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Perceived health and postpartum depression among perinatal women: a cross-sectional study

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Abstract

Background Understanding the health status and postpartum depression (PPD) of mothers is crucial for improving and meeting women's needs for quality care. We assessed the perceived health and PPD of perinatal women, examining differences based on whether their postpartum educational needs were met.

Methods This cross-sectional study of 3,085 women used secondary data from a national survey on the status of postpartum care.

Results Perceived health after childbirth was significantly lower than that during pregnancy. Moreover, 41.9% were found to be at risk for PPD. More than half of the participants (52.9%) received education on postpartum care, while only 26.0% received education on PPD. Participants with unmet educational needs about postpartum care and PPD had significantly lower perceived health and higher PPD levels than those who were educated.

Conclusion The findings highlight the necessity of improving education and support systems for perinatal women to promote well-being, which could help achieve Sustainable Development Goals.

Keywords COVID-19, Maternal care, Perceived health, Postpartum depression, Pregnancy

Background

The perinatal period is a time of considerable physical and emotional adjustment and can be a vulnerable period for women [1]. The coronavirus disease 2019 (COVID-19) pandemic posed unprecedented challenges to society, notably impacting and straining the healthcare system and infrastructure. These challenges had substantial repercussions on perinatal care and the psychosocial well-being of pregnant women [2, 3]. Furthermore, additional stressors associated with the global health crisis, including social isolation, fear of infection, and uncertainties about the future, likely worsened the challenges faced by perinatal women [4].

Perinatal depression is a public health concern owing to its negative impact on perinatal health outcomes [5]. Research has highlighted the impact of COVID-19 on pregnancy outcomes, revealing that women with severe symptoms were at a high risk of preeclampsia, preterm birth, and stillbirth [6, 7]. Furthermore, the COVID-19 pandemic led to a global increase in mental health issues, such as stress, anxiety, and depressive symptoms among perinatal women [8]. A qualitative synthesis of 20 studies revealed that women's mental health during the perinatal

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period was affected by quarantine measures and disruptions in maternity care [9]. Caffieri et al. [10], through a synthesis of 12 meta-analyses, found that the global prevalence of depression among pregnant and postpartum women during the COVID-19 pandemic was 20% and 30%, respectively.

Specifically, postpartum depression (PPD) can have detrimental effects on mothers' psychological health, quality of life, interactions with infants, and the development of children [11]. Consequently, to support women's health and well-being, providing education on postpartum care and PPD is essential during the antenatal and postnatal periods.

However, face-to-face prenatal care, health care, and educational opportunities for mothers decreased during the COVID-19 pandemic [3]. Meanwhile, prenatal education was not actively provided, nor was it replaced with online or virtual classes [12]. Thus, disruptions in healthcare services, as well as limited access to support networks [13], affected the overall health management of postpartum mothers, hindering their ability to receive appropriate postnatal care.

Understanding the health status and PPD of mothers who gave birth during the COVID-19 pandemic is crucial for improving and meeting women's needs for quality care. Juarez Padilla et al. [14] conducted a study on Latina women, finding that those who rated their health as poor had significantly higher rates of prenatal depression. Managing PPD is critical, and understanding the relationship between perceived health and PPD is beneficial. However, studies investigating this connection are lacking.

Moreover, unmet educational needs as a result of the COVID-19 pandemic might have negatively impacted maternal and neonatal health. Mothers have essential physical and emotional needs throughout the year following childbirth [15]. However, women often feel that their need for information and support is inadequately met during the perinatal period [15]. Adams et al. [16] conducted focus group interviews with 54 postpartum women, revealing a lack of education on maternal physical and mental health. Thus, understanding whether the educational needs regarding PPD and postpartum care were related to the health of mothers who gave birth during the COVID-19 pandemic is vital. The COVID-19 pandemic caused systemic disruptions like cancellations of in-person prenatal classes and highlighted digital communication barriers. These limitations on perinatal education access could have further contributed to unmet educational needs among postpartum women, underscoring the importance of examining whether those needs were adequately addressed.

We assessed the perceived health and PPD of women who gave birth during the COVID-19 pandemic and examined whether their educational needs regarding postpartum care and PPD were met. We also determined differences in PPD and perceived health depending on whether their postpartum educational needs were met. These findings can provide valuable insights for improving women's perinatal health.

Methods

Study design and population

This cross-sectional study was conducted using secondary data from a national survey on the status of postpartum care. The participants were 3,085 women who gave birth between January 1 and December 31, 2020. The inclusion criteria were women in the perinatal period who gave birth in 2020. The exclusion criterion was women without a partner, as the presence of a partner was considered a significant factor influencing postpartum depression.

Data collection

The data were from the 2021 Postpartum Care Survey, a national survey conducted by the Ministry of Health and Welfare and the Korea Institute for Health and Social Affairs from September 1–10, 2021, to assess mothers' postpartum care status in Korea. The sampling framework was the registration data of pregnant women in a web-based Public Healthcare Information System in Korea. The sample of original study [17] was selected using stratified two-stage cluster sampling. In the first stage, 107 districts were selected from the 1,178 administrative districts. In the second stage, of 3,210 households sampled from the 107 districts using systematic sampling, 3,127 women responded (97.4%). Among them, women without a partner (n = 42) were excluded in this study (Fig. 1).

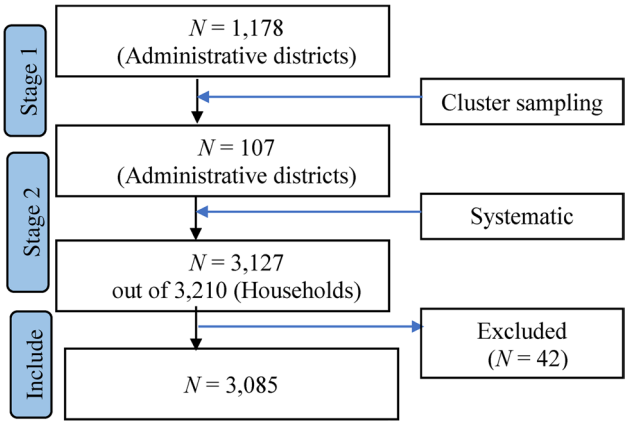


Fig. 1 Flowchart of participants

Measures

Postpartum depression

PPD was assessed using the Korean version of the Edinburgh Postnatal Depression Scale (EPDS) developed by Cox et al. [18]. The Korean version of the EPDS has been validated with a sample of women with PPD [19]. The EPDS comprises 10 items scored on a 4-point scale (0–3), yielding a maximum total score of 30. Higher scores indicate a higher degree of postnatal depressive symptoms. Scores of 10 or higher indicate possible depression. The Cronbach's α in this study was 0.91.

Perceived health

Participants rated their overall health on a single-item scale ranging from 1 (*very bad*) to 5 (*very good*) during pregnancy and after childbirth (up to 6 weeks). Higher scores indicate a perception of better health.

Postpartum educational needs

We assessed educational needs for postpartum care (one item) and PPD (one item) and whether such education was received. The response options were "needed" and "not needed" for educational needs and "yes" and "no" for whether they were educated about postpartum care and PPD. Participants were categorized into three groups based on whether their postpartum educational needs were met: (1) those who received education, regardless of whether they had expressed educational needs, (2) those who had educational needs but did not receive education, and (3) those who had no needs and did not receive any education.

Data analysis

Data were analyzed using SPSS Version 28.0 (IBM Corp. Armonk, NY, USA). Descriptive statistics were calculated to determine the participants' characteristics, level of perceived health, and the severity of PPD symptoms. A paired *t*-test assessed changes in perceived health during the prenatal and postnatal periods. Group differences were analyzed using analysis of variance, with post hoc comparisons performed using Scheffe's analysis.

Table 1 Means, standard deviations, and correlations of the study variables *(N* = 3,085*)*

Variable	M (SD)	1 *r* (*p*)	2 *r* (*p*)	3 *r* (*p*)
1. Postpartum depression	9.24 (5.28)	--		
2. Perceived health during pregnancy	3.52 (0.98)	−0.24 (< 0.001)	--	
3. Perceived health during postpartum	3.14 (0.98)	−0.36 (< 0.001)	0.39 (< 0.001)	--

Results

Participants' characteristics

More than half of the participants (n = 1,717; 55.7%) were aged < 35 years. Most (n = 2,600; 84.3%) were college graduates or higher, and 58.0% (n = 1,788) had a moderate socioeconomic level. Regarding pregnancy, 64.5% (n = 1,991) of the participants had planned their pregnancies, and 90.8% (n = 2,800) had natural conceptions. Most participants (n = 3,066; 99.4%) gave birth in a hospital, and 0.6% (n = 19) gave birth at home or a birthing center. Slightly more deliveries were made by cesarean section (n = 1,656; 53.7%) than natural births (n = 1,429; 46.3%). Of all deliveries, 7.6% were premature. Most participants (n = 2,998; 97.2%) gave birth to one child, 54.7% (n = 1,687) were first-time mothers, and 79.4% (n = 2,450) used a postpartum care center after delivery.

Perceived health and PPD

Perceived health was significantly lower during the postpartum period (M = 3.14, SD = 0.98) than during pregnancy (M = 3.52, SD = 0.98; paired t = 19.59, p < .001). Women's PPD scores ranged from 1 to 27, with a mean score of 9.24 (SD = 5.28), and 41.9% had scores of 10 or higher. PPD negatively correlated with perceived health during pregnancy (r = – .24, p < .001) and the postpartum period (r = – .36, p < .001; Table 1).

Postpartum educational needs

Most participants had educational needs related to postpartum care and PPD. However, 52.9% (n = 1,633) had received education in postpartum care, and 26.0% (n = 802) had received education in PPD (Fig. 2).

Perceived health and PPD by meeting educational needs

Table 2; Fig. 3 present the differences in perceived health and PPD among the three groups based on educational need fulfillment. Participants in the group that needed but did not receive education on postpartum care and PPD had significantly lower perceived health than in the group that had education (F = 31.72, p < .001) and the group that had no need and no education (F = 35.78, p < .001). Correspondingly, PPD was significantly higher in the group that needed but did not receive education on postpartum care and PPD than in the group that had education (F = 11.62, p < .001) and the group that had no need and no education (F = 37.08, p < .001).

Postpartum care and PPD by participant characteristics

Perceived health status was lower in women who delivered by cesarean section than in those having vaginal deliveries (t = 2.37, p < .05). Additionally, PPD was higher in the following groups: low-income (F = 16.18, p < .001), unplanned pregnancy (t = – 2.67, p < .01), cesarean section (t = – 2.11, p < .05), pregnancies of less than 37 weeks

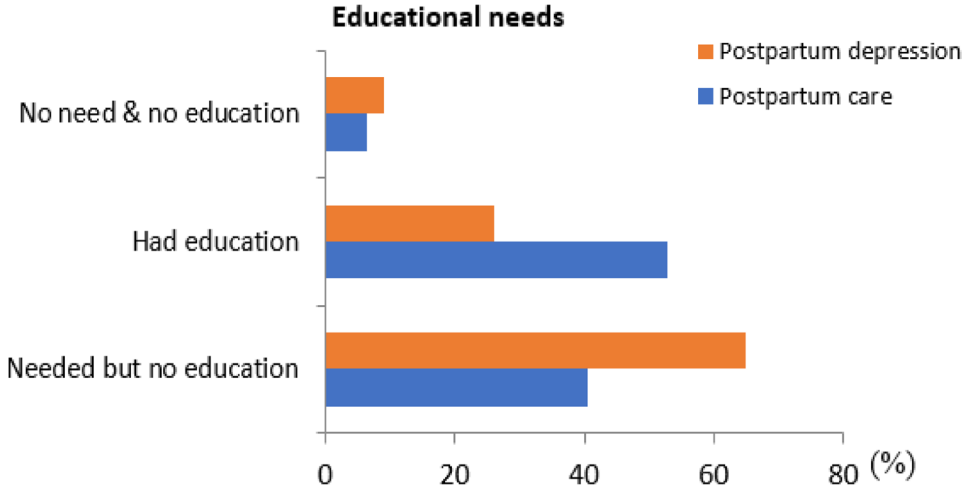


Fig. 2 Educational needs for postpartum care and depression ($N = 3,085$)

Table 2 Perceived health and postpartum depression by postpartum educational needs ($N = 3,085$)

Educational needs		*n* (%)	Perceived health	*F* (*p*)	Postpartum depression	*F* (*p*)
			M (SD)		M (SD)	
Postpartum care	1. Needed but no education[a]	1,253 (40.6)	2.98 (0.95)		9.78 (5.39)	
	2. Had education[b]	1,633 (52.9)	3.26 (0.98)	31.72 (< 0.001)	8.92 (5.12)	11.62 (< 0.001)
	3. No need & no education[c]	199 (6.5)	3.21 (1.00)	b, c > a	8.50 (5.55)	a > b, c
	Total	3,085 (100.0)	3.14 (0.98)		9.24 (5.28)	
Postpartum depression	1. Needed but no education[a]	2,002 (64.9)	3.04 (0.97)		9.80 (5.29)	
	2. Had education[b]	802 (26.0)	3.34 (1.00)	35.78 (< 0.001)	8.52 (5.21)	37.08 (< 0.001)
	3. No need & no education[c]	281 (9.1)	3.36 (0.88)	b, c > a	7.37 (4.65)	a > b > c
	Total	3,085 (100.0)	3.14 (0.98)		9.24 (5.27)	

($t = 3.35$, $p < .001$), and multiple fetal pregnancies ($t = 0.84$, $p < .05$), than in the counterpart groups (Table 3).

Discussion

We examined the perceived health and PPD of perinatal women, focusing on whether their postpartum educational needs were met. The results indicated that participants experienced a more significant decline in their perceived health status during the postpartum period than during pregnancy. This finding emphasizes the need for enhanced healthcare support during the postpartum period to aid complete recovery following pregnancy and childbirth.

Notably, 41.9% of participants were at risk of PPD (score ≥ 10), underscoring the substantial mental health burden in this population. Safi-Keykaleh et al. [20] reviewed 24 studies, reporting that the prevalence of PPD was 27% when using a cutoff score of 10. An et al. [21] found the prevalence of PPD among Chinese women during the COVID-19 pandemic to be 56.9%. Through our study, we reaffirm the commonality of PPD among perinatal women, highlighting the critical need for its prevention and management.

In the present study, mothers who had a cesarean delivery reported lower perceived health than those who had vaginal deliveries. Furthermore, consistent with previous studies [2, 22, 23], we identified several risk factors for PPD, including low income, premature childbirth, pregnancy intention, cesarean section, and multiple births. Thus, focusing on and supporting at-risk women is essential to prevent PPD throughout pregnancy and the postpartum period. Moreover, Juarez Padilla et al.'s study [14] has linked low perceived health with high prenatal depression among Latin women. Our findings expand on existing research, indicating a negative relationship between perceived health during postpartum and PPD,

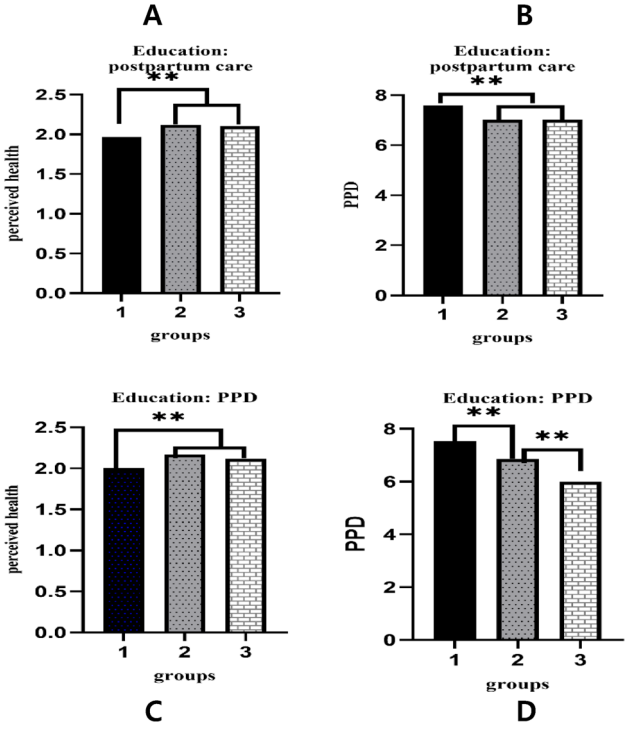


Fig. 3 Perceived health and postpartum depression by postpartum educational needs (N = 3,085). **A** & **B** show the levels of perceived health and PPD based on whether the need for education on postpartum care was met. **C** & **D** show the levels of perceived health and PPD based on whether the need for education on PPD was met. ** $p < 0.001$; PPD: postpartum depression; Groups 1: Needed but no education; 2: Education received; 3. No need & no education

highlighting the continued relevance of this relationship throughout the perinatal period.

A key finding of this study was the significant differences observed in perceived health and PPD levels, depending on whether the participants' educational needs regarding postpartum care and PPD were met. Through this difference, we highlight the potential positive effects of targeted education in reducing PPD and improving women's overall health in the perinatal period. Moreover, it aligns with previous studies that emphasize the importance of providing education and social support to meet the healthcare needs of postpartum women [21, 24, 25]. Saleh et al. [25] conducted a study on the effect of the COVID-19 pandemic on mothers' pregnancy, postpartum, and parenting experiences, reporting that women felt they did not receive adequate pregnancy-related education and support. Furthermore, a study conducted in Iran found that pregnant women's mental health was at risk because of insufficient access to necessary information about the fetus/newborn, pregnancy, delivery, and COVID-19 [26]. Bayrampour and Tsui [24] reported that postpartum women in Canada expressed a need for pandemic-related information and education as well as mental health support in the form of counseling, support groups, and meditation programs. Our findings are consistent with the studies mentioned above, indicating that perinatal women received insufficient information and experienced a lack of social support during the pandemic. However, owing to data limitations in this study, we did not determine why some participants considered their educational needs unmet or what specific improvements are required to address them. Researchers are summoned to conduct qualitative research that can help provide a comprehensive understanding of these aspects.

During the pandemic, social distancing and infection prevention measures limited face-to-face educational opportunities for pregnant women; likewise, in our study, we observed that mothers' educational needs were unmet. However, researchers have highlighted the beneficial effects of various interventions, including an application-based mHealth consultation service for PPD prevention by health professionals in Japan [27]; increased social support provided by online peer groups to lower prenatal and postnatal depression [28]; a weekly online mother-and-baby group to enhance adjustment [29]; and a chatbot designed to improve the obstetric and mental health care for perinatal couples in South Korea [30]. Moreover, through a systematic review, Schnitman et al. [31] highlighted that maternal education using digital tools (e.g., text with images, SMS, and videos) increased knowledge, emotional support, and behavioral changes in perinatal women. These studies indicated the potential for improving women's perinatal health by providing various types of education. However, the effectiveness of postpartum education may vary depending on the method of delivery. For example, online education can improve accessibility, especially during pandemic-like situations, but may be less effective for individuals with limited internet access or low digital literacy. Digital interventions for postpartum support, like mobile apps and chatbots are promising but their implementation may face barriers, particularly in low-resource settings. Barriers could include limited internet infrastructure, restricted smartphone access, gaps in digital literacy, language barriers, and cultural resistance to technology-based care. Recognizing these challenges is vital to interpret the feasibility and effectiveness of digital approaches that inform more inclusive health education strategies. Alternative strategies should be considered for women without access to the internet or smartphones, like radio broadcasts, television programs, telephone-based support, printed guidebooks, and local health worker visits. These approaches can help bridge the digital divide and ensure that essential information and support reach all women, regardless of their technological access.

In our study, we identified the unmet educational needs of postpartum mothers, highlighting the necessity of

Table 3 Perceived health and postpartum depression by participants' characteristics *(N = 3,085)*

Characteristic	Category	*n*	%	Perceived health		Postpartum depression	
				M (SD)	t/F (*p*)	M (SD)	t/F (*p*)
Age	< 35	1,717	55.7	3.17 (1.00)	1.83	9.26 (5.33)	0.26
	≥ 35	1,368	44.3	3.11 (0.95)	(0.068)	9.21 (5.20)	(0.796)
Education	≤ High school	485	15.7	3.20 (0.97)	1.41	9.67 (5.78)	1.79
	≥ College	2,600	84.3	3.13 (0.98)	(0.160)	9.16 (5.17)	(0.075)
Household income	High[a]	498	16.1	3.19 (1.01)	2.48	8.97 (4.87)	16.18
	Medium[b]	1,788	58.0	3.16 (0.98)	(0.084)	8.91 (5.20)	(< 0.001)
	Low[c]	799	25.9	3.08 (0.96)		10.15 (5.57)	c > a, b
Planned pregnancy	Yes	1,991	64.5	3.14 (0.97)	-0.39	9.05 (5.09)	-2.67
	No	1,094	35.5	3.15 (0.99)	(0.693)	9.59 (5.59)	(0.008)
Mode of conception	Natural	2,800	90.8	3.15 (0.98)	1.64	9.28 (5.28)	1.14
	Assisted[a]	285	9.2	3.05 (0.96)	(0.101)	8.90 (5.27)	(0.253)
Place of childbirth	Hospital	3,066	99.4	3.14 (0.98)	-1.71	9.25 (5.28)	0.86
	Others	19	0.6	3.53 (0.90)	(0.087)	8.21 (4.72)	(0.393)
Delivery mode	Vaginal	1,429	46.3	3.19 (0.97)	2.37	9.03 (5.14)	-2.11
	Cesarean section	1,656	53.7	3.10 (0.99)	(0.018)	9.43 (5.39)	(0.035)
Gestation	< 37	236	7.6	3.03 (0.96)	-1.93	10.35 (5.64)	3.35
(weeks)	≥ 37	2,849	92.4	3.15 (0.98)	(0.054)	9.15 (5.24)	(< 0.001)
Pregnancy	Singleton	2,998	97.2	3.15 (0.98)	1.61	9.20 (5.26)	-2.47
	Multiple	87	2.8	2.98 (0.95)	(0.108)	10.62 (5.51)	(0.013)
Parity	Primipara	1,687	54.7	3.12 (1.02)	-1.70	9.32 (5.33)	0.84
	Multipara	1,398	45.3	3.18 (0.93)	(0.089)	9.15 (5.21)	(0.399)
Use of Sanhujoriwon[b]	Yes	2,450	79.4	3.15 (0.97)	-1.14	9.15 (5.12)	1.74
	No	635	20.6	3.10 (1.03)	(0.256)	9.59 (5.84)	(0.082)

[a]Infertility treatment, [b]Sanhujoriwon are postpartum care centers in Korea

providing nursing interventions through multiple channels and supporting women's active participation. Establishing a robust system to strengthen non-face-to-face education is also essential. Additionally, collective efforts at the individual, community, and national levels are crucial. International collaboration in sharing common goals and developing effective policies and strategies can also contribute to enhancing women's health.

In the current study, we also found that more participants perceived that they did not receive education on PPD than those who did not receive education on postpartum care. Based on their study in Poland, Chrzan-Dętkoś et al. [32] suggested that the need for support to improve women's mental health might increase during the postpartum period, particularly during the COVID-19 pandemic. Chen et al. [2] showed that a lack of support negatively contributed to PPD. Similarly, we found that education positively affects women's postpartum health. Although it is unclear why some women reported having no educational needs, this group had lower perceived health scores and higher PPD levels than those who received postpartum education. Therefore, future research should examine individuals without educational needs and their education-related perceptions to decrease PPD and improve mental health.

Limitations

The limitations of the study should be considered when interpreting the results. First, this study relied on secondary data, which limited control over the measurement tools used. This study relied on self-reported secondary data, with perceived health assessed using a single item. However, the WHO report identifies a single-item measure of perceived health as a recommended indicator for assessing overall health status [33]. Nonetheless, it may not fully capture the multidimensional nature of health. Future studies may benefit from incorporating multi-item scales to provide a more comprehensive assessment of perceived health. Second, the study was conducted in one country, which may limit the generalizability of the findings to other cultural and socioeconomic contexts. Cultural and societal factors such as social distancing policy, access to educational services, and traditional postpartum confinement could have influenced the findings. Additionally, it should be noted that the "no need and no education" groups may have included participants who were unaware of the types of postpartum care or depression education available to them. Thus, their responses might have reflected a lack of awareness rather than a genuine absence of need. This potential underestimation of the actual demand for postpartum education should be considered when interpreting the findings.

Furthermore, the findings can provide evidence for developing strategies to achieve shared goals in women's health promotion. Comparative studies in different cultural contexts are needed to validate the current findings and provide a broader understanding of the influence of educational needs on postpartum health. Finally, owing to the cross-sectional design of the study, we were unable to draw causal inferences regarding the relationships between variables. Longitudinal studies are needed to establish temporal relationships and causality between unmet educational needs, perceived health, and PPD.

Conclusions

This study indicates a high prevalence of PPD and that educational support can have a positive impact on perceived health and PPD in perinatal women. Women who did not receive education had lower perceived health and higher depression levels than those who received education. Thus, a critical need exists for assessing and supporting women's educational needs to improve their health during postpartum recovery. More than 40% of the participants were at risk of PPD, with higher risks found among those with unmet educational needs, suggesting the necessity of follow-up support for women with elevated PPD symptoms. This study underscores the importance of comprehensive postpartum education as part of regular maternal care, particularly during global health crises. Education should address physical recovery and mental health to provide mothers with the skills to manage postpartum challenges. Therefore, incorporating educational programs on postpartum care and depression into care routines may help enhance the overall well-being of women during the postpartum period. In addition to the primary analyses conducted using analysis of variance and t-tests, it is important to note that the lack of multivariate analytical approaches represents a methodological limitation of this study. While our main objective was to compare group differences, incorporating multivariate models—such as regression analyses or sensitivity checks—could have provided a more comprehensive understanding of potential confounding factors and enhanced the robustness of the findings. Future research would benefit from employing these analytical strategies to validate and extend the current findings.

Abbreviations

COVID-19	Coronavirus disease 2019
EPDS	Edinburgh Postnatal Depression Scale
PPD	Postpartum depression

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Authors' contributions

HSK and HJL: Conceptualization, Methodology, Analysis, Writing–Original Draft. JD: Methodology, Writing-review & editing. CJK: Conceptualization, Methodology, Writing-review & editing, Visualization.

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Data availability

The data for this study will be available from the first and corresponding author upon reasonable request. The dataset: A Survey of the Status of Postpartum Care (Sanjujori) for this study is available from Korean Statistical Information Service (KOSIS) website (https://kosis.kr/common/meta_onedepth.jsp? vwcd=MT_OTITLE&listid=117_001).

Declarations

Ethics approval and consent to participate

The dataset used is publicly available and does not contain individually identifiable information. As the study used archival data, an exemption was obtained from the Institutional Review Board at Chung-Ang University's Institutional Review Board (No. 1041078-20240618-HR-152). The study was conducted in accordance with the principles of the Declaration of Helsinki and its later amendments. Participation in the original survey was voluntary and confidential, and all participants provided informed written consent. Trained national data collection personnel collected data by conducting in-person interviews, self-reports, or online.

Consent for publication

This study used publicly available anonymized national survey data, so consent for publication was not required. Human Ethics and Consent to Participate declarations: not applicable.

Competing interests

The authors declare no competing interests.

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