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REVIEW

Systematic Review and Meta-Analysis of the Prevalence of the Maternity Blues in the Postpartum Period

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ABSTRACT

Objective: To determine the prevalence of maternity blues among women in the postpartum period.

Data Sources: We conducted our systematic review and meta-analysis by searching the literature for relevant articles published in three international databases, PubMed, Web of Science, and Scopus, from date of inception through December 11, 2019, using the keywords *prevalence*, *incidence*, *maternity blues*, and *baby blues*.

Study Selection: From 336 articles initially screened, we included 26 articles in the systematic review and meta-analysis.

Data Extraction: Two independent reviewers used a standardized form to extract data from eligible articles. We evaluated the quality of individual studies and the overall evidence according to Hoy et al.'s risk of bias tool.

Data Synthesis: The prevalence of maternity blues in the 26 included studies was 13.7% to 76.0%. Based on the results of the random effects model, the prevalence of maternity blues in 5,667 women was 39.0% (95% confidence interval [32.3, 45.6]; $I^2 = 96.6\%$). The prevalence of maternity blues among women in Africa was greatest at 49.6%.

Conclusion: Considering the great prevalence of maternity blues in women after childbirth, paying attention to the key symptoms of maternity blues and implementing educational programs for health care providers and mothers after childbirth are essential.

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During the postpartum period, potential complications can occur that have significant effects on women and their neonates. The lack of accurate and timely diagnosis and attention to physical and mental disorders, specifically after birth, may result in irrecoverable emotional and cognitive impairment for women and their neonates (Norhayati, Hazlina, Asrenee, & Emilin, 2015). One such postpartum psychological disorder is maternity blues (Rai, Pathak, & Sharma, 2015), also referred to as *mother's blues* or *third-*, *fourth-*, or *tenth-day blues*. Maternity blues is a transient physiologic and psychological disorder with potential symptoms of depression, tearfulness, sorrow/weeping, unstable mood, insomnia, anxiety, and confusion (Ntaouti et al., 2018).

Maternity blues may disrupt infant care and increase the risk of symptoms of postpartum depression (Zanardo et al., 2019), impair maternal–infant interactions (Badr & Zauszniewski, 2017; Bydlowski, Lalanne, Golse, & Vaivre-Douret, 2013), and affect child development (Mirhosseini et al., 2015). The exact causes of maternity blues are unknown, but the most probable cause is sudden hormonal changes after childbirth; hence, women who are more sensitive to hormonal changes have greater incidence of maternity blues than women who are not (Pop et al., 2015). Various researchers reported that maternity blues is a definite and important risk factor for postpartum depression (Gerli et al., 2019; Meilina & Nasrudin, 2019). Maternity blues may begin the first day after birth and may continue for up to 10 days or several weeks. The prevalence of maternity blues in individual studies was estimated to be 10% to 80% (O'Hara & McCabe, 2013). Although the prevalence of maternity blues has been reported in individual studies, to our knowledge, there is no systematic review or meta-analysis about the prevalence of maternity blues. Furthermore, the

Maternity blues is one of the most common complications in the postpartum period.

precise estimation of the prevalence of maternity blues may be helpful to provide timely and appropriate treatment for maternity blues. Therefore, the aim of our systematic review and meta-analysis was to determine the prevalence of maternity blues among women in the postpartum period.

Methods

Search Strategy

We searched international databases PubMed, Web of Science, and Scopus for relevant articles published in English from the inception of the databases through December 11, 2019. We adapted the search strategy we used for MEDLINE for the other databases. The specific search strategy was created by a health sciences librarian with expertise in systematic review based on the Peer Review of Electronic Search Strategies (PRESS) standard (McGowan et al., 2016). Additionally, we used PROSPERO to search for ongoing or recently completed systematic reviews. We used Boolean operators (AND, OR, and NOT), medical subject headings, truncation (*), and related words to search titles and abstracts using the following keywords: *prevalence*, *incidence*, *occurrence*, *survey*, *frequency*, *surveillance*, *maternity blues*, *baby blues*, *postpartum blues*, and *maternal blues*.

Eligibility Criteria

The methods adapted for this systematic review were developed in accordance with the *Cochrane Handbook for Systematic Reviews* (Higgins & Green, 2011), and results are reported using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) tool (Moher, Liberati, Tetzlaff, & Altman, 2009). Descriptive cross-sectional, retrospective, and prospective studies were included. We excluded reviews, letters to the editor, correspondence, case reports, and case series; articles published in languages other than English; articles without available full texts; studies with poor methodologic quality based on Hoy et al.'s (2012) quality assessment tool; and studies in which the tools used to measure maternity blues were not specified accurately. We excluded randomized controlled trials because our study aim was to find observational studies on prevalence; because the randomized controlled trials were conducted with specific populations, prevalence may have been erroneously estimated. The target population consisted of women in the postpartum period. The prevalence of maternity blues after childbirth was calculated based on the available standard instruments. The included studies were conducted using prospective and retrospective approaches.

Selection of Studies and Data Extraction

According to the study protocol, two researchers (M.E.A. and M.A.) independently screened the titles and abstracts based on the eligibility criteria. After removal of the duplicate articles, the full texts of the remaining articles were screened based on the eligibility criteria, and the required information was extracted. Disagreements between the two researchers were resolved by consensus. We extracted the following data from each article: first author information, year of publication, country, sampling method, age of participants, design, name of tool, day after birth of measurement for maternity blues, income level (defined based on the World Bank categories of high income, high-middle income, low-middle income, and low income), risk of bias, and prevalence of maternity blues.

Quality Assessment

To assess the methodologic quality and risk of bias, we evaluated each observational study using Hoy et al.'s (2012) tool. This 10-item tool is used to evaluate the quality of studies in two dimensions: external validity (Items 1–4: target population, sampling frame, sampling method, and nonresponse bias minimal) and internal validity (Items 5–9: data collection method, case definition, study instrument, and mode of data collection). Item 10 assesses bias related to the analysis. Two researchers (K.R.K. and M.E.A.) independently evaluated risk of bias.

Data Synthesis

We recorded the frequency with percentage of prevalence of maternity blues from each study. We then tested for pooled effect size of prevalence and evaluated the heterogeneity of the preliminary studies by I^2, tau-square, and chi-square tests. Because of great variability among study results, we reported pooled prevalence based on the random-effects model and used a forest plot to present the results. We conducted subgroup analyses to determine heterogeneity based on the location of the studies and instruments used to assess the prevalence of maternity blues. We conducted univariate meta-regression to assess the heterogeneity of studies

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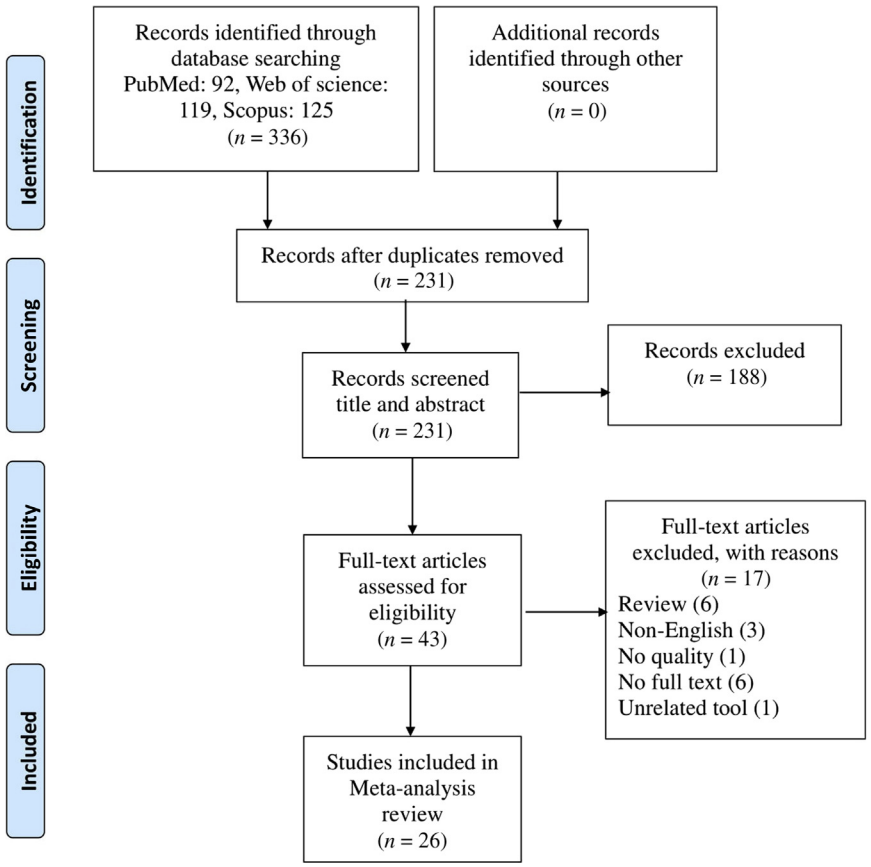

Figure 1. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram of study selection process.

and the proportion of between-study variance explained by covariates using regression coefficient with 95% confidence interval (CI) and adjusted R^2. We performed meta-analysis using Stata (Version 14; StataCorp, College Station, TX).

Results

We retrieved 336 articles from the initial search in the three electronic databases. Among the 231 nonduplicated articles, we excluded 188 after review of abstracts. Of the 43 articles that remained, 26 met the eligibility criteria. Of the 17 excluded articles, six were reviews, three were published in languages other than English, six did not have full text, one had an unrelated tool, and one did not meet the minimum quality requirements for inclusion (see Figure 1).

Study Characteristics

The 26 eligible studies included a total of 5,667 participants whose ages ranged from 18 to 39 years. Most studies were conducted in Asia ($n = 10$) and Europe ($n = 12$); only one study was conducted in the United States ($n = 1$). Most of the Asian studies were conducted in Japan ($n = 7$). Most of the studies were descriptive cross-sectional ($n = 21$), and convenience sampling was used for data collection. The instrument used to measure maternity blues in most studies ($n = 13$) was the Stein scale (Stein, 1980). The sample size of the included studies that used the Stein scale was 2,623 participants. All of the included studies had suitable quality in terms of methods and a low risk of bias. In most studies ($n = 16$), researchers assessed maternity blues during the first week postpartum. Moreover, anxiety and postpartum depression, considered to be associated disorders, were reported in one and seven studies, respectively (see Supplemental Table S1).

Tools

The most commonly used tools in the 26 studies were the Stein scale ($n = 13$) and the Kennerley and Gath Blues Scale ($n = 8$). Other tools included the Pitt scale (Pop et al., 1995), Zung Self-Rating Depression Scale (ZSDS; Nagata et al., 2000), Middlesex Hospital Questionnaire

Across studies, the prevalence of maternity blues was 39%.

(MHQ; Harris, 1981), Edinburgh Postnatal Depression Scale (EPDS; Cox, Holden, & Sagovsky, 1987), and Maternity Blues Scale (MBS; Pop et al., 2015). All of the tools were validated. The number of items and scoring system based on the type of tool were as follows: Pitt (12 items, score range = 1–26), Stein (24 items, score range = 1–48), Kennerley and Gath Blues Scale (28 items, score range = 1–28), MHQ (48 items, score range = 1–8), ZSDS (20 items, score range = 1–100), EPDS (10 items, score range = 1–30), and MBS (16 items, score range = 1–100).

Prevalence of Maternity Blues

The prevalence of maternity blues reported in the 26 studies was 13.7% to 76.0%. Based on the results of the random-effects model, the overall prevalence of maternity blues in 5,667 women was 39.0% (95% CI [32.3, 45.6], I^2 = 96.6%). Subgroup analysis for the diagnosis of heterogeneity was performed based on the instrument used for maternity blues assessment and the country where the study was conducted. Maternity blues had a lesser pooled prevalence with the Stein scale (33.6%) and Kennerley and Gath Blues Scale (40.1%) than with the other instruments (50.9%). The prevalence of maternity blues when measured with the other instruments was 76.1% with the MHQ, 40.6% with the Pitt, 66.7% with the ZSDS, 29.4% with the EPDS, and 43.1% with the MBS (see Figure 2). The prevalence of maternity blues in Africa was greater than in other continents. Among women in Africa and Asia, the prevalence of maternity blues was 49.6% (95% CI [31.7, 67.5]) and 33.1% (95% CI [20.1, 46.0]), respectively (see Figure 3).

One study was conducted in a low-income country, four studies were conducted in middle-income countries, and 21 studies were conducted in high-income countries. Subgroup analysis based on income status showed that the prevalence of maternity blues was greater in low- and middle-income countries than in high-income countries. Hence, the pooled prevalence of maternity blues was 76.0% (95% CI [61.8, 86.9]), 40.8% (95% CI [28.4, 53.3]; I^2 = 95.3%), and 38.4% (95% CI [30.0, 46.7]; I^2 = 97.0%) in low-, middle-, and high-income countries, respectively.

Prevalence of Maternity Blues by Tools

The pooled prevalence of maternity blues based on the random-effects model for the two main measurement tools (Stein scale and Kennerley and Gath Blues Scale) in 21 studies with 4,597

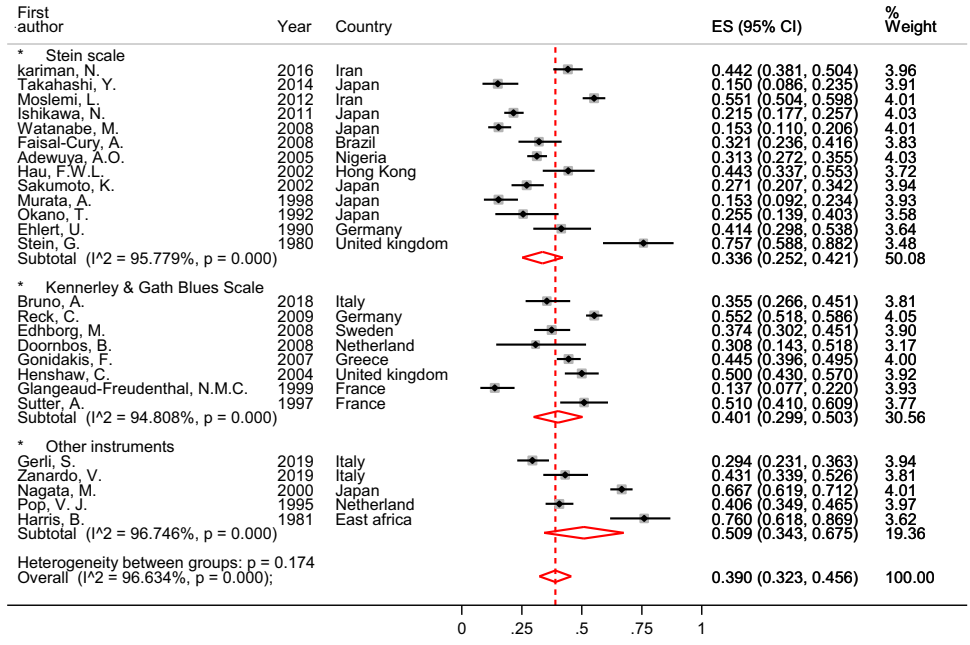

Figure 2. Pooled analyses and subgroup analyses by type of instrument for estimation of maternity blues prevalence in the world. CI = confidence interval; ES = effect size.

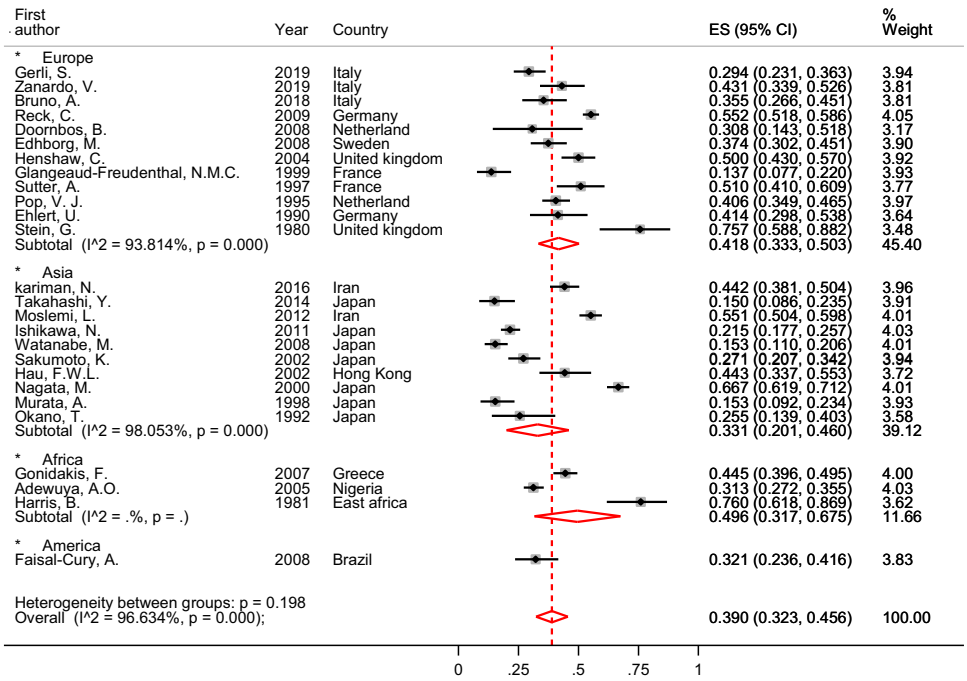

Figure 3. Pooled analyses and subgroup analyses by continent of study conducted for estimation the maternity blues prevalence in the world. CI = confidence interval; ES = effect size.

participants was 36.1% (95% CI [29.1, 43.1]; $I^2 = 96.2\%$). Based on these two main measurement tools, the prevalence of maternity blues in Europe was greater than on other continents. Moreover, the prevalence of maternity blues in middle-income countries was greater than in high-income countries (see Table 1).

Three studies based on other instruments were conducted in The Netherlands (Pitt), Japan (ZSDS), Tanzania (MHQ), and Italy (EPDS and MBS). Subgroup prevalence of maternity blues based on these tools showed greater pooled prevalence than prevalence determined with the other instruments (MHQ, Pitt, ZSDS, EPDS, and MBS) and for the Kennerley and Gath Blues Scale. Hence, we repeated the meta-analysis and subgroup analyses separately based on the tools used.

Metaregression

The results of the univariate random-effects metaregression analyses showed that the publication year significantly contributed to the heterogeneity of prevalence, with coefficients of –0.66% (95% CI [–1.3, -0.01]) and R^2 of 11.3%. The instruments used to measure maternity blues did not significantly explain variation in prevalence ($p = .060$). Moreover, income status was not significantly associated with the prevalence of maternity blues ($p = .685$). Although the mean age of participants had an indirect association with maternity blues prevalence, the effect size variation was not significant ($p = .131$; see Table 2 and Figure 4).

Discussion

We conducted a systematic review and meta-analysis to investigate the prevalence of maternity blues. Maternity blues is considered the most common psychological disorder in the early weeks after childbirth. We included 26 studies published between 1980 and 2019 involving 5,667 participants in our meta-analysis. The prevalence of maternity blues across these studies was 39.0% (13.7%–76%). We also found that the prevalence of maternity blues was greater in African and European countries than in Asian countries and the United States.

Additionally, the prevalence of maternity blues was greater in low- and middle-income countries than in high-income countries. This finding was consistent with those of previous studies that women with poor economic status experienced greater levels of postpartum depression and

Results indicate that attention to symptoms of maternity blues after childbirth is crucial in combination with physical care.

maternity blues (Hahn-Holbrook, Cornwell-Hinrichs, & Anaya, 2018; Manjunath, Giriyappa, & Rajanna, 2011; Shivalli & Gururaj, 2015). Because it was observed by researchers that mothers with newborn daughters experience more maternity blues (Manjunath et al., 2011), factors that may contribute to the increased prevalence of maternity blues in less-developed countries include the lesser importance associated with female newborns in these countries and the lack of emotional and social support (Alvarado-Esquivel, Sifuentes-Alvarez, Salas-Martinez, & Martínez-García, 2006; Goyal, Gay, & Lee, 2010; Manjunath et al., 2011). Moreover, in terms of policy making, the lack of necessary infrastructure to better manage maternity blues and provide support for women until it resolves, such as shortage of health care personnel, insufficient mental health screening services for mothers, and low awareness about use of social support services in countries with low income levels, is the primary factor affecting the resolution of maternity blues (Gelaye, Rondon, Araya, & Williams, 2016; Patel et al., 2007; World Health Organization, 2008). Moreover, this difference in the prevalence of maternity blues among countries might be related to differences in cultural backgrounds and their lifestyles (Alves, Fonseca, Canavarro, & Pereira, 2018; Fiala, Švancara, Klánová, & Kašpárek, 2017; Shi, Ren, Li, & Dai, 2018).

The most commonly used tools to measure maternity blues were the Stein scale and the Kennerley and Gath Blues Scale, which were used in 13 and 8 studies, respectively. A greater prevalence in maternity blues was found using the Kennerley and Gath Blues Scale than the Stein scale. This difference may arise from the different symptoms measured by the two tools. Because maternity blues causes a variety of emotional and psychological symptoms and each tool may examine a slightly different domain of symptoms, there may be variations in the prevalence of maternity blues depending on the measurement tool (Manjunath et al., 2011). This difference can also be caused by the study population, demographic characteristics (residence, educational attainment, and age), and time elapsed between data collection and when the participants gave birth.

Implications

Timely detection and treatment of the symptoms of maternity blues can help reduce the burden of these symptoms. Untreated symptoms of maternity blues can have negative consequences on the health of women and their infants, including

Table 1: Pooled Prevalence of Maternity Blues in Continents and Income Status Subgroups by Tools

	Stein Scale			Kennerley–Gath Blues Scale			Two Main Tools[a]		
Characteristic	*n*	Effect Size, % [95% CI]	I^2	*n*	Effect Size (95% CI)	I^2	*n*	Effect Size, % (95% CI)	I^2
Continent									
Asia	9	29.2 [18.4, 40.1]	96.6	0	—	—	9	29.2 [18.4, 40.1]	96.6
America	1	32.1 [23.6, 41.6]	NA	0	—	—	1	32.1 [23.6, 41.6]	NA
Europe	2	55.5 [46.6, 64.4]	NA	7	39.3 [26.7, 52.0]	95.5	9	43.3 [32.1, 54.5]	94.8
Africa	1	31.3 [27.2, 35.5]	NA	1	44.5 [39.6, 49.5]	NA	2	36.7 [33.6, 39.8]	NA
Income status									
Middle	4	40.8 [28.4, 53.3]	95.3	0	—	—	4	40.8 [28.4, 53.3]	95.3
High	9	29.9 [21.4, 38.5]	92.4	8	40.1 [29.9, 50.3]	94.8	17	35.0 [26.5, 43.4]	96.4
Overall pooled effect size	13	33.6 [25.2, 42.1]	95.8	8	40.1 [29.9, 50.3]	94.8	21	36.1 [29.1, 43.1]	96.2

Note. CI = confidence interval; I^2 index = degree of heterogeneity; NA = not applicable.
[a]The two main tools are the Stein scale and Kennerley–Gath Blues scale.

Table 2: Univariate Metaregression for Prevalence of Maternity Blues

Variable	Coefficient, %	Standard Error	95% CI for Coefficient	*p*	Adjusted R^2
Mean age	–2.1	1.3	[–4.9, 0.68]	.131	7.0
Publication year	–0.66	0.32	[–1.3, –0.01]	.047	11.3
Type of instrument[a]	8.2	4.2	[–0.36, 16.8]	.060	12.1
Income status[b]	–2.7	6.7	[–16.8, 11.2]	.685	3.7

Note. CI = confidence interval.
[a]Type of instrument: 1 = Stein scale, 2 = Kennerley–Gath Blues Scale, 3 = other tools. [b]Income status: 1 = low, 2 = middle, 3 = high.

the children's cognitive growth (Kieviet, Dolman, & Honig, 2013). Disagreement among specialists about approaches to the diagnosis of maternity blues is an important barrier to comprehensive management of maternity blues, and this led to the great heterogeneity in prevalence in our study (Gonidakis, Rabavilas, Varsou, Kreatsas, & Christodoulou, 2007; Ntaouti et al., 2018). This can be attributed to the lack of a specific definition of *maternity blues* based on international standards. Although instances of maternity blues present with postpartum changes in mood, no specific diagnostic criteria have been established (Gonidakis et al., 2007; Ntaouti et al., 2018). Additionally, some rare medical disorders such as frontotemporal dementia, frontal lobe tuberculoma, and Sheehan syndrome may be associated with some symptoms similar to those of maternity blues (Dell & Halford, 2002; Gautam, Bhatia, Rathi, & Kaur, 2014; Stavrou & Sgouros, 2002). Despite the variety of maternity blues assessment tools, Vitale et al. (2016) found that the use of mood-affecting drugs and antidepressants, along with appropriate precautions, such as family support, can help in the treatment of the symptoms of maternity blues.

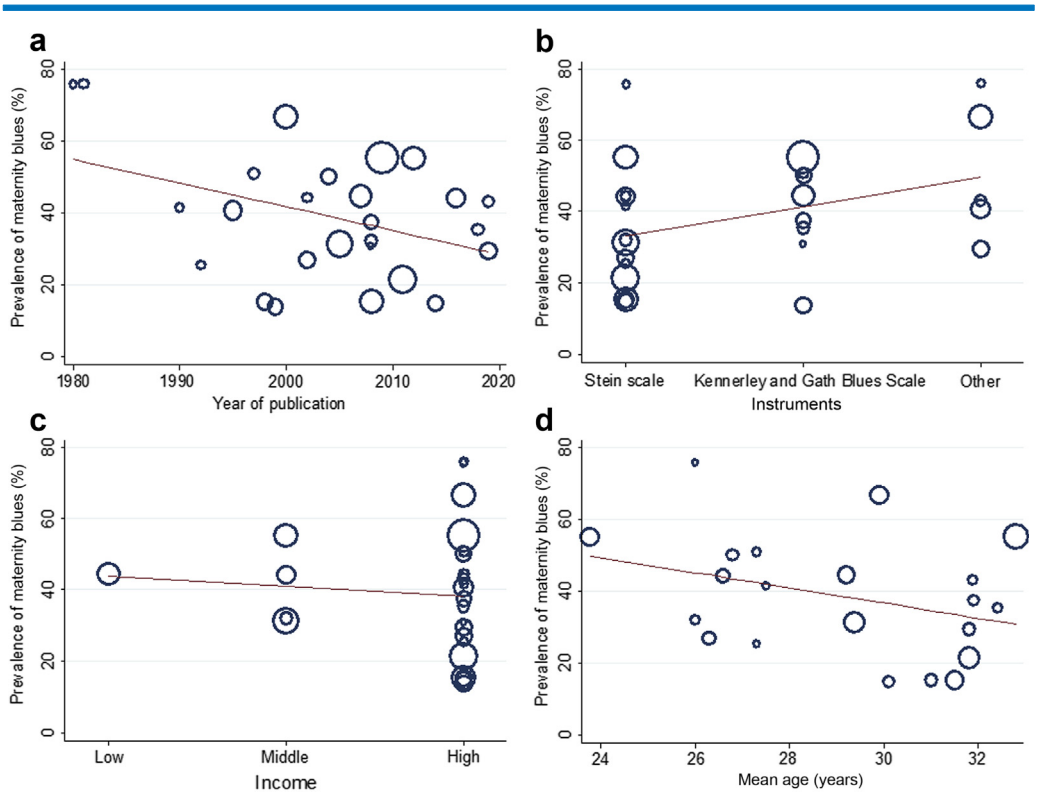

Figure 4. Metaregression of the prevalence of maternity blues based on four variables: (a) publication year of study, (b) instruments, (c) income status, and (d) mean age in years.

Limitations

There were several limitations to our review. Among the most important challenges was that the time at which the symptoms of maternity blues were measured was diverse across the studies, resulting in the inability to determine the prevalence of maternity blues based on time since childbirth. The use of different maternity blues measurement tools in various studies was another important limitation that led to a broad range of prevalence rates and substantially increased the heterogeneity. To decrease the heterogeneity, we assessed the prevalence of maternity blues based on subgroups, including the type of scale used and the continents where the studies were conducted. Finally, all studies were cross-sectional observational designs, and the estimated prevalence in the United States was determined based on one study.

Conclusion

Our findings suggest a relatively high prevalence of maternity blues among women during the postpartum period. Our findings also indicate that attention to symptoms of maternity blues after childbirth is crucial in combination with physical care. The attention paid to psychological dimensions of the postpartum period can be improved through educational programs designed for women and their families before and after childbirth. Furthermore, our results suggest that health care professionals, including midwives, nurses, and physicians, play a vital role in identifying the occurrence and severity of maternity blues through essential psychosocial care and mental health support.

Supplementary Material

Note: To access the supplementary material that accompanies this article, visit the online version of the *Journal of Obstetric, Gynecologic, & Neonatal Nursing* at http://jognn.org and at https://doi.org/10.1016/j.jogn.2020.01.001.

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