>
- O'Hara, M. W., & Swain, A. M. (1996). Rates and risk of postpartum depression: A meta-analysis. *International Review of Psychiatry*, 8(1), 37–54. <https://doi.org/10.3109/09540269609037816>

- Organisation for Economic Co-operation and Development (OECD). (2022). *OECD economic outlook, 2022(2): Confronting the crisis*. <https://doi.org/10.1787/f6da2159-en>
- Parfitt, Y., & Ayers, S. (2014). Transition to parenthood and mental health in first-time parents. *Infant Mental Health Journal*, 35(3), 263–273. <https://doi.org/10.1002/imhj.21443>
- Paulson, J. F., & Bazemore, S. D. (2010). Prenatal and postpartum depression in fathers and its association with maternal depression: A meta-analysis. *JAMA*, 303(19), 1961–1969. <https://doi.org/10.1001/jama.2010.605>
- Richards, G. (2012). 'Race', racism and psychology: Towards a reflexive history. *Routledge/Taylor & Francis Group*.
- Robertson, E., Grace, S., Wallington, T., & Stewart, D. E. (2004). Antenatal risk factors for postpartum depression: A synthesis of recent literature. *General Hospital Psychiatry*, 26(4), 289–295. <https://doi.org/10.1016/j.genhosppsych.2004.02.006>
- Rominov, H., Pilkington, P. D., Giallo, R., & Whelan, T. A. (2016). A systematic review of interventions targeting paternal mental health in the perinatal period. *Infant Mental Health Journal*, 37(3), 289–301. <https://doi.org/10.1002/imhj.21560>
- Rosenberg, M. (1965). Rosenberg Self-Esteem Scale (RSES). *APA PsycTests*. <https://doi.org/10.1037/t01038-000>
- Schnyder, N., Panczak, R., Groth, N., & Schultze-Lutter, F. (2017). Association between mental health-related stigma and active help-seeking: Systematic review and meta-analysis. *The British Journal of Psychiatry*, 210(4), 261–268. <https://doi.org/10.1192/bjp.bp.116.189464>
- Slomian, J., Honvo, G., Emonts, P., Reginster, J. Y., & Bruyère, O. (2019). Consequences of maternal postpartum depression: A systematic review of maternal and infant outcomes. *Women's Health*, 15, 1745506519844044. <https://doi.org/10.1177/1745506519844044>
- Smith-Nielsen, J., Egmo, I., Wendelboe, K. I., Steinmejer, P., Lange, T., & Vaever, M. S. (2021). Can the Edinburgh Postnatal Depression Scale-3A be used to screen for anxiety? *BMC Psychology*, 9(1). <https://doi.org/10.1186/s40359-021-00623-5>
- Sobotka, T., & Fürnkranz-Prskawetz, A. (2020). Demographic change in Central, Eastern and Southeastern Europe: Trends, determinants and challenges. *30 Years of Transition in Europe*. <https://doi.org/10.4337/9781839109508.00027>
- Stein, A., Pearson, R. M., Goodman, S. H., Rapa, E., Rahman, A., McCallum, M., Howard, L. M., & Pariante, C. M. (2014). Effects of perinatal mental disorders on the fetus and child. *The Lancet*, 384(9956), 1800–1819. [https://doi.org/10.1016/S0140-6736\(14\)61277-0](https://doi.org/10.1016/S0140-6736(14)61277-0)
- Stewart, D. E., & Vigod, S. (2016). Postpartum depression. *The New England Journal of Medicine*, 375(22), 2177–2186. <https://doi.org/10.1056/NEJMc1607649>
- Thombs, B. D., Arthurs, E., Coronado-Montoya, S., Roseman, M., Delisle, V. C., Leavens, A., Levis, B., Azoulay, L., Smith, C., Ciofani, L., Coyne, J. C., Feeley, N., Gilbody, S., Schinazi, J., Stewart, D. E., & Zekowitz, P. (2014). Depression screening and patient outcomes in pregnancy or postpartum: A systematic review. *Journal of Psychosomatic Research*, 76(6), 433–446. <https://doi.org/10.1016/j.jpsychores.2014.01.006>
- Thornicroft, G., Rose, D., Kassam, A., & Sartorius, N. (2007). Stigma: Ignorance, prejudice or discrimination? *The British Journal of Psychiatry*, 190, 192–193. <https://doi.org/10.1192/bjp.bp.106.025791>
- Țarcă, E., Roșu, S. T., Cojocaru, E., Trandafir, L., Luca, A. C., Rusu, D., & Țarcă, V. (2021). Socio-epidemiological factors with negative impact on infant morbidity, mortality rates, and the occurrence of birth defects. *Healthcare*, 9(4), 384. <https://doi.org/10.3390/healthcare9040384>
- Weissman, M. M., & Klerman, G. L. (1977). Sex differences and the epidemiology of depression. *Archives of General Psychiatry*, 34(1), 98–111. <https://doi.org/10.1001/archpsyc.1977.01770130100011>
- Witt, W. P., DeLeire, T., Hagen, E. W., Wichmann, M. A., Wisk, L. E., Spear, H. A., Cheng, E. R., Maddox, T., & Hampton, J. (2010). The prevalence and determinants of antepartum mental

- health problems among women in the USA: A nationally representative population-based study. *Archives of Women's Mental Health*, 13(5), 425–437.
<https://doi.org/10.1007/s00737-010-0176-0>
- Witt, W. P., Wisk, L. E., Cheng, E. R., Hampton, J. M., Creswell, P. D., Hagen, E. W., Spear, H. A., Maddox, T., & DeLeire, T. (2011). Poor prepregnancy and antepartum mental health predicts postpartum mental health problems among US women: A nationally representative population-based study. *Women's Health Issues*, 21(4), 304–313.
<https://doi.org/10.1016/j.whi.2011.01.002>
- World Health Organization. (2021). *World health statistics 2021: Monitoring health for the SDGs, sustainable development goals*.
<https://www.who.int/data/stories/world-health-statistics-2021-a-visual-summary>
- World Health Organization. (2022). *World health statistics 2022: Monitoring health for the SDGs, sustainable development goals*.
<https://www.who.int/news/item/20-05-2022-world-health-statistics-2022>
- Zubin, J., & Spring, B. (1977). Vulnerability: A new view of schizophrenia. *Journal of Abnormal Psychology*, 86(2), 103–126. <https://doi.org/10.1037/0021-843X.86.2.103>