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Sleep quality and perinatal depression in pregnant women treated in a primary care centre in Lima, Peru



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ABSTRACT

Objective: The aim is to evaluate the association between sleep quality and perinatal depression in pregnant women between the 12th week of gestation and the 36th week of gestation in a maternity and child centre in Lima.

Methods: Analytical cross-sectional study in pregnant women cared for in a primary care centre between August and December 2019. The data were collected through a self-administered survey. The Pittsburgh Sleep Quality Index (PSQI) was used to assess sleep quality. The evaluation of perinatal depression was performed with the Edinburgh Postnatal Depression Scale (EPDS). For the multivariate analysis, Poisson regression with robust variances was used to calculate the crude and adjusted prevalence ratios and their respective confidence intervals.

Results: The sample was composed of 200 participants. The median [IQR] age was 26 [22–32] years, and 111 (55.5%) pregnancies were unplanned. 52% presented a poor quality of sleep and the risk of perinatal depression was 31.5%. Poor quality of sleep was associated with a significantly higher frequency of perinatal depression (aPR = 4.8 for those with poor quality of sleep warranting medical attention, and aPR = 6.6 for those with poor quality of sleep warranting medical attention and treatment).

Conclusions: There is a possible association between poor sleep quality and perinatal depression in pregnant women between weeks 12 and 36 of gestation. Operational research should be promoted to assess whether interventions to improve sleep quality could have a positive impact on reducing perinatal depression.

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Calidad del sueño y depresión perinatal en gestantes atendidas en un centro de atención primaria en Lima, Perú

R E S U M E N

Palabras clave:

Embarazadas

Perú

Depresión

Sueño

Trastornos del sueño-vigilia

Objetivo: Evaluar la asociación entre la calidad del sueño y la depresión perinatal en gestantes que cursan entre las semanas de gestación 12 y 36 en un centro materno-infantil de Lima.

Métodos: Estudio transversal analítico en gestantes atendidas en un centro de atención primaria entre agosto y diciembre de 2019. Los datos se recogieron mediante una encuesta autoaplicada. Se empleó el Índice de calidad del sueño de Pittsburgh (PSQI) para la evaluación de la calidad de sueño. La depresión perinatal se evaluó con la Escala de Depresión Posnatal de Edimburgo (EPDS). Para el análisis multivariado, se utilizó la regresión de Poisson con varianzas robustas a fin de calcular las razones de prevalencia brutas y ajustadas y sus respectivos intervalos de confianza.

Resultados: Se incluyó a 200 participantes. La mediana de edad [intervalo intercuartílico] fue 26 [22-32] años y 111 gestaciones (55,5%) fueron no planificadas. El 52% tenía mala calidad del sueño, y el riesgo de depresión perinatal fue del 31,5%. La mala calidad del sueño se asoció con una frecuencia significativamente mayor de depresión perinatal (con mala calidad de sueño que merece atención médica, $RP_a = 4,8$; con mala calidad de sueño que merece atención y tratamiento médico, $RP_a = 6,6$).

Conclusiones: Existe una posible asociación entre la mala calidad del sueño y la depresión perinatal en gestantes entre las semanas 12 y 36 de gestación. Se debe promover investigaciones operativas a fin de evaluar si intervenciones para mejorar la calidad del sueño podrían tener un impacto positivo en la reducción de la depresión perinatal.

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Introduction

Depression during pregnancy and postpartum is a serious public health problem.¹ Perinatal depression is defined as a depressive disorder that begins during pregnancy and can persist until the first four weeks postpartum.²

The World Health Organization (WHO) reports that the global prevalence of perinatal depression in low- and middle-income countries is between 10 and 41%, depending on location, gestational trimester, and screening instrument.³ In Latin America, Rodríguez-Baeza et al.⁴ found a prevalence of perinatal depression of 16.66% in Yucatán, Mexico. In Chile the reported prevalence is around 10%.⁵ In Peru, Luna et al.,⁶ in a cross-sectional study carried out at the National Maternal Perinatal Institute, found that the prevalence of perinatal depression was 40.1%. In the United States, 50-70% of women with perinatal depression are not detected or diagnosed, and almost 85% do not receive treatment.⁷ The Peruvian Ministry of Health has not published official national or regional figures on this condition.

There are factors associated with lifestyle, such as poor quality of diet, poor quality of sleep, physical inactivity, vitamin D insufficiency, smoking before or during pregnancy, and perceived need for social support, which may be associated with perinatal depression.⁸ Sleep in particular has a significant impact on people's health. Previous works have shown that sleep-related problems exist in various populations. Sedov et al.⁹, in a meta-analysis, report that clinicians

should be aware that some reduction in sleep quality is to be expected during pregnancy.

Surprisingly, few studies in South America have focused on identifying sleep quality as a risk factor for perinatal depression despite the fact that: a) women in low- and middle-income countries have a higher prevalence of perinatal depression than those in high-income countries¹⁰; b) poor sleep quality in pregnant women is associated with suicidal ideation^{11,12}; c) two meta-analyses and reviews have shown that poor sleep quality increases the risk of perinatal depression^{13,14}, and d) insomnia is recognised as a risk factor for depression.¹⁵

In other words, studying this association in Peru would contribute to the development of a new approach in the care of pregnant women, increasing the awareness of health professionals about the quality of sleep and preventive or therapeutic treatment with the aim of reducing the high prevalence of perinatal depression. We have not found any study in Peru that examines the relationship between the quality of sleep of pregnant women and the risk of perinatal depression.

The objective of the study is to evaluate the association between sleep quality and perinatal depression in pregnant women between 12 and 36 weeks of gestation in a maternal and child centre in Lima. Specific objectives included describing the sleep quality of pregnant women, exploring the prevalence of perinatal depression, and evaluating the crude and potential confounding variables-adjusted associations between sleep quality and perinatal depression of pregnant women.

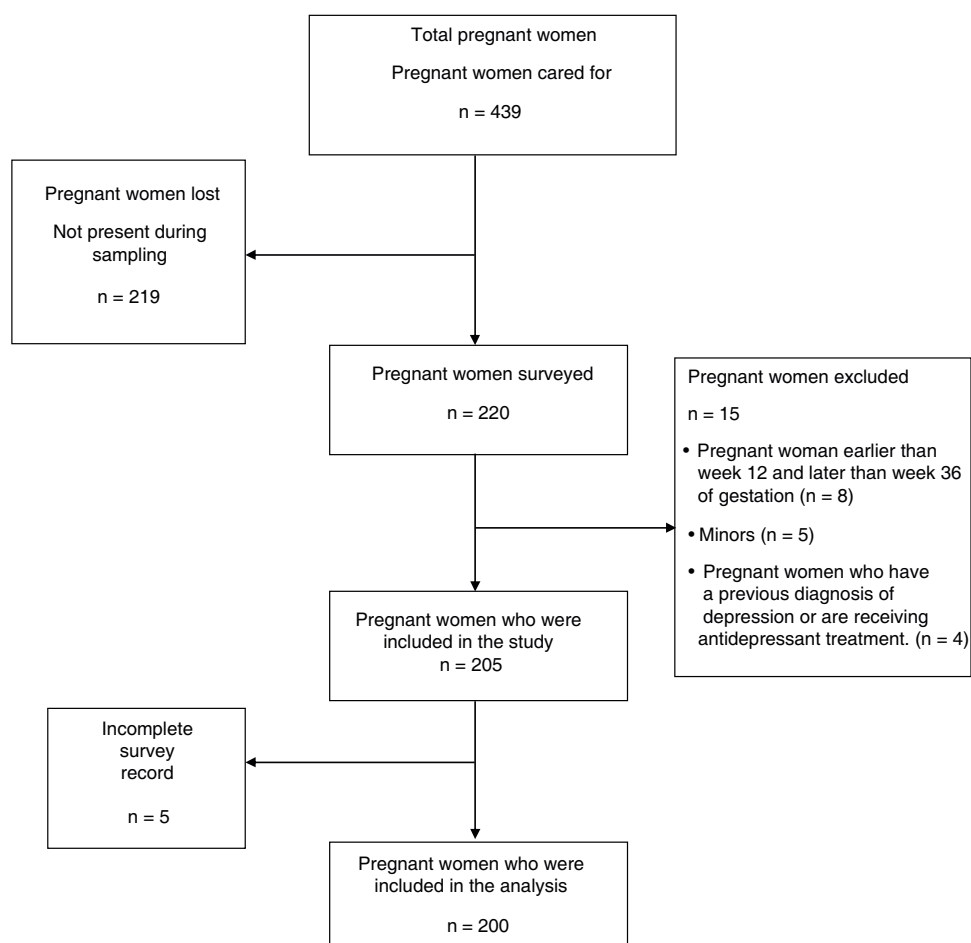


Figure 1 – Flowchart of participation of pregnant women in the Centro Materno Infantil Virgen del Carmen Lima-Peru.

Methods

Study design and context

An analytical cross-sectional study was carried out on pregnant women who attended the Centro Materno Infantil Virgen del Carmen [Virgen del Carmen Maternal and Child Centre] during the months of August to December 2019, a primary care health centre located in the Chorrillos district of Lima (Peru). The data were collected through a self-administered survey.

Participants

All pregnant women who attended the Centro Materno Infantil Virgen del Carmen were invited to participate from Monday to Friday from 8:00 a.m. to 1:00 p.m., between 1 August and 19 December 2019. The Health Centre records confirm that on those dates 439 pregnant women visited the clinic, and 220 of them were surveyed (Fig. 1).

The inclusion criteria were: pregnant women between 12 and 36 weeks of gestation; voluntary participation in the study, signing the informed consent and being of legal age. The exclusion criteria were: pregnant women with a previous diagnosis of depression or undergoing antidepressant treatment;

illiterate or non-Spanish speaking or unable to respond to the survey and pregnant woman with mental disorders (taking medication or being treated for anxiety or another mental health disorder).

Calculation of the sample size

Using the Epidat 4.2 software, the sample size was calculated using the hypothesis contrast formula for the difference of independent proportions with a confidence level of 95%, a power of 90% and an exposed: unexposed ratio of 1. The study of Zahra et al.,¹⁶ was taken as a reference, which showed a proportion of pregnant women with perinatal depression of 37.5% of those with good sleep quality compared to 71.7% of those with poor sleep quality. The sample size obtained was 192. The type of sampling was non-probabilistic.

Study procedure

The survey collected detailed information on maternal sociodemographic characteristics and reproductive history. The variables included were age, level of education (none, initial education, primary, secondary, incomplete non-university higher education, complete non-university higher education, incomplete university higher education, complete university

Table 1A – Sociodemographic characteristics of pregnant women at the Virgen del Carmen Maternal and Child Centre in Lima, Peru, 2019.

Pregnant women, n	200
Age (years)	26 [22–32]
Number of pregnancies	2 [1–2]
Marital status	
Single	150 (75.0)
Married	47 (23.5)
Divorced	3 (1.5)
Planned pregnancy	89 (44.5)
Single mother	19 (9.5)
Level of education	
Initial and primary education	14 (7.0)
Secondary	89 (44.5)
Non-university higher	45 (22.5)
University higher	52 (26.0)
Gestational age	
First trimester (weeks 1–12)	16 (8.0)
Second trimester (weeks 13–26)	85 (42.5)
Third trimester (week 27 to the end of pregnancy)	99 (49.5)

Values are expressed as n (%) or median [interquartile range].

higher education), marital status (single, married, widowed or divorced), number of pregnancies, planned pregnancy (yes/no), single mother (yes/no) and gestational age at the time of the interview.

The Pittsburgh Sleep Quality Index (PSQI) was used to assess sleep quality. The PSQI is a 19-item self-administered survey, designed for the subjective evaluation of sleep quality and disturbances during the last month in different populations.¹⁷ A distinction between good and poor sleep is based on an overall PSQI score >5, which produces a sensitivity of 89.6% and a specificity of 86.5%.¹⁷ The PSQI instrument is validated in Peru and in the pregnant population.¹⁸ Likewise, after adding everything together, the total score can be classified into four categories: 0–5, without sleep problems; 5–7, warrants medical attention; 8–14, warrants attention and treatment, and ≥15 is a serious sleep problem.¹⁹

Perinatal depression was assessed using the Edinburgh Postnatal Depression Scale (EPDS). The EPDS is a widely used 10-item screening scale for depression before and after birth.²⁰ Items on the EPDS will ask participants to rate how they felt during the previous seven days. The overall score ranges from 0 to 30; a score ≥13 points indicates suspicion of perinatal depression.²¹ The EPDS is validated for use in the population of Peruvian pregnant women.²²

Statistical analysis

Categorical variables are described by absolute and relative frequencies and numerical variables by median [interquartile range]. The analysis of the bivariate association between the sociodemographic variables was obtained using the Kruskal-Wallis and Fisher statistical tests. For the multivariate analysis, Poisson regression (crude and adjusted) with robust variances was used to calculate the adjusted prevalence ratios (APR) and their respective 95% confidence intervals (95% CI). The STATA statistical package version 15 (StataCorp LP, United States) was used. A p value <0.05 was considered statistically significant.

Table 1B – Components of the Pittsburgh sleep quality index of pregnant women at the Centro Materno Infantil Virgen del Carmen in Lima, Peru, 2019.

Components of the Pittsburgh index	n (%)
No sleep disorders	96 (48.0)
With sleep disorders	104 (52.0)
Items of the Pittsburgh index	
Subjective sleep quality	17 (8.5)
Very good	147 (73.5)
Somewhat good	30 (15.0)
Somewhat bad	6 (3.0)
Very bad	
Sleep latency	50 (25.0)
<15 min	58 (29.0)
16–30 min	70 (35.0)
31–60 min	22 (11.0)
>60 min	
Sleep duration	120 (60.0)
>7 h	65 (32.5)
6–7 h	8 (4.0)
5–6 h	7 (3.5)
<5 h	
Usual sleep efficiency ^a	146 (73.0)
>85%	27 (13.5)
75–84%	20 (10.0)
65–74%	7 (3.5)
<65%	
Score related to sleep disturbances ^b	2 (1.0)
0	126 (63.0)
1–9	70 (35.0)
10–18	2 (1.0)
19–27	
Takes medication to sleep	199 (99.5)
Never in the last month	1 (0.5)
Less than 1 time per week	
Score related to dysfunction during the day ^c	56 (28.0)
0	77 (38.5)
1–2	49 (24.5)
3–4	18 (9.0)
5–6	
Type of sleep quality (points)	96 (48.0)
No sleep disorders (0–5)	54 (27.0)
Warrants medical attention (5–7)	50 (25.0)
Warrants medical attention and treatment (8–14)	0
This is a serious sleep problem (>15)	

^a Percentage of hours of effective sleep divided by the number of hours a person remains in bed.

^b The sum of related problems: difficulties falling asleep, falling asleep at inappropriate times, sleeping too much, and abnormal behaviour during sleep.

^c Tendency to fall asleep during normal waking hours.

Ethical aspects

All study participants signed an informed consent form. The protocol was approved by the Health Centre and the Ethics Committee of the Faculty of Health Sciences of the Peruvian University of Applied Sciences.

Results

Two hundred and twenty pregnant women were surveyed. Twenty people were excluded from the database due to exclusion criteria or incomplete survey registration. Table 1A shows

Table 2 – Risk of perinatal depression according to the Edinburgh scale and its association with sociodemographic characteristics and its association with the type of sleep quality of pregnant women at the Centro Materno Infantil Virgen del Carmen in Lima, Peru.

Sociodemographic characteristics	Risk of perinatal depression				p
	Yes (n = 63)		No (n = 137)		
	n	%	n	%	
Age (years)	26 [22–34]		26 [22–30]		0.823
Number of pregnancies	2 [1–3]		2 [1–2]		0.458
Marital status					
Single	49	32.7	101	67.3	0.673
Married	14	29.8	33	70.2	
Widow	0		0		
Divorced	0		3	100	
Planned pregnancy					0.545
Yes	26	29.2	63	70.8	
No	37	33.3	74	66.7	
Single mother					0.610
Yes	7	36.8	12	63.2	
No	56	30.9	125	69.1	
Level of education					0.306
None	0	0.0	0	0.0	
Initial and primary education	6	42.9	8	57.1	
Secondary	32	36.0	57	64.0	
Non-university higher	13	28.9	32	71.1	
University higher	12	23.1	40	76.9	
Gestational age					0.757
First trimester	6	62.5	10	37.5	
Second trimester	25	29.4	60	70.6	
Third trimester	32	32.3	67	67.7	
Types of sleep quality ^a					<0.001
No sleep disorders	9	9.4	87	90.6	
Warrants medical attention	23	42.6	31	57.4	
Warrants medical attention and treatment	31	62.0	19	38.0	

Unless otherwise specified, the values express median [interquartile range].

^a No patient had a serious sleep problem (>15).

the sociodemographic characteristics and components of the PSQI of the 200 pregnant women included in the analysis. The median age was 26^{22–32} years and 111 (55.5%) were unplanned pregnancies. The majority of the pregnant women, 181 (90.5%) had a partner and 19 (9.5%) were single mothers. Of the total number of pregnant women, 97 (48.5%) had a post-secondary level of education. The majority of pregnant women were in the third trimester (49.5%).

Table 1B shows the components of the quality of sleep of pregnant women. Eighty-two percent mentioned good subjective sleep quality, but the final Pittsburgh score shows that only 48% of the participants classified themselves as having good sleep quality. Regarding sleep latency, only 25% took less than 15 min to fall asleep. Furthermore, 60% of pregnant women reported sleeping more than seven hours. The majority (73%) reported habitual sleep efficiency >85%. Likewise, participants who had a moderate amount of sleep disturbances were 36%. Also in response to the use of sleeping medications, 99.5% had not consumed any in the last month. On the other hand, 72% of the participants declared some daytime dysfunction. When categorising the total PSQI scores, it was found that in general pregnant women tend to have a quality of sleep that warrants medical attention (27%) or medical attention and treatment

(25%). None of the pregnant women had sleep quality with a serious problem (PSQI > 15).

Table 2 presents the number of pregnant women at risk of perinatal depression: 63 (31.5%). The bivariate analysis found an association between the risk of perinatal depression and sleep quality ($p < 0.001$). No associations were found in the bivariate analysis between the risk of perinatal depression and age, number of pregnancies, marital status, planned pregnancy, being a single mother, level of education and gestational age.

The association of the individual items of the Pittsburgh index with the risk of perinatal depression is shown in Table 3: the time until falling asleep at night ($p < 0.001$), the actual hours slept per night ($p < 0.001$), problems sleeping due to feeling cold ($p < 0.001$), problems sleeping due to pain ($p < 0.001$), and problems staying cheerful or enthusiastic when carrying out tasks or activities ($p = 0.001$).

Table 4 shows the multivariate analysis. The probability of perinatal depression in pregnant women with poor sleep quality who warrant medical attention is 4.8 (95% CI, 2.44–9.51) times greater than for those without sleep problems, and the probability increases by 6.6 (95% CI, 3.48–12.73) times more if the pregnant woman has a sleep quality that warrants medical

Table 3 – Association of individual items of the Pittsburgh index with the risk of perinatal depression at the Centro Materno Infantil Virgen del Carmen in Lima, Peru, 2019.

Individual items of the Pittsburgh index	Risk of perinatal depression				p
	Yes (n = 63)		No (n = 137)		
	n	%	n	%	
1. What was your bedtime?	10:00 p.m. (9:00–10:30 p.m.)	10:00 p.m. (7:00–10:30 p.m.)			0.571
2. How long did it take you to fall asleep at night? Write the time in minutes			84.7		
<15 min			67.5		
16–30 min	11	15.3	61	46.1	<0.001
31–60 min	26	32.5	54	44.4	
>60 min	21	53.9	18		
	5	55.6	4		
3. What time did you get out of bed in the morning without going back to sleep?	7:00 a.m. [6:00–8:00 a.m.]	7:00 a.m. [6:00–8.30 a.m.]			0.446
4. How many effective hours have you slept per night?	7 [6–8]	8 [7–9]			<0.001
5. How many times have you had trouble sleeping because of:					0.311
5a. Not being able to fall asleep within the first half hour	57	70.4	24	29.6	
Never in the last 4 weeks	23	79.3	6	20.7	
Less than 1 time per week	28	68.3	13	31.7	
1 or 2 times per week	29	59.2	20	40.8	
3 or more times per week					
5b. Waking up during the night or early morning					
Never in the last 4 weeks	22	68.8	10	31.2	
Less than 1 time per week	25	75.8	8	24.2	0.789
1 or 2 times per week	38	65.5	20	34.5	
3 or more times per week	52	67.5	25	32.5	
5c. Having to get up early to go to the bathroom					
Never in the last 4 weeks	16	69.6	7	30.4	0.464
Less than 1 time per week	22	81.5	5	18.5	
1 or 2 times per week	41	67.2	20	32.8	
3 or more times per week	58	65.2	31	34.8	
5d. Not being able to breathe well					
Never in the last 4 weeks	99	72.8	37	27.2	0.052
Less than 1 time per week	16	76.2	5	23.8	
1 or 2 times per week	14	50.0	14	50.0	
3 or more times per week	8	53.3	7	46.7	
5e. Coughing or snoring loudly					0.101
Never in the last 4 weeks	117	70.9	48	29.1	
Less than 1 time per week	10	71.4	4	28.6	
1 or 2 times per week	6	40.0	9	60.0	
3 or more times per week	4	66.7	2	33.3	
5f. Feeling cold					
Never in the last 4 weeks	76	79.8	20	20.2	<0.001
Less than 1 time per week	27	65.9	14	34.1	
1 or 2 times per week	30	65.2	16	34.8	
3 or more times per week	4	23.5	13	76.5	
5g. Feeling too hot	76	77.6	22	22.4	0.018
Never in the last 4 weeks	29	65.9	15	34.1	
Less than 1 time per week	26	59.1	18	40.9	
1 or 2 times per week	6	42.9	8	57.1	
3 or more times per week					
5h. Having nightmares or "bad dreams"					0.006
Never in the last 4 weeks	79	76.7	24	23.3	
Less than 1 time per week	35	67.3	17	32.7	
1 or 2 times per week	21	56.8	16	43.2	
3 or more times per week	2	25.0	6	75.0	
5i. Feeling pain					<0.001
Never in the last 4 weeks	72	78.3	20	21.7	
Less than 1 time per week	20	58.8	14	41.2	
1 or 2 times per week	35	74.5	12	25.5	
3 or more times per week	10	37.0	17	63.0	

– Table 3 (Continued)

Individual items of the Pittsburgh index	Risk of perinatal depression				p
	Yes (n = 63)		No (n = 137)		
	n	%	n	%	
6.1. How many times have you taken sleeping medicine on your own?					1.000
Never in the last 4 weeks	136	68.3	72	78.3	
Less than 1 time per week	1	100.0	0	0	
1 or 2 times per week					
3 or more times per week					
6.2. How many times have you taken sleeping medicine prescribed by your doctor?					–
Never in the last 4 weeks					
Less than 1 time per week	137	68.5	63	31.5	
1 or 2 times per week	–	–	–	–	
3 or more times per week	–	–	–	–	
	–	–	–	–	
7.1. How many times have you felt drowsy when driving, eating or doing some other activity?					
Never in the last 4 weeks					0.078
Less than 1 time per week	46	75.4	15	24.6	
1 or 2 times per week	32	78.1	9	21.9	
3 or more times per week	38	63.3	22	36.7	
	21	55.3	17	44.7	
7.2. Has “staying awake” when you were driving, eating, or doing some other activity been a big problem for you?					
Never in the last 4 weeks					
Less than 1 time per week	95	74.8	32	25.2	0.044
1 or 2 times per week	24	63.2	14	36.8	
3 or more times per week	11	47.8	12	52.2	
	7	58.3	5	41.7	
8. How much trouble have you had staying cheerful or enthusiastic when carrying out your tasks or activities?	73	82.0	16	18.0	
None at all	41	64.1	23	35.9	
A little	20	51.3	19	48.7	0.001
Regular or moderate	3	37.5	5	62.5	
A lot or quite a bit					
9. How would you evaluate or rate the quality of your sleep?					0.017
Somewhat good	14	82.4	3	17.6	
Good	106	72.1	41	27.9	
Bad	14	46.7	16	53.3	
Somewhat bad	3	50.0	3	50.0	

Unless otherwise specified, the values express median [interquartile range].

Unless otherwise specified, the values express median [interquartile range].

Table 4 – Association between sleep quality and risk of perinatal depression at the Centro Materno Infantil Virgen del Carmen, Peru, 2019. Results of raw and adjusted analysis.

Risk factors in the prevalence of perinatal depression	PR	95% CI	p	APR ^a	95% CI	p
Types of sleep quality ^b						
No sleep disorders	1			1		
Warrants medical attention	4.5	(2.28–9.18)	<0.001	4.8	(2.44–9.51)	<0.001
Warrants medical attention and treatment	6.5	(3.41–12.73)	<0.001	6.6	(3.48–12.73)	<0.001

PR: prevalence ratio; APR: adjusted prevalence ratio.

^a Compared to pregnant women without sleep problems.

^b Adjusted for age, level of education, marital status, number of pregnancies, planned pregnancy and gestational age.

attention and treatment compared to pregnant women with a sleep quality without the need for medical attention.

Discussion

In this study, of 104 pregnant women with sleep problems, 51.9% were at risk of perinatal depression, and of 96 without sleep problems, only 9.4%. Pregnant women with sleep quality that warrants medical attention had a 4.8 (95% CI, 2.44–9.51) times higher frequency of perinatal depression, and the probability increased by 6.6 (95% CI, 3.48–12.73) times more if the pregnant woman has a sleep quality that warrants medical attention and treatment.

To our knowledge, this study is the first in Peru that addresses the association between sleep quality and the risk of perinatal depression in pregnant women and shows positive association results. Our findings, however, are generally consistent with existing literature documenting this association.^{13,14} Yang et al.¹³ found that sleep disorders in pregnant women increased the risk of depression by 3.98 (95% CI, 2.74–5.77). González-Mesa et al.¹⁴ reported that poor sleep quality increased the risk of perinatal depression by 1.49 (95% CI, 1.19–1.79). Furthermore, our finding of a statistically significant association of poor sleep quality with perinatal depression is close to the observations of MacLean et al., although they evaluated common mental disorders.²³ In their study of Brazilian pregnant women of low socioeconomic status, the authors reported that the presence of sleep disorders during pregnancy was associated with a 1.4-fold increase (RR = 1.36; 95% CI, 1.01–1.84) in the risk of having a common persistent mental disorder (assessed using a 20-item self-administered questionnaire [SRQ-20]).

The explanation for the association between poor sleep quality and the increased probability of perinatal depression has several mechanisms. First, sleep neural pathways are closely connected and partly overlap with neural pathways that regulate affect, cognition, and other important brain functions.²⁴ Second, poor sleep quality and short sleep duration are associated with poorer regulation of emotions.²⁵ Difficulties in the regulation of emotions are stable predictors of depressive episodes.²⁶ A strong relationship has been observed between inflammation and depression.²⁷ Poor sleep quality contributes to an increase in inflammatory cytokines and increases cellular inflammation, and these effects are more evident in women.²⁸

Our study shows that the prevalence of pregnant women with poor sleep quality (PSQI > 5) is high (52%), with values similar to those of previous studies in Peru.^{29,30}

Regarding the risk of perinatal depression, our findings are consistent with those of other Peruvian studies. Lam et al.³¹, in a multi-centre study in three Peruvian hospitals, found a prevalence of probable cases of perinatal depression of 34.1%. The prevalences obtained in studies in Peru are higher than those of other countries such as Brazil³² and Colombia³³, where they are 16 and 22.36%. However, these results are in line with the prevalence estimated by the WHO.³ A possible explanation for the high prevalence could be that Peruvian women, apart from possible poor sleep quality, are exposed to other risk factors for perinatal depression established by

the United States Preventive Services Task Force.³⁴ These are: personal or family history of depression, history of physical or sexual abuse, having an unplanned or unwanted pregnancy, current stressful life events, pre-gestational or gestational diabetes, complications during pregnancy, low socioeconomic status, lack of social or financial support and teenage parenthood. Some of these risk factors have been published with several of them in Peruvian pregnant women in the study of Mercado et al.³⁵

According to the *Diagnostic and Statistical Manual of Mental Disorders V* (DSM-V), for the diagnosis of perinatal depression, five or more of the established criteria must be met in a time > 2 weeks.² Based on this, a complementary analysis of the individual items of the PSQI was carried out, where some questions showed an association with the risk of perinatal depression. It is possible to hypothesise that some questions on the PSQI are related to the criteria established by the DSM-V. "Decreased interest or pleasure in all or almost all activities most of the day, almost every day"² could be related to the question about having problems staying cheerful or enthusiastic when carrying out tasks or activities, which had a significant statistical value in the association with the risk of perinatal depression ($p = 0.001$). In addition, another criterion is "insomnia or hypersomnia almost every day"², which could be associated with the questions about the time it takes to fall asleep at night ($p < 0.001$), the actual hours slept per night ($p < 0.001$), problems sleeping due to feeling cold ($p < 0.001$) and problems sleeping due to pain ($p < 0.001$). All of these questions also have a significant statistical value in the association with the risk of perinatal depression. In general, these results underline the importance of taking care of the quality of sleep of all pregnant women. These symptoms indicate the need for more studies on the usefulness of some PSQI questions for suspected diagnosis and ruling out perinatal depression.

All the previously mentioned studies make it clear that poor sleep quality is an aetiology that needs to be addressed to avoid cases of perinatal depression. Our results indicate that screening for sleep quality and perinatal depression in pregnant women should be considered. It has even been shown that poor sleep quality can be an independent risk factor for suicidal ideation among pregnant women.^{11,12}

A review of studies on sleep disorders associated them with increased risk of pre-eclampsia (adjusted odds ratio [ORa] = 2.77; 95% CI, 1.81–4.24), gestational diabetes mellitus (ORa = 1.96; 95% CI, 1.62–2.38), caesarean birth (ORa = 1.99; 95% CI, 1.70–2.33) and premature birth (ORa = 1.95; 95% CI, 1.55–2.45).¹³ Children of mothers with perinatal depression have anthropometric alterations and alterations in cognitive and motor, language and emotional development.³⁶ On the other hand, prenatal depression is the most important risk factor for depressed mood during the postpartum, and 50% of women with depression during pregnancy were depressed after giving birth.³⁷ Two systematic reviews found evidence of the impact of self-reported lack of sleep during pregnancy and postpartum on the development of postpartum depression.^{38,39} Zlotnick et al.⁴⁰ verified that, when intervening in the mother with group sessions before delivery and with postpartum reinforcement, only two cases of postpartum depression were evident in 46 pregnant women compared to

eight in 40 pregnant women who did not receive the intervention. Rezaei et al.⁴¹ demonstrated that instruction on healthy sleep behaviours is effective in the quality of life of pregnant women with sleep disorders.

Our study is the first in Peru to evaluate the association of sleep quality with perinatal depression. Other studies that explored the same association in other countries did not use our methodology to categorise sleep quality. Finally, our study is easy to repeat in other contexts because the PSQI and EPDS scales are simple and validated screening methods in the Peruvian pregnant population that do not require complex training to be applied. However, our study had some limitations. The instrument to evaluate sleep quality is subjective. Objective methods, such as wrist actigraphy, were not possible. Second, the cross-sectional nature of the study limits causal inference. In particular, the possibility of reverse causality should be mentioned, a relevant consideration in cross-sectional studies where the possible exposure could actually be a consequence of the variable postulated as an effect.⁴² However, our study, rather than a causal association, seeks to draw attention to the relationship between sleep quality and perinatal depression so that it is taken into account in the evaluation of pregnant women. On the other hand, the findings are based on a local population, and may not be generalisable to other healthcare settings.

Conclusions

There is a possible association between poor sleep quality and perinatal depression in pregnant women between weeks 12 and 36 of gestation. The high frequency of alterations in sleep quality and perinatal depression justify its approach in public health. It is proposed to evaluate the impact of screening the quality of sleep of pregnant women during their check-ups in order to offer preventive or therapeutic interventions as necessary. Operational research should be promoted to evaluate whether interventions to improve sleep quality have a positive impact on reducing perinatal depression.

Conflicts of interest

The authors declare that they have no conflicts of interest.

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