

A Systematic Review of Psychometric Properties of the Edinburgh Postnatal Depression Scale in Iranian Population

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Abstract

Background: Regarding adverse effects of postpartum depression on maternal mental health and the reduction of mother-infant attachment, there is a need to comprehensively understand Edinburgh Postnatal Depression Scale (EPDS). We aimed to review the validity and reliability of the EPDS in Iranian population to provide comprehensive information for the health providers.

Materials and Methods

The search procedure was fulfilled on the databases of Medline (via PubMed), Scopus, Cochran Library and Web of Science from inception to April 2018. The quality of studies was assessed by COSMIN checklist. Search keywords include (Edinburgh Postnatal Depression Scale) AND (Psychometric Properties).

Results: Three studies identified a two-factor structure and one study found a three-factor structure. Discriminant validity of the EPDS was able to differentiate three groups (minor depression, major depression, and healthy women); but failed to distinguish between women with caesarean section, and women with normal delivery. Internal consistency was reported by four studies. Cronbach's alpha ranged from 0.7 to 0.79 for total EPDS score. Test-retest reliability was reported only in a study with Intraclass Correlation Coefficient (ICC) > 0.80. In terms of convergent validity, the EPDS was significantly positively correlated with General Health Questionnaire (GHQ) ($r=0.76$; $p<0.001$), and Hamilton Depression Rating Scale (HDRS) ($r=0.62$, $p<0.001$), and negatively with Short Form Health Survey (SF-36). Sensitivity was almost 0.74%, and specificity ranged from 0.80% to 0.93% at the cut-off point of <12.

Conclusion

Evidence to support the validity and reliability of the EPDS in Iranian population is sufficient as a screening tool for postnatal depression to decrease damage to the mother and the baby.

Key Words: Edinburgh Postnatal Depression Scale, Iranian population, Systematic review.

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1- INTRODUCTION

Fear of childbirth, birth abnormalities, loss of attraction for a spouse, and ambivalence toward taking care of a newborn make many mothers anxious and cause postpartum periods, and especially six weeks later, a vulnerable cycle for the development of mental disorders (1). Postpartum depression (PPD) is a disorder that occurs within two to six weeks after delivery in some women, and is known by the American Psychiatric Association as a major depressive disorder that is associated with depressed mood symptoms such as appetite changes, insomnia, energy loss, low self-esteem, cognitive problems, anxiety, sleep disorder symptoms, a feeling of worthlessness, feeling guilty and suicidal ideation (2, 3). The results of meta-analysis of PPD prevalence were reported 23.8%, 25%, and 19% in Turkey (4), Iran (5), and India (6), respectively.

Etiologically, there are various theories about the incidence of PPD, including biological and psychosocial factors. Some of the psychosocial factors studied in this area include depression during pregnancy and before giving birth, low self-esteem, stress in child care, life stress, low social support, marital dissatisfaction, inadequate social support, poor marital relationship, history of depression, low socioeconomic status, and unwanted pregnancy (7, 8). The PPD has negative and adverse effects on mother, child and family, relationships with the spouse, and interactions and behavior with the child, as well as exposing the infant to developmental impairment. It also renders behavioral, cognitive, social and emotional problems in infants until the age of 4-8 years (9-11). The PPD increases the likelihood of damage to the mother and the baby, the quality of mother-child emotion, family relationships, family mental health, different aspects of marital relationship, less responsibility and responsiveness to the baby, less interaction with the baby,

cognitive and emotional development of the baby, negligence and abuse of the baby in care. The PPD is associated with an increased risk of chronic, recurrent, and treatment-resistant depression (11). These findings suggest the significant negative long-term impact of depression on postpartum mothers and their infants, and the necessity of appropriate and accurate screening to identify depression as early as possible during the postnatal period (9). Postpartum blues has a debilitating effect on mother-infant bonding (12). This reduces mother-infant attachment. Emotional attachment increases self-confidence, and adaptation to maternal role (AMR). On the other hand, long-term mother-infant relationship and attachment are the most important post-birth psychological processes that have consequences for the infant. The exact cause of postpartum blues is unknown, however, some researchers have attributed the reason for these blues to a feeling of separation from the fetus because the mother had long lived with the fetus and had adapted to the changes made during pregnancy. With the onset of labor, these changes disappear and the mother has a feeling of emptiness.

This vulnerability, coupled with the feeling of insecurity and incompetence in the new role of motherhood, reduces the mother's self-confidence (13). The Edinburgh Postnatal Depression Scale (EPDS) is a well-known scale for detection of postpartum depression. This questionnaire is suitable due to several features including easy to use, objectivity, targeting depression symptoms, and shortened form (12). This questionnaire was first set up by Cox et al. in 1987 (14), and is related to depression, anxiety, feeling guilty and suicidal ideation, which is used to measure the depression intensity (15). This questionnaire requires about five minutes of completion time, and consists of 10 short items scored 0 to 3. The questions 1,

2 and 4 are scored from zero to three, and the remaining questions from three to zero (16). Then, the total score of the research units is determined by adding the scores of each item, which range from zero to 30. Scores higher than 12 indicated depression (16, 17). Regarding adverse effects of postpartum blues on maternal mental health and the reduction of mother-infant attachment and subsequent consequences, and in light of research on the effects of depression on other infant problems, there is a need for comprehensive understanding of Edinburgh Postnatal Depression Scale (EPDS). The purpose of the present study was to review the validity and reliability of the Edinburgh Postnatal Depression Scale to provide comprehensive information for the health providers.

2- MATERIALS AND METHODS

2-1. Search strategy

The purpose of the present study was to review the validity and reliability evidence of the EPDS in Iranian population to provide comprehensive information to health providers. The current systematic review covered all articles mainly assessing the psychometric features of the EDPS, which were searched among English databases of Medline (via PubMed), Scopus, Cochran library and Web of Science from inception to May 2018 with the help of keywords, including (Edinburgh Postnatal Depression Scale) AND [(Reliability OR Validity OR Psychometrics OR Factor Analysis OR Exploratory Factor Analysis OR

Confirmatory Factor Analysis) OR (Iranian or Iran)]. No language and date restrictions were considered. Bibliographies of the obtained articles were checked to detect any studies not retrieved through the electronic databases. In addition, SID, Iran doc, Barakatks, Magiran, Medlib, and also Google Scholar; and were searched with equivalent keywords in May 2018 to explore relevant Persian article published in the above mentioned Persian data bases.

2-3. Quality assessment

The quality of related studies was investigated using COSMIN checklist (17), including internal consistency, reliability, measurement error, content validity, structure validity, and hypothesis testing, cross cultural, criterion, responsiveness, interpretability and generalizability (**Table.1**).

2-4. Inclusion and exclusion criteria

Studies were included if their primary aim of study was to assess psychometric properties of the Edinburgh Postnatal Depression Scale in Iranian population.

2-5. Data extraction

All abstracts were read by two reviewers independently to identify relevant articles. The deemed or uncertain relevant articles were downloaded and read in detail. Standardized data extraction was used to extract the data independently by two researchers (**Table.2**).

Table-1: The quality assessment of related studies using COSMIN checklist (17).

Author (years)	A	B	C	D	E	F	G	H	I	J	K
Ahmadi and GoliZadeh (20)	(2)	-	-	-	-	-	-	-	-	-	(1)
Mazhari et al. (18)	2	-	-	(2)	(3)	(3)	(2)	(2)	-	-	(4)
Kheirabadi et al. (19)	2	-	-	-	(3)	(0)	(0)	(0)	(0)	-	(3)
Montazeri et al. (21)	2	2	-	-	(2)	(4)	-	-	-	-	(3)

Empty boxes=not applicable, 0=poor, 1=good, 2= fair, 3=good and 4=excellent.
A; internal consistency; reliability, measurement error; D; content validity; E: Structural validity, f; hypothesis testing, G; Cross cultural, H; criterion, I; responsiveness; Interpretability, Generalizability.
(): did not report aspect.

Table-2: Characteristics of four studies included into systematic review.

Author, Years, City, Reference	Age, year	Sampling method and Sample size	Reliability	Content validity and cross cultural	Discriminant Validity	Criterion validity	Construct validity	Concurrent Validity
Ahmadi kani Golzar and GoliZadeh, 2012, Kurdistan, Reference (20)	-	361	Internal consistency	-	-	-	-	-
Mazhari et al., 2007, Kerman, Reference (18)	25.6 4.9	600, random sampling	Internal consistency	Content validity and cross cultural	Major depression, minor depression, and no depressive disorder	DSM-IV criteria	EFA	GHQ-12
Kheirabadi, 2012, Isfahan Reference (19)	26.6 ± 5.1	262, stratified random sampling method	Internal consistency	-	-	HDRS	EFA	HDRS
Montazeri et al., 2007 Isfahan Reference (21)	20-29=92% ≥30=8%	100 Consecutive sample	Internal consistency and reliability test-retest	Cross cultural	There was no significant difference in EPDS score in women with caesarean section with women with normal delivery.	SF-36	EFA	-

HDRS: Hamilton Depression Rating Scale; EFA: Explanatory Factor Analysis; GHQ-12: 12-item General Health Questionnaire; SF-36: 36-Item Short Form Survey Instrument.

3- RESULTS

1220 studies were explored using database searching; 646 were screened, 4 full-text articles were evaluated for

eligibility, and 4 studies were included in qualitative synthesis. **Figure.1** shows search strategy of the study was included in systematic review.

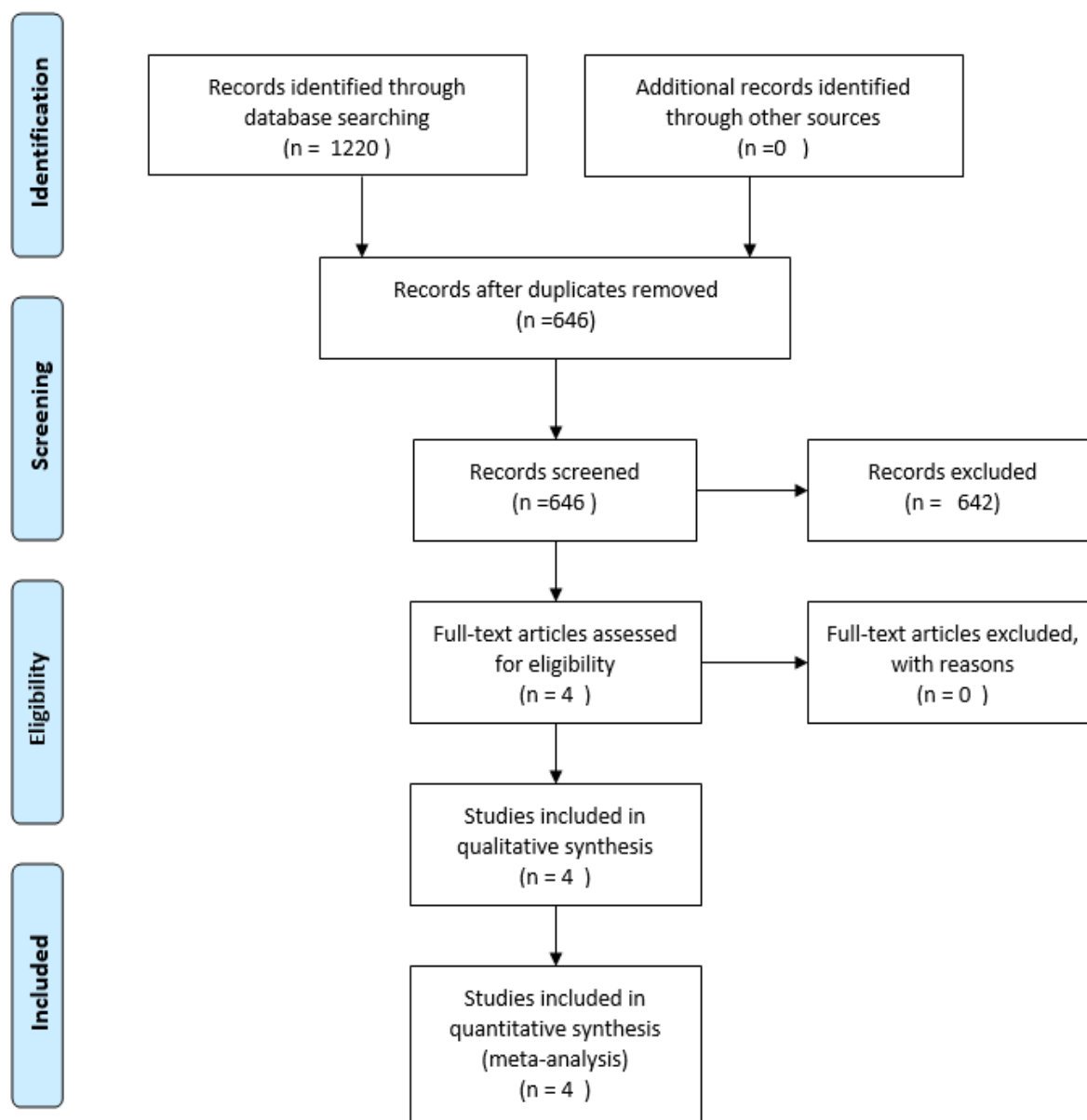


Fig.1: PRISMA flowchart of present systematic review.

3-1. Content validity

3-1-1. Face validity and acceptability

Mazhari and Nakhaee (18) assessed content validity through face validity and acceptability in women from different education groups. The questionnaire was acceptable and comprehensive. Also, there were not any ambiguous questions.

3-2. Convergent validity

EPDS was significantly positively correlated with General Health Questionnaire (GHQ) ($r=0.76$; $p<0.001$) (18), and Hamilton Rating Scale for Depression (HDRS) ($r=0.62$, $p<0.001$) (19), and significantly negatively correlated with 36-item Short Form Health Survey (SF-36), and EPDS ($r=-0.41$, $p<0.001$ for time 1, and $r=-0.57$, $p<0.001$ for time 2).

3-3. Explanatory Factor analysis (EFA)

Kheirabadi et al. (19) employed explanatory factor analysis. Kaiser-Meyer-Olkin Measure (KMO) was 0.84, and Bartlett's test of sphericity ($X^2=530$, degrees of freedom [DF] =45, $p<0.001$). Two factors were identified using principle component analysis (PCA) with varimax rotation, accounting for 62% of total variance (46.4 for depression item and 15.5 for anhedonia). Ahmadi kani Golzar and Golizadeh conducted an exploratory factor analysis (EFA) on a sample of 361 postpartum women referred to health center between 2 and 4 weeks after delivery (20). KMO was 0.8, and Bartlett's test of sphericity ($X^2=839$, DF=45, $p<0.001$). Two factors were extracted based one eigenvalue greater than one, accounting for 50% of total variance. Factor loading ranged from 0.54 to 0.83. Eigenvalue of the first two factors was 3.24, and 1.77, respectively. In a study by Mazhari and Nakhaee (18), Kaiser's Measure of Sampling Adequacy (MSA) was 0.8, suggesting sample size was sufficient for further analysis. Exploratory factor analysis identified two factors, accounting for 47% of total variance. All factors' loading was above 0.3. One and two items were grouped into factor 1 and called anhedonia. The rest of the items were included into the factor 2 and called relating to depressed mood. Montazeri et al. conducted (21) an EFA on a sample of 361 postpartum women referred to health center between 2 and 4 weeks after delivery; principal component analysis (PCA) with varimax rotation identified three factors. The first factor consisted of items 3, 4, 5 and was called factor "euthymic mood", the second factor included items 6, 7, 8, 9, and 10, and was called " anxiety", and the third factor consisted of items 1 and 2 and was named "depression".

3-4. Discriminant validity

In study by Mazhari and Nakhaee (18), discriminate validity was assessed by comparing total EPDS score among three groups: women with major depression 43(21.5%), women with no depression 26 (13%). The mean score of EPDS was 17.83 ± 3.75 , 11.38 ± 2.97 , and 7.14 ± 3.2 for women with major depression, minor depression and no depression, respectively. Comparison of scores of EPDS among three groups (women with depression, minor depression and no depression) showed a significant difference ($p<0.001$). In Montazeri et al.'s study, in terms of discriminant validity, there was no significant difference in EPDS scores in women with caesarean section and women with normal delivery. At time 1 [8 and 12 weeks after delivery ($p=0.15$)], and time 2 [12 to 14 weeks after delivery ($p=0.55$)] (21).

3-5. Criterion validity

Two studies assessed Criterion validity. In the first study by Kheirabadi et al. (19), selected gold standard was Hamilton Depression Rating Scale (HDRS). Area under the receiver operating characteristic curves (AUROC) was 0.84(95% confidence interval [CI]: 0.77-0.90) with sensitivity 78% and specificity 75% at cut-off point >12 . (19). In Mazhari and Nakhaee's study (18), gold standard was DSM-IV diagnoses interview. At 9/10 cut off, sensitivity, specificity and positive likelihood were 98, 72, and 3.5, respectively, suggesting in this cut off, EPDS identified 98% of women with major depression. At 9/10 cut off, sensitivity, specificity and positive likelihood were 89, 81, and 4.9, respectively, suggesting in this cut off, EPDS identified 90% of women with combined depression (severity minor and major) (18).

3-6. Reliability

Cronbach' alpha was 0.791 in Kheirabadi et al. (19), and 0.70 in Ahmadi kani Golzar

and GoliZadeh (20). In Montazeri et al.'s study, reliability was assessed using internal consistency and test-retest reliability. Cronbach' alpha was 0.77 for time 1 (12-14 weeks after delivery), and 0.86 for time 2 (6-8 weeks after delivery) (21). In Mazhari and Nakhaee's study (18), Cronbach' alpha was 0.59 for "anhedonia" factor, 0.82 for "other symptom" factor, and 0.83 for whole scale.

4- DISCUSSION

To the best of our knowledge, this is the first systematic review to comprehensively assess the psychometric properties of EPDS in Iranian population. Three studies identified a two-factor structure (18-20), and one study (21), found a three-factor structure. Discriminant validity of the EPDS was able to differentiate three groups (minor depression, major depression, and healthy women), but failed to distinguish between women with caesarean section and women with normal delivery. Internal consistency was reported in four studies. Cronbach's alpha ranged from 0.7 to 0.79 for total EPDS scale. Test-retest reliability was reported only in a study with ICC > 0.80.

In terms of convergent validity, the EPDS significantly correlated positively with General Health Questionnaire (GHQ) ($r=0.76$; $p<0.001$), and Hamilton Depression Rating Scale (HDRS) ($r=0.62$, $p<0.001$), and negatively with 36-item Short Form Health Survey (SF-36). The sensitivity was almost 0.74%, and the specificity ranged from 0.80 to 0.93% at 12> cut-off point. Positive likelihood ratio was 1.9 at the cut-off point of 7.8, and also 18.9 at the cut-off point of 14.15. The study limitations need to be acknowledged. Firstly, psychometric properties of the EPDS have not been comprehensively investigated in Iranian population, particularly regarding confirmatory factor analysis (CFA), positive predictive value (PPV), negative predictive value (NPV),

measurement error and responsiveness. Future works should be designed and described in accordance with COSMINE checklist. Second limitation, the test-retest reliability was reported only in one study. Most researchers reported Cronbach's alpha for total EPDS score (18-20), and only one out of four stated Cronbach's alpha for both subscales of EPDS (21). The validity of the EPDS was investigated with respect to face and content validities. The content validity was investigated by qualitative approach using consultation with a panel of relevant experts. Third limitation, none of studies employed qualitative method such as CVR, and CVI.

The estimated sample size seems to be adequate, for example, all studies had a KMO, adequacy of sample size, and higher recommended value of 0.5. However, none of the studies reported post analysis power. Fourth limitation, one of studies did not report the KMO. Fifth limitation, none of studies mentioned the post analysis power through assessing adequacy of the sample size. Sixth limitation, missing percentage of items and how they were handled were not underlined in any of the studies. Some evidence supported the validity and reliability of EPDS to screen the postpartum depression in men, antepartum depression and predicting depression in postpartum period (9). Seventh limitation, although the psychometric properties of the EPDS have never been considered in Iranian population, two studies declared the sensitivity and the specificity (18, 19). In a study of Kheirabadi et al. (19), the sensitivity and the specificity at the cut-off point of >12 were 78%, and 75%, respectively. Another study by Mazhari and Nakhaee (18) reported the sensitivity and the specificity were 95%, and 87% at the cut-off point of 12.13, respectively. The sensitivity and the specificity of the EPDS were somewhat different in these studies at almost the same cut-off point, which can be attributed to timing of the

EPDS administrated to women during postpartum, subject's age, difference in cultural attitude in various parts of Iran, different criteria (gold standard), and diagnostic interview. Gibson et al. suggested that since the EPDS has been developed in a western setting, and also there are different etiologies in various cultures, it seems that this tool is unable to accurately detect the status of postpartum depression in other cultural settings. Some studies believe that the time interval between the EPDS implementation and the diagnostic interview should be less than 24 hours due to varied mental status during the postpartum period. Eighth limitation, the time interval was not determined in several studies applying the gold standard (22).

5- CONCLUSION

Evidence to support the validity and the reliability of the EPDS is adequate as a screening tool for postnatal depression. However, future studies should have more focus on other psychometric properties such as CFA. Future works should be better able to address systematic review of psychometric properties of the Edinburgh Postnatal Depression Scale in western population. Future studies should be developed and reported based on COSMIN checklist.

6- CONFLICT OF INTEREST: None.

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