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Perinatal Post-Natural Disaster Depression Screening Among Pregnant Women in West Sumatra, Indonesia

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Abstract
Indonesia is located in a region prone to natural disasters. Natural disasters not only have physical and environmental impacts but also affect victims' psychological well-being. Exposure to traumatic stress caused by natural disasters can exacerbate depressive symptoms, both during and after pregnancy. Approximately 6.5 – 20% of perinatal depression worldwide can contribute to postpartum depression. Up to 50% of perinatal depression cases go undiagnosed due to social stigma and the lack of mental health integration in antenatal care. This study aims to determine the occurrence of perinatal depression among pregnant women after a disaster using the Edinburgh Postnatal Depression Scale (EPDS) in West Sumatra, Indonesia. This study used an observational, cross-sectional design and was conducted from October to December 2024 in West Sumatra. Using a purposive sampling technique, the study sample consisted of 23 pregnant women who were victims of natural disasters. The results of the study showed that 44% of pregnant women in West Sumatra were at moderate risk of experiencing perinatal depression due to natural disasters, with the most common risk factors found in the 20-35 age group (74%), high school education level (48%), occupational status as a housewife (79%), family income below Regional Minimal Wage/RMW (70%), multiparity (61%), gestational age 14-27 weeks (52%), and have no history of miscarriage (78%). This study reflected the importance of integrating perinatal depression screening into antenatal care for pregnant women in disaster-prone areas.

Keywords: Depression, Perinatal, Screening, Edinburgh Postnatal Depression Scale, Post-Natural Disaster

1.0 Introduction
Indonesia is geographically composed of an archipelago and is located in an area of volcanic and tectonic activity that is vulnerable to geological disasters such as earthquakes, tsunamis, and volcanic eruptions, as well as hydrometeorological disasters such as floods, landslides, droughts, and tornadoes (Regional Disaster Management Agency of West Sumatra Province, 2020). There were 3,472 disasters in Indonesia in 2024. Worldwide, more than 400 natural disasters occur each year (Ünsel-Bolat *et al.*, 2024). The dominant natural disaster incidents in Indonesia are hydrometeorological disasters, accounting for 99.34%, and geological disasters, accounting for

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0.66% (National Board for Disaster Management, 2025). West Sumatra Province is categorized as high risk, with a value of 144.39, and is prone to various disaster threats, including earthquakes, tsunamis, volcanoes, floods, landslides, droughts, extreme weather, extreme waves, abrasion, and forest and land fires (Adi *et al.*, 2023).

A natural disaster is defined as a natural hazard event that causes economic losses of at least US$50 million or damages 2,000 homes, and includes floods, earthquakes, fires, or storms (Ünsel-Bolat *et al.*, 2024). A natural disaster is a sudden and acute event caused by one of the Earth's geophysical systems that can disrupt a population beyond its capacity to manage (Lafortune *et al.*, 2021). Natural disasters cause severe disruption to affected regions and populations, frequently leading to loss of life and serious physical injuries. Survivors of natural disasters frequently experience mental health challenges, with depression being among the most prevalent conditions. Depression is strongly associated with an elevated risk of various medical conditions and unfavorable health outcomes. The prevalence of depression after natural disasters indicates that the percentage of people experiencing depression ranges from 4.9% to 54% (Tang *et al.*, 2014). The 2015 earthquake in Nepal caused widespread damage. Four months after the earthquake, one in three adults experienced symptoms of depression and very high levels of anger, and one in ten had suicidal thoughts. Overall, the study findings indicated significant levels of psychological distress (Kane *et al.*, 2018). Exposure to natural disasters increases the risk of pregnant women experiencing mental health problems, such as anxiety and depression, with a higher prevalence (Ünsel-Bolat *et al.*, 2024).

Perinatal depression is a non-psychotic, unipolar depressive disorder characterized by specific feelings and thoughts about parenthood. It is a major complication for people during the antepartum period, with a worldwide prevalence estimated between 21% and 28% (Stefana, 2024). Perinatal depression encompasses depression that occurs during pregnancy (prenatal depression) and in the weeks following delivery (postpartum depression). Most cases of perinatal depression begin within 4–8 weeks of birth. Pregnant women and postpartum mothers with perinatal depression experience extreme sadness, anxiety, and fatigue that can make it difficult to perform daily tasks, including caring for themselves or others (National Institutes of Health, 2023). Perinatal depression, which occurs during pregnancy or in the first 12 months after delivery, is one of the most common medical complications during pregnancy and the postpartum period (Futterman *et al.*, 2023). Perinatal depression is a form of depression that develops during pregnancy, leading up to delivery, or within the first year postpartum. Perinatal depression is one of the most common complications of pregnancy and the postpartum period (Johnson *et al.*, 2020). In the United States, perinatal depression affects approximately 11.5% of pregnant and postpartum women annually (Johnson *et al.*, 2020). Alarmingly, up to 51% of people with perinatal depression go undiagnosed (Johnson *et al.*, 2020; Futterman *et al.*, 2023). Stigma-related barriers, including shame and fear, often prevent pregnant women from reporting depressive symptoms to mental health providers. According to reports from Postpartum Support International, the National Institutes of Health, and the Centers for Disease Control and Prevention, perinatal depression remains a substantially under-treated condition, resulting in serious adverse outcomes for pregnant women and their families. Current estimates indicate that only 49.6% of pregnant women with major depressive disorder access mental health care (Latendresse *et al.*, 2021). Perinatal depression affects approximately one in seven pregnant women. Estimates from 2011 suggest that 9% of pregnant women and 10% of postpartum women fulfilled the criteria for major depressive disorder. Several recent meta-analyses have reported a wide range of prevalences of depression in the perinatal period, with estimates ranging from 8.5% to 15.2% before birth and increasing to 9.9%

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after birth (Futterman *et al.*, 2023). Depression occurring during pregnancy and within the first year after birth is a prevalent condition with significant negative implications for maternal well-being, the baby, family members, and the wider community. The prevalence of perinatal depression is estimated at 11.9% (Pettman *et al.*, 2023).

Among populations affected by natural disasters, pregnant women and newborns are particularly vulnerable. Pregnant women are more likely to experience physical and mental health problems both during and after a natural disaster, compared to the general population (Ünsel-Bolat *et al.*, 2024). Stressful life events, such as natural disasters, can impact perinatal depression, leading to decreased bonding with their infants and higher rates of mood disorders in their children (Futterman *et al.*, 2023). An increased number of stressful life events during pregnancy increases the prevalence of postpartum depression, reaching up to 42% among those with six or more stressful life events, such as natural disasters (Latendresse *et al.*, 2021).

Perinatal depression is relatively common and can have negative consequences for both mother and child (O'Connor *et al.*, 2019) . Perinatal depression can have both short-term and long-term negative consequences for both mother and child (Johnson *et al.*, 2020). Depression caused by natural disasters can lead to premature rupture of membranes, preterm labor, low birth weight, and infectious diseases, as the intrauterine period is very sensitive in embryonic and fetal development (Ünsel-Bolat *et al.*, 2024).

Based on a study by Futterman *et al.* (2023), 8,357 pregnant and postpartum women were assessed during the antepartum and postpartum periods. Among these participants, 1,281 women were classified as pre-disaster, while 7,248 were included in the post-disaster group. The findings revealed markedly elevated prevalence rates of mental health disorders in the post-disaster period, with anxiety reported in 48.2% of participants, depression in 27.3%, and post-traumatic stress disorder (PTSD) in 22.9%. These rates were significantly higher compared to those observed in the pre-disaster group. Similarly, post-earthquake evaluations demonstrated high prevalence levels of depression (38.8%) and PTSD (22.4%). The prevalence of anxiety, depression, and PTSD after the hurricane was 17.4%, 22.5%, and 8.2%, respectively (Futterman *et al.*, 2023). Perinatal depression is often underdiagnosed, with approximately one in five pregnant women not being asked about depression during prenatal visits (Stefana, 2024).

Effective post-disaster mental health recovery for high-risk populations necessitates integrated programs that encompass mental health screening, longitudinal monitoring, preventive and therapeutic interventions, and sustained psychosocial support. Routine screening for depression during the reconstruction phase is therefore essential (Tang *et al.*, 2014). Guidelines from the American College of Obstetricians and Gynecologists (ACOG) advise obstetric providers to screen for depressive and anxiety symptoms in pregnant women at least once throughout the perinatal period. They are in dire need of close attention and greater psychosocial support as they navigate the challenges posed by natural disasters (Futterman *et al.*, 2023). Depression screening has the potential to improve the detection and management of perinatal depression (Susanti *et al.*, 2024). The most commonly used perinatal depression screening tool in the United States is the Edinburgh Postnatal Depression Scale (EPDS), which has a score range of 0–30 (Latendresse *et al.*, 2021). EPDS is the most widely used and validated self-administered scale for screening perinatal depression, consistent with DSM-5 and ICD-10 diagnostic frameworks. This scale assesses the frequency of each of the following depressive symptoms experienced in the previous seven days: anhedonia (two items); guilt; anxiety; panic attacks; feelings of being overwhelmed; sleep disturbances; sadness; tearfulness; and suicidal ideation (Stefana, 2024). The EPDS does not provide a clinical diagnosis; however, it is an effective tool for screening and ongoing clinical

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monitoring of depression. The EPDS is a 10-item instrument. Each item has four short statements and is scored from 0 to 3. It is widely used among pregnant and postpartum women and can be completed in less than 5 minutes (Latendresse *et al.*, 2021; Susanti *et al.*, 2024). The EPDS has been validated and performed well as a screening tool (Stefana, 2024). Therefore, this study aimed to determine the incidence of perinatal depression in pregnant women after a disaster using the Edinburgh Postpartum Depression Scale (EPDS) in West Sumatra, Indonesia.

2.0 Methodology

Using an observational cross-sectional design, this study investigated perinatal depression screening results among pregnant women in a post-disaster context with the EPDS in West Sumatra, Indonesia. The research was conducted over three months from October to December 2024. The study took place in West Sumatra Province, located on the west coast of central Sumatra Island, Indonesia. West Sumatra Province was chosen because it has a high risk of natural disasters, namely based on the Indonesian Disaster Risk Index measurement in 2022, with a value of 144.39 which has disaster threats, namely: earthquakes, tsunamis, volcanoes, floods, landslides, droughts, extreme weather, extreme waves and abrasion as well as forest and land fires (Adi *et al.*, 2023).

Participants were pregnant women domiciled in West Sumatra with a history of exposure to a natural disaster in the past year. Pregnant women who were unable to understand or complete the questionnaire were excluded from the study. Using a purposive sampling technique, the study sample consisted of 23 individuals. The study utilized a structured questionnaire, divided into two principal sections, as the main data collection instrument. The first section contained demographic information, including age, education, occupation, family income, parity, gestational age, and a history of miscarriage. The second section contained the Indonesian version of the EPDS scale, a validated and reliable instrument used to assess perinatal depression symptoms in pregnant women after a natural disaster. Prior to data collection, written informed consent was obtained from all pregnant women involved in the study.

Data collection involved a self-administered questionnaire in Indonesian, distributed and collected by trained research assistants who provided standardized instructions to eligible participants. After collection, data were coded and entered into a secure electronic database, followed by systematic data cleaning and validation to ensure confidentiality and data quality. Next, descriptive statistical analysis was conducted to describe the frequency distributions of the research variables, which were presented as frequency tables and percentages in SPSS.

3.0 Results

Participants are classified by age, education level, employment status, family income status, gestational age, history of miscarriage, and parity, as shown in Figure 1. Similarly, EPDS score levels are shown in Figure 2. The distribution of EPDS statement items is also presented in Table 1.

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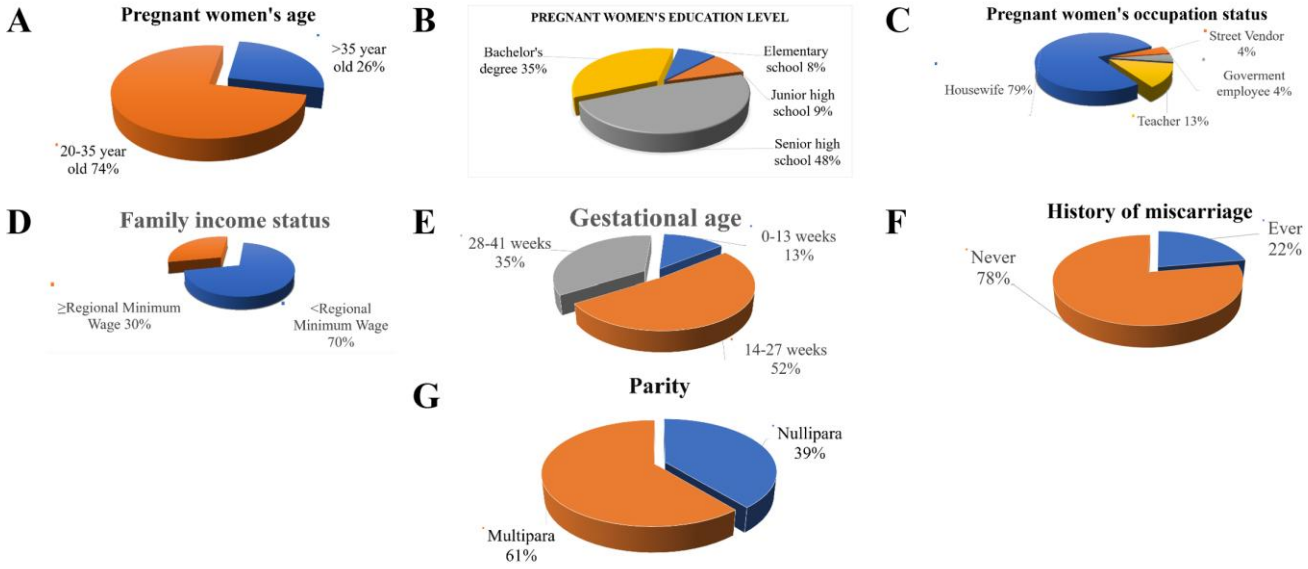

Figure 1: (A) Pregnant women's age, (B) pregnant women's education level, (C) pregnant women's occupation status, (D) family income status, (E) gestational age, (F) history of miscarriage,
(G) Parity

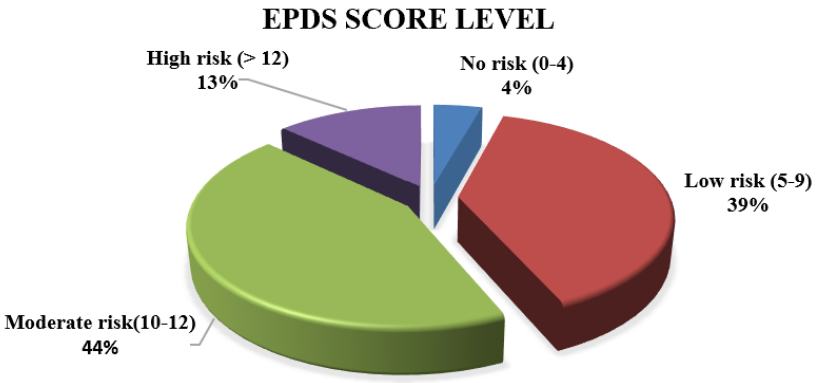

Figure 2: EPDS score levels

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Table. 1
EPDS statement items

Item	Statement	Item's Score				Total
		0	1	2	3	
		n (%)	n (%)	n (%)	n (%)	n (%)
1	I have been able to laugh and see the funny side of things	17 (73.9)	5 (21.8)	1 (4.3)	0 (0)	23 (100)
2	I have looked forward with enjoyment to things	13 (56.5)	8 (34.8)	2 (8.7)	0 (0)	23 (100)
3	I have blamed myself unnecessarily when things went wrong	3 (13.0)	6 (26.1)	14 (60.9)	0 (0)	23 (100)
4	I have been anxious or worried for no good reason	1 (4.3)	9 (39.1)	11 (47.8)	2 (8.8)	23 (100)
5	I have felt scared or panicky for no very good reason	5 (21.8)	9 (39.1)	8 (34.8)	1 (4.3)	23 (100)
6	Things have been getting on top of me	1 (4.3)	12 (52.2)	10 (43.5)	0 (0)	23 (100)
7	I have been so unhappy that I have had difficulty sleeping	4 (17.4)	11 (47.8)	8 (34.8)	0 (0)	23 (100)
8	I have felt sad or miserable	7 (30.4)	15 (65.3)	1 (4.3)	0 (0)	23 (100)
9	I have been so unhappy that I have been crying	5 (21.8)	18 (78.2)	0 (0)	0 (0)	23 (100)
10	The thought of harming myself has occurred to me	20 (87.0)	2 (8.7)	0 (0)	1 (4.3)	23 (100)

4.0 Discussion

According to the results in Fig. 1(A), 74% of participants were aged 20-35 years. This finding aligns with a 2024 study by Eny and Zakkiyatus, which reported that the majority of participants were between 20 and 35 years old. Women aged between 26 and 35 years are generally productive and have good physical and psychological health. Younger women (18 to 25 years) are more likely to experience depressive symptoms compared to older women >35 years ($p<0.001$) (Khatri *et al.*, 2019). Younger women are the group most affected by natural disasters (Lafortune *et al.*, 2021). Perinatal depression occurs in 12% to 18% of women of childbearing age (Latendresse *et al.*, 2021).

The highest educational level among participants in Fig. 1 (B) was high school, with 11 out of 23 (48%). Education is the process by which a person develops their abilities and behavior in society, thereby maximizing their individual and social capabilities. The educational attainment of these participants positively impacts the treatment they receive, as it influences their understanding of interventions and their appreciation for the importance of selecting a suitable health facility for childbirth (Susanti *et al.*, 2024). Women with less education are the group most affected by natural disasters (Lafortune *et al.*, 2021). Women with less education have a higher risk of experiencing depression ($p<0.001$). Women with less than a high school education have a higher chance of experiencing depression in univariate analysis ($p<0.01$)(Khatri *et al.*, 2019).

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The results of the study, as shown in Fig. 1 (C), also indicate that the majority of participants were housewives, specifically 18 out of 23 (78.3%). This study is in line with the study of Nasri *et al.* (2017), which stated that unemployed mothers often experience postpartum depression, and the mother's ability to adapt to her new position is affected by fatigue and boredom with her household duties. Women who are unemployed or not working have a higher chance of experiencing depressive symptoms in univariate analysis ($p < 0.05$) (Khatri *et al.*, 2019).

The majority of participants' family incomes in this study, as shown in Fig. 1 (D), are below the Padang City Minimum Wage (<Rp 2,811,000), accounting for 70%. Poor family financial conditions during pregnancy can impact the mother's mental health. Economically, disasters make pregnant women more vulnerable to depression due to job loss, which results in limited access to health resources (Ünsel-Bolat *et al.*, 2024). Socioeconomic disadvantage has been consistently associated with an increased risk of perinatal depression. Higher rates of depression have been consistently reported among individuals with lower income levels compared to other socioeconomic groups. Income levels influence treatment, maternal care, infant development, and disrupted or decreased language development (Johnson *et al.*, 2020). Women from lower socioeconomic backgrounds are the group most affected by natural disasters (Lafortune *et al.*, 2021). Low-income families have a higher chance of experiencing perinatal depression ($p<0.001$)(Khatri *et al.*, 2019).

The majority of participants in this study (Fig. 1 (E) were mothers who had given birth more than once, with 61% of participants having two or more children. The extra stress experienced by women due to caring for and being responsible for their previous children is one of the causes of depression in multiparas. Other circumstances, such as economic factors, also play a role as stressors that cause mothers to experience emotional and psychological disorders, considering that the majority of participants in this study earned below the Regional Minimum Wage of Padang City. According to Khatri *et al.* (2019), the arrival of a baby, which should be a joyous occasion, can put pressure on families amidst unstable economic conditions because it creates new needs to support the child's growth and development.

The majority of participants in the study shown in Figure 1 (F) were between 14 and 27 weeks of gestation (the second trimester of pregnancy), accounting for 52% of participants. Perinatal depression can occur from the first trimester to the third trimester of pregnancy, and this risk can be influenced by various factors, including psychological readiness for childbirth, previous mental health history, and the social support received by pregnant women. Anxiety in pregnant women will increase with increasing gestational age, because mothers begin to think about the birth process and the condition of the baby to be born, and mid-pregnancy tends to experience higher stress and anxiety related to hormonal changes and pregnancy, which has the potential to increase the incidence of perinatal depression (Heryanti *et al.*, 2024) .

The majority of participants in this study (78%) (Figure 1) indicated that they had never experienced a miscarriage. This suggests that perinatal depression is not solely caused by the experience of miscarriage but can also arise from other factors such as psychosocial stress and trauma from natural disasters. The experience of a natural disaster can be a significant factor triggering depression, even in women without a history of miscarriage. The trauma and severe stress caused by a natural disaster can activate psychological mechanisms that cause mental disorders, including depression, thus leading to a high incidence of depression. Women without a history of miscarriage who have experienced traumatic experiences due to a natural disaster can develop depression and mental disorders (Israfil & Bali, 2022).

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Based on the EPDS score results in Figure 2, participants with a moderate risk of depression (10 people) were most likely to answer statement number 1 with a score of 0 (70.0%) participants, statement number 2 with a score of 0 (50.0%) participants, and statement number 6 with a score of 2 (50.0%) participants. Statements number 1, 2, and 6 are indicators of anhedonia. Anhedonia is defined as a reduced ability to desire and feel pleasure from activities that are usually pleasurable. This means that participants with a moderate risk of depression are unable to feel pleasant feelings in daily functioning, and a few experience sadness (Serretti, 2025).

Of the 10 participants with a moderate risk of depression, 5 (50.0%) scored 2 on question number 3, 5 (50.0%) scored 2 on question number 4, and 4 (40.0%) scored 2 on question number 5. Questions 3, 4, and 5 indicate anxiety. This means that most participants with a moderate risk of perinatal depression experience anxiety. The results are in accordance with earlier studies reporting a high prevalence of anxiety among individuals with depression. Anxiety in pregnant women can be influenced by various factors, such as age under 20 years, education, occupation, parity, including primigravida, low income, knowledge, support from husband, environment, and information obtained.

Then, for question 7, the most frequently selected response among participants was the option scored 2 (50.0%). For question 8, the response option scored 1 was selected by most participants (90.0%). For question 9, the 1-point response option was the most frequently selected by participants (80.0%). For question 10, the majority of participants chose a score of 0 (70%), and 1 participant chose a score of 3 (10.0%). Questions 7, 8, 9, and 10 are indicators of depressive mood. The survey results indicate that participants are at moderate risk of depression. This can be seen in question 10, where 7 out of 10 participants (70%) chose an answer with a score of 0, meaning the participants have never thought about harming themselves, but 3 out of 10 participants (30.0%) chose an answer greater than 0, indicating suicidal thoughts or thoughts of harming themselves.

Based on the results of a 2021 study by Latendresse *et al.*, it was reported that 51.1% of pregnant women experienced mild to moderate symptoms of perinatal depression (with an EPDS score of 10-20), while 48.9% of pregnant women had an EPDS score of less than 10 but were at high risk of perinatal depression due to medical history and significant life events (Latendresse *et al.*, 2021). Disasters that last longer and are more widespread in the community are disasters that must be addressed by first responders and public health agencies by providing greater protection to pregnant women and their unborn children, in order to reduce subsequent challenges to the health, development, and well-being of children (Lafortune *et al.*, 2021). Exposure to natural disasters places pregnant women at higher risk for antenatal mental health problems, and those with more extensive earthquake experience are significantly more likely to experience depression ($p<0.001$)(Khatri *et al.*, 2019).

This preliminary study indicates that 44% of pregnant women affected by natural disasters in West Sumatra are at moderate risk of experiencing perinatal depression, making it a significant health problem in disaster-prone areas. Identification of risk factors, including age 20–35 years, secondary education, housewife status, family income below the minimum wage, multigravida, and second-trimester gestational age, indicates that vulnerability to perinatal depression is influenced by socio-economic factors. This study emphasizes the importance of integrating routine perinatal depression screening in pregnant women using the EPDS into antenatal care as an early detection effort and a basis for providing preventive interventions to prevent the development of more severe perinatal depression, especially for pregnant women in disaster-prone areas.

Conclusion

In summary, the majority of pregnant women who were victims of natural disasters in West Sumatra had a moderate risk of developing perinatal depression (44%). The most common risk factors were those aged 20-35, those with a high school education, those with a housewife status, family income below the Regional Minimum Wage (RMW), those with multiple pregnancies, those with a gestational age of 14-27 weeks, and those without a history of miscarriage. This recommendation emphasizes the importance of integrating routine perinatal depression screening with the EPDS in antenatal care for pregnant women in disaster-prone areas to identify pregnant women showing early symptoms of perinatal depression.

Conflict of Interest: None declared

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