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Prevalence of depression and anxiety, and associated variables among expectant mothers in Bucaramanga and Floridablanca (Santander, Colombia)

Prevalencia de depresión y ansiedad y variables asociadas en gestantes de Bucaramanga y Floridablanca (Santander, Colombia).

Prevalência de depressão e ansiedade, e variáveis associadas em gestantes de Bucaramanga e Floridablanca (Santander, Colômbia).

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ABSTRACT

Introduction. Depression and anxiety frequently affect women at their reproductive age, and are associated with adverse perinatal outcomes. The prevalence among the

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Colombian population at low obstetric risk is unknown. This research intends to determine the prevalence of gestational depression and anxiety, as well as any associated variables, among women of Bucaramanga and Floridablanca, Santander.
Methodology. A cross-sectional descriptive study based on a survey and the Edinburgh Postnatal Depression Scale (EPDS), the Zung Self-Rating Anxiety Scale (SAS), the Family APGAR scale, and the Questionnaire of Perceived Social Support. Reasons of prevalence were established.
Results. Among 244 expectant mothers with an average age of 24.8 years, depression was prevalent in 24.6 % of them, and anxiety in 25.8 %. Depression is associated with a family history of depression at a prevalence ratio (PR) of 2.0; anxiety at a PR of 22.5, and alcohol consumption at a PR of 2.9. One identified protective factor was that the patient had two sources of income (spouse and family), at a PR of 0.6. Anxiety was associated with the presence of depression at a PR of 13.3; the presence of psychological violence at a PR of 2.3, and lack of trust in the spouse at a PR of 3.4.
Discussion. The study is one of the first local studies. It approaches depression and anxiety during pregnancy in low-obstetric risk populations, with findings that are congruent with those reported in literature.
Conclusion. Anxiety and depression are strongly associated. We recommend detecting psychosocial morbidity.

Keywords:
Pregnancy, Depression; Anxiety; Prevalence; Risk Factors.

RESUMEN

Introducción. La depresión y la ansiedad son frecuentes en mujeres en edad fértil y están asociadas a desenlaces perinatales adversos. Se desconoce la prevalencia en población colombiana de bajo riesgo obstétrico. Este estudio busca determinar la prevalencia de depresión y ansiedad gestacional, así como las variables asociadas en mujeres de Bucaramanga y Floridablanca (Santander).
Metodología. Estudio descriptivo transversal a partir de una encuesta y las escalas de Depresión Posnatal de Edimburgo, Autoevaluación de Ansiedad de Zung, *APGAR* familiar y Cuestionario de Apoyo Social Percibido. Se establecieron razones de prevalencia.
Resultados. En 244 gestantes con edad promedio de 24.8 años la prevalencia de depresión fue del 24.6 %, y de ansiedad del 25.8 %. La depresión está asociada con antecedentes familiares de depresión a razón de prevalencia (RP) de 2.0; presencia de ansiedad a RP de 22.5, y consumo de alcohol a RP de 2.9. Como factor protector se encontró que la paciente tenía dos fuentes de ingresos (pareja y familia), a RP de 0.6. La ansiedad se asoció a presencia de depresión a RP de 13.3; la presencia de violencia psicológica a RP de 2.3, y no tener confianza en la pareja, a RP de 3.4.
Discusión. El estudio es uno de los primeros a nivel local. Permite un acercamiento a la depresión y la ansiedad durante el embarazo en población de bajo riesgo obstétrico, con hallazgos concordantes con los reportados en la literatura.
Conclusión. La ansiedad y la depresión están fuertemente asociadas. Se recomienda detectar la morbilidad psicosocial.

Palabras clave:
Embarazo; Depresión; Ansiedad; Prevalencia; Factores de riesgo.

RESUMO

Introdução. Depressão e ansiedade são comuns em mulheres em idade fértil e estão associadas a resultados gestacionais adversos. A prevalência na população colombiana com baixo risco obstétrico é desconhecida. Este estudo busca determinar a

prevalência de depressão e ansiedade gestacional, bem como as variáveis associadas em mulheres de Bucaramanga e Floridablanca (Santander).
Métodos. Estudo transversal descritivo com base em uma pesquisa e nas escala de Depressão Pós-parto de Edimburgo (EPDS), de Autoavaliação de Ansiedade de Zung, de *APGAR* familiar e no Questionário de Apoio Social Percebido. Foram estabelecidas razões de prevalência (RP).
Resultados. Em 244 gestantes com idade média de 24,8 anos, a prevalência de depressão foi de 24,6 % e a ansiedade foi de 25,8 %. A depressão está associada a uma história familiar de depressão (RP=2,0); presença de ansiedade (RP=22,5), e consumo de álcool (RP=2,9). Como fator protetor, verificou-se que a paciente tinha duas fontes de renda (casal e família), com RP de 0,6. A ansiedade foi associada à presença de depressão (RP=13,3); presença de violência psicológica (RP=2,3), e desconfiança no casal (RP=3,4).
Discussão. O estudo é um dos primeiros no ámbito local. Permite uma abordagem da depressão e da ansiedade durante a gravidez em uma população com baixo risco obstétrico, com resultados consistentes com os relatados na literatura.
Conclusões. Ansiedade e depressão estão fortemente associadas. Recomenda-se detectar morbidade psicossocial.

Palavras-chave:
Gravidez; Depressão; Ansiedade; Prevalência; Fatores de risco.

Introduction

Mental well-being is considered a global priority in matters of health and economic development. The United Nations has included mental well-being as one of world's priorities in the Sustainable Development Goals (1). From 1990 to present day, depression and anxiety have been the two main causes of disabilities due to mental disorders. In 2017, depression disorders represented 5.0 % of the disability-adjusted life year (DALY), with anxiety disorders (2) representing 3.2 %.

In 2018, depression continued to be the leading cause of disabilities in South America, at 7.8 % of the DALY, secondary to mental disorders. Paraguay, Brazil, Peru, Ecuador and Colombia took the first five slots of the DALY secondary to depression, and the most affected population is ages 15 to 50 (2,3).

Similarly, the two most frequent mental disorders among the female population during their fertile years are depression and anxiety (4). Women are twice as likely as men to experience depression (5) and, during pregnancy, it is common for the first depressive episode to occur or recur. The second and third trimester of pregnancy and the postpartum period are the most vulnerable times (6-8).

In recent years, studies of pregnancy's physiology and physio-pathology have revealed hormonal, immunological, biochemical and even genetic biomarkers that help explain an expectant mother's susceptibility to mental disorders (4,9-11). Depression is a heterogeneous behavioral disease with varied symptomatic profiles and different symptom trajectories (12,13).

Recently, there has been renewed interest in learning more about perinatal mental health problems, especially in developing countries. Small-scale studies have been conducted in diverse populations to determine the prevalence of depression and anxiety during pregnancy (14) and in the postpartum period (15,16). Estimates of reviews and meta-analyses have also been synthesized (7,17-19), although these figures vary and sometimes have methodological errors. Therefore, when interpreting prevalence numbers, it is necessary to take certain factors into consideration, such as the type of studied population, contemplated diagnostic criteria, used measurement scale, how the scale is applied (self-completed or done by trained personnel), and the time of assessment (pregnancy, postpartum and perinatal), among others. Primary studies have reported estimated frequencies of up to 80 % for minor depression and 4.9 % for major depression (20), but the number varies if both conditions are combined. In 2005, a systematic revision with 26 observational studies estimated a global frequency of depressive disorders of 8.5 % – 11 % as the high values, and 3.1 % - 4.9 % as lower values,

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only if major depression is considered (20). Another review by the same authors found that when assessing cases of pregnancy and the first year of postpartum, the prevalence of major and minor depression during pregnancy was 6.5 % - 12.9 % (21).

Another systematic review conducted in 2012 in low and middle-income countries showed a 15.6 % increase in the prevalence of depression (15.4 - 15.9). Similarly, it showed that the figure varies depending on the data-collection methodology, at 13.4 % (12.4 - 14.5) when self-reporting scales are used and 21.7 % (19.8 - 23.0) when the diagnosis is confirmed with a structured clinical interview (22).

Prevalence of depression during pregnancy varies depending on various contexts. It is estimated at 7 % - 20 % in high-income countries and 35 % - 45 % in low-income countries (23). A 2016 systematic review comprised of 51 observational studies, in which 48,904 women from 20 low and middle-income countries participated, found a prevalence of depression of 25.3 %, 95 % CI (21.4 - 29.6) (18). It also found a higher frequency among vulnerable populations: adolescents (26 %) (24), persons infected with HIV (47 %) (25), and racial minorities or persons with social inequalities (26).

The co-morbidity most frequently associated with gestational depression is anxiety. Up to 60% of women with depression during pregnancy also suffer from anxiety (17), so these two need to be addressed jointly (12). Anxiety disorders include a varied and relatively heterogeneous group of clinical patterns such as generalized anxiety disorder, panic disorder, social phobias, post-traumatic stress, and obsessive-compulsive disorders, which makes their study and comparison somewhat harder (27).

A meta-analysis was published in 2016 with 66 studies that included 162,120 women from 30 countries. An analysis of 17 studies and 25,592 women established a prevalence of prenatal anxiety symptoms and mild to severe symptoms of depression of 9.5 %, 95 % CI (7.8 - 11.2). Another 17 studies and 27,270 expectant mothers established a prevalence of prenatal anxiety symptoms and mild to severe symptoms of depression of 6.3 %, 95 % CI (4.8 - 7.7). Data from 10 studies and 3,918 women established an estimated global prevalence for any anxiety and depression disorder of 9.3 %, 95 % CI (4.0 - 14.7). After that, with data from 3 studies and 3,085 pregnant women for concomitant presence of generalized anxiety disorder and depression, the prevalence was 1.7 %, 95 % CI (0.2 - 3.1) (28).

After that, in 2017, a meta-analysis conducted with 102 studies and 221,974 women from 34 countries established a global prevalence for any anxiety disorder of 15.2 %, 95 % CI (9.0 - 21.4). The prevalence increases if the expectant mother reports her symptoms, with percentages of 18.2 %, 95 % CI (13.6 – 22.8) in the first trimester, 19.1 %, 95 % CI (15.9 – 22.4) in the second trimester, and 24.6 %, 95 % CI (21.2 – 28.0) in the third trimester. Specifically for generalized anxiety disorder, the prevalence was 4.1 %, 95 % CI (1.9 – 6.2) (29).

Surveys conducted in Colombia only have depression prevalence data during the entire life of the non-pregnant female population. The prevalence increased between 2003 and 2015. In 2003, global prevalences of depression and anxiety were at 14.9 % and 21.8 %, respectively. The National Mental Health Survey showed a prevalence among women ages 18 to 44 with the presence of four to six depressive symptoms of 18.2 %, 95 % CI (16.8 - 20.8), and for anxiety, 15.6 %, 95 % CI (14.3-17.0) (30).

In terms of the prevalence of mental disorders among the expectant Colombian population, only three studies have been conducted: two in Medellín and one in Barranquilla. The first, developed in Medellín in 2009 among adolescents, found a prevalence of depression of 32.8 % (31). The second, conducted with expectant mothers classified as having a high obstetrics risk who went to a reference center, showed a prevalence of 61.4 % for depression and 40.7 % for anxiety (32). In 2012, a cross-sectional study of 151 expectant mothers at a second-tier hospital in Barranquilla found a prevalence of depression of 19.2 % (33).

The study and medical care for perinatal depression starts during the pregnancy and extends up to one year postpartum, as during this life cycle, biological and psychosocial changes occur that can cross the barriers of normal adaptation and end up triggering psychological alterations (10). Since the presence of depressive prenatal symptoms can predict the occurrence of postpartum depression (34), it is recommended that the disorder be screened starting with the first prenatal monitoring visit (35).

There are several risk factors associated with the presence of depression during pregnancy (36). Sociodemographic factors such as socio-economic deprivation, lack of education and marital status; clinical factors such as a personal history of depression (17,18), a family history of depression and complications related to pregnancy (37); or

psychosocial drivers such as stressful life events (38 - 40), marital conflicts (22), unwanted or unplanned pregnancy (40), the spouse or expectant mother losing their job, recent negative life experiences, little perceived social support (26), poor relationship quality, a history of violence (22,41,42), and marital dysfunction (17). Similarly, there are many drivers that foster anxiety during pregnancy, including a personal history of mental disorders, depression, multiparity, food insecurity (19), an unwanted pregnancy, or a history of stressful events. On the other hand, perceived social support reduces the possibilities of the expectant mother suffering from this condition. In summary, a history of anxiety or depression, especially during the gestational period, is considered to be the main risk factor for a depressive episode during postpartum, so reviewing psychosocial factors, especially among vulnerable populations, is emphasized (43,44).

Maternal depression and anxiety affect fetuses in many ways, but most of the current evidence is weak and controversial (45). It includes low birth weight (46), premature birth (47), delayed infant growth, emotional and behavioral problems in the child, and adverse cognitive development, among others (45).

In view of the lack of knowledge about expectant mother's mental health in Bucaramanga, the authors decided to conduct this study in order to learn about the prevalence of depression and anxiety during pregnancy, and determine the demographic, psychosocial and clinical variables associated with these two mental conditions.

Methodology

A cross-sectional descriptive study was conducted. The target population was made up of expectant mothers residing in the Metropolitan Area of Bucaramanga who went for prenatal check-ups to primary or secondary health care institutions. The sample was made up of 244 women selected under the following inclusion criteria: expectant mothers in any trimester of their pregnancy classified as low obstetric risk according to the Hurtado & Herrera Scale having completed primary education who voluntarily agreed to participate in the study. No exclusion criteria were considered. It was a non-probability consecutive sample of expectant mothers who went for a prenatal check-up to four health care centers in Bucaramanga and Floridablanca, selected for convenience between the months of March and November 2014.

The set of applied instruments was comprised of a questionnaire that contained psychosocial, clinical and demographic data designed by the researchers, product of the thematic review phase and the application of four short self-reporting scales: Edinburgh Postnatal Depression Scale (EPDS), the Zung Self-Rating Anxiety Scale (SAS), the Family APGAR scale, and the Questionnaire of Perceived Social Support.

Various scales are used to detect perinatal depression, and the Edinburgh Postnatal Depression Scale (EPDS) stands out. A systematic review prepared with 25 studies to assess the operational characteristics of the test determined that the Edinburgh Postnatal Depression Scale performs well, with a cut-off point of ≥9 for depression. It estimated a consistency of 84 %, 95 % CI (71 - 87), sensitivity of 94 %, 95 % CI (68 - 99) and specificity of 77 %, 95 % CI (59 - 88) (48). In addition, this test is well-accepted by women (9), is translated into several languages, including Spanish, is validated in Colombia (49), and can be applied easily and quickly (18). The study considered the presence of depression in patients with Edinburgh scores of ≥ 12.

The Zung Self-Rating Anxiety Scale is an instrument designed by Zung in 1971. It was translated and validated in Colombia in 2009 in a sample of medicine and psychology students, with a Cronbach's alpha coefficient of 0.7 (50). Subsequently, it has been used in various national and local research projects that have verified the psychometric properties, and the results were comparable by gender and age. In 2015, reliability levels of 85 % and sensitivity of 70 % (51) were observed in the university population of Bucaramanga. This scale is comprised of 20 affirmations with a *Likert* type rating scale (never=1, always=4), where 5 of them were written as negative affirmations. It is easy and fast to apply and measures anxiety levels over the last two weeks, based on the score in 4 groups of statements: symptoms of the cognitive, autonomous, motor and nervous or central nervous system. Total scores oscillate between 20 and 80. The study considered the presence of anxiety in patients with Zung scores of ≥ 40.

The Family APGAR scale is a questionnaire designed by neurologist Gabriel Smilkstein in 1978 that has five elements with a *Likert* response scale (never=0, always=4). It has been validated in several Latin American populations, showing correlation indicators that oscillate between 0.7 and 0.8. In 2015, the Family APGAR's reliability in the university population of Bucaramanga was 87 %, and sensitivity was 67 % (51). This instrument globally measures the degree of

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family functionality perceived by an individual as a member of a family unit at a specific time. An ordinal variable was created as follows: normal family function, with a score of 18 to 20; mild family dysfunction, 14 - 17; moderate family dysfunction, 10 - 13; and serious family dysfunction, under 9.

The *DUKE-UNC* Questionnaire is a self-administered scale designed by Broadhead in 1988 that consists of 11 items and a *Likert*-type response scale (1 - 5). The score range oscillates between 11 and 55 points. It assesses the interviewee's perception regarding the availability of people capable of offering help when facing difficulties, ease of social relationships and communicating emphatically and emotionally. The score is a reflection of the perceived support: the lower the score, the less support. The Spanish validation opted for a cut-off point in the 15th percentile, which corresponds to a score of < 32. A score of ≥ 32 indicates normal support, while < 32 indicates low perceived social support. In addition to global support, the questionnaire helps discriminate between emotional or affective support (show of affection and empathy) and confidential support (possibility of having people to communicate with). For emotional support, ≥ 15 points is considered normal, and <15 is low. For emotional support, ≥ 18 points is considered normal, and <18 is low. It is used in multiple regional and national research projects, and in diverse populations (52). The research considered the cut-off point of functional perceived social support to be 32.

In terms of the statistical analysis, a descriptive analysis was initially developed, as shown on **tables 1, 2 and 3**. Subsequently, in the bivariate analysis that measured the raw association using the chi square test or exact Fisher test (categorical) and *t-student* (continuous), between each of the independent variables and the dichotomous dependent variable. In the multivariate analysis, the strength of association was established through a *binomial regression log* with a prevalence ratio (PR) and its respective interval and level of statistical significance (95 % CI). A binomial model was constructed for depression and another for anxiety due to the fact that the prevalence of the disease was greater than 10 % and because it produces an estimate closer to the relative risk (53). Variables were selected in the best functional manner, and they made it possible to follow the Greenlanld criteria (54) with their respective statistical significances, excluding variables that showed a high co-linearity, information bias or were not answered by the total population. A value of $p < 0.05$ was considered to be statistically significant. The statistical analysis was conducted using Stata 14.

With respect to ethical considerations, this study resulted from an internal solicitation by Universidad Autónoma de Bucaramanga, classified as minimal risk (55), which also complies with all the ethical principles of health research (56), approved by ethics committees of participating institutions and by the Universidad Autónoma de Bucaramanga. Prior to their participation, the women signed a written informed consent.

Results

The 244 expectant mothers in the study had an average age of 24.8 years (DE 5.3), and a median of 3.8 prenatal check-ups (DE 2). Only 9 women (3.7 %) were in their first trimester of pregnancy. 98.3% of the women were from socioeconomic levels one, two or three; 84.4 % had attended primary and secondary school, and only 22.1 % worked outside the home. Of the women in the study, 60 scored 12 or more in the Edinburgh Postnatal Depression Scale, which represents a prevalence of 24.6 %, 95 % CI (19.1 - 30.3). 96.7 % of the group was either in the second or third trimester of pregnancy; 63.3 % of them had not planned their pregnancy, and 40 % did not desire it; 66 % exhibited anxiety, 58.3 % had been victims of verbal violence at some point in their lives, 22.5 % victims of physical violence, and 48.3 % of psychological violence. With regard to a history of depression, 33.3 % of the group claimed to have a family history of depression, and 60 % referred to personal backgrounds. 26.7 % referred to alcohol consumption during the pregnancy, and a woman from this group claimed to have used psychoactive substances. Forty-three of these expectant mothers (71.7 %) displayed some degree of family dysfunction; and finally, forty nine (81.7 %) perceive adequate social support. Only 5 patients, which is 1 % of the studied population, said they had no confidential support (*DUKE* < 18). All of this can be seen in **tables 1, 2 and 3**.

In the bivariate analysis, the main factors associated with depression were: having to work, having more than one source of income, the presence of a spouse, being satisfied and having stability in the couple's relationship; presence of conflicts with the spouse, having emotional support from the spouse, having trust in the spouse, having self-esteem, a history of difficult situations and experiences in the last year, being a victim of verbal violence, being a victim of psychological violence, and having personal histories of depression ($p < 0.001$). On the other hand, the

Table 1. Sociodemographic characteristics of expectant mothers from Bucaramanga and Floridablanca (2014).

	Depression N:60	**No depression** N:184	Chi square Fischer• *T student*◆ P value	**Anxiety** N: 63	**No anxiety** N:181	Chi square Fischer• *T student*◆ P value
Prevalence (%)	(24.6)	(75.4)		(25.8)	(74.2)	
Age	24.8 (D4.6)	24.8 (D5.6)	0.9379◆	25.3 (D4.9)	24.6 (D5.4)	0.4144◆
Gestational age	25.6 (D7.1)	27.1 (D8.3)	0.2280◆	27.0 (D6.9)	26.6 (D8.4)	0.7833◆
Trimester						
First	2 (3.3)	7 (3.8)	0.205	2 (3.2)	7 (3.8)	0.761
Second	36 (60.0)	86 (46.7)	0.200•	34 (53.9)	88 (48.6)	0.808•
Third	22 (36.6)	91 (49.5)		27 (42.8)	86 (47.5)	
Employed						
Yes	23 (38.3)	31 (16.8)	**0.002**	22 (34.9)	32 (17.6)	**0.012**
No	37 (61.6)	150 (81.5)	0.002•	41 (65.1)	146 (80.6)	0.014•
Social security						
Regimen Contributive	2 (3.3)	10 (5.4)	0.825	3 (4.7)	9 (4.9)	0.577
Regimen Subsidized	58 (96.6)	173 (94.0)	0.565•	60 (95.2)	171 (94.5)	1
Type of work						
Unemployed	37 (61.6)	153 (83.1)		41 (65.1)	149 (82.3)	
Employed	10 (16.6)	19 (10.3)	**0.002**	12 (19.1)	17 (9.3)	**0.038**
Independent	9 (15.0)	7 (3.8)	0.002•	7 (11.1)	9 (4.9)	0.030•
No answer	4 (6.6)	5 (2.7)		3 (4.7)	6 (3.3)	
Source of income						
Not applicable	22 (36.6)	32 (17.4)		21 (33.3)	33 (18.2)	
Spouse	10 (16.6)	13 (7.1)	**< 0.0010**	7 (11.1)	16 (8.8)	**0.022**
Some relative	26 (43.3)	134 (72.8)	< 0.0010•	32 (50.7)	128 (70.7)	0.022•
Unknown	2 (3.3)	5 (2.7)		3 (4.76)	4 (2.2)	
Living conditions						
Alone with children	3 (5.0)					
With spouse and children	18 (30.0)	3 (1.6)		2 (3.1)	4 (2.2)	
		101 (54.8)	**0.005**	26 (41.2)	93 (51.3)	0.148
With parents and children	13 (21.6)	20 (10.8)	0.003•	14 (22.2)	19 (10.5)	0.120•
		53 (28.8)		18 (28.5)	60 (33.1)	
With spouse and his family	25 (41.6)					
Marital status						
Single	20 (33.3)	21 (11.4)		14 (22.2)	27 (14.9)	
Married	5 (8.3)	28 (15.2)		7 (11.1)	26 (14.3)	0.516
Living together	35 (58.3)	134 (72.8)	**0.001**	42 (66.6)	127 (70.1)	0.549•
Widow	0 (0.0)	1 (0.5)	0.001•	0 (0.0)	1 (0.5)	

D= Standard deviation •= Exact Fischer test = *T student*

Source: Prepared by the authors.

Table 2. Psycho-social characteristics of expectant mothers from Bucaramanga and Floridablanca (2014).

	Depression N: 60	**No depression** N:184	Chi square Fischer• P value	**Anxiety** N: 63	**No anxiety** N:181	Chi square Fischer• P value
Presence of spouse						
No	12 (20.0)	9 (4.9)	**0.001**	9 (14.5)	12 (6.6)	0.056
Yes	48 (80.0)	174 (95.1)	0.001•	53 (85.5)	169 (93.4)	0.068 •
Satisfaction						
No	24 (40.0)	17 (9.2)	**<0.001**	21 (33.3)	20 (11.1)	<0.001
Yes	36 (60.0)	167 (90.7)	<0.001•	42 (66.6)	161 (88.9)	<0.001•
Conflict						
No	24 (40.0)	162 (88.1)	**<0.001**	36 (57.1)	162 (89.5)	<0.001
Yes	36 (60.0)	22 (11.9)	<0.001•	27 (42.9)	19 (10.5)	<0.001•
Emotional support						
No	28 (46.7)	25 (13.6)	**<0.001**	23 (36.5)	30 (16.6)	<0.001
Yes	32 (53.3)	159 (86.4)	<0.001•	40 (63.5)	151 (83.4)	<0.001•
Trust						
No	23 (38.3)	20 (10.9)	<0.001	21 (33.3)	22 (12.1)	<0.001
Yes	37 (61.7)	164 (89.1)	<0.001•	42 (66.7)	159 (87.9)	<0.001•
Self-esteem						
No	18 (30.0)	2 (1.1)	**<0.001**	16 (25.4)	4 (2.2)	<0.001
Yes	42 (70.0)	182 (98.9)	<0.001•	47 (74.6)	177 (97.8)	<0.001•
No problems						
Not experienced	5 (8.3)	53 (28.8)		3 (4.7)	55 (30.4)	
Marital problems	3 (5.0)	8 (4.3)		2 (3.2)	9 (4.9)	
Problems family, neighbors, friends	1 (1.6)	9 (4.8)		1 (1.6)	9 (4.9)	
Economic problems	19 (31.6)	53 (28.8)	**<0.001**	25 (39.6)	47 (25.9)	<0.001
Family bereavement	1 (1.6)	10 (5.4)	<0.001•	1 (1.5)	10 (5.5)	<0.001•
Spouse + SE	4 (6.6)	9 (4.8)		5 (7.9)	8 (4.4)	
Multiple	26 (43.3)	22 (11.9)		21 (33.3)	27 (14.9)	
Verbal violence						
No	20 (33.3)	118 (64.1)	**<0.001**	22 (34.9)	116 (64.1)	<0.001
Yes	40 (66.7)	66 (35.9)	<0.001•	41 (65.1)	65 (35.9)	<0.001•
Physical violence						
No	37 (61.7)	145 (78.8)	**0.008**	36 (57.1)	146 (80.7)	<0.001
Yes	23 (38.3)	39 (21.2)	0.010•	27 (42.9)	35 (19.3)	<0.001•
Psychological violence						
No	26 (43.3)	134 (72.8)	**<0.001**	26 (41.3)	134 (74.1)	<0.001
Yes	34 (56.7)	50 (27.2)	<0.001•	37 (58.7)	47 (25.9)	<0.001•

• = Exact Fischer test

Source: Prepared by the authors.

Table 3. Clinical characteristics of expectant mothers from Bucaramanga and Floridablanca (2014).

	Depression N: 60	**No depression** N:184	Chi square Fischer P value	**Anxiety** N: 63	**No anxiety** N:181	Chi square Fischer• P value
Planned						
Yes	22 (36.6)	94 (51.1)	**<0.001**	23 (36.5)	93 (51.3)	0.042
No	38 (63.3)	90 (48.9)	<0.001•	40 (63.5)	88 (48.6)	0.056•
Desired						
Yes	38 (56.6)	135 (73.4)	**0.005**	38 (60.3)	131 (72.4)	0.019
No	23 (40.0)	49 (26.6)	0.007 •	23 (36.5)	50 (27.6)	0.022•
Unknown	2 (3.3)					
History of Personal Depression						
No	24 (40.0)	151 (82.1)	**<0.001**	27 (42.9)	148 (81.8)	<0.001
Yes	36 (60.0)	31 (16.8)	<0.001•	36 (57.1)	31 (17.1)	<0.001•
Unknown	0 (0.0)	2 (1.1)		0 (0.0)	2 (1.1)	
Alcohol consumption						
No	44 (73.3)	166 (90.2)	**0.002**	47 (74.6)	163 (90.1)	0.004
Yes	16 (26.7)	17 (9.3)	0.002•	15 (23.8)	18 (9.9)	0.003•
Drug use						
No	58 (96.7)	182 (98.9)	**0.201**	61 (96.4)	179 (98.9)	0.225
Yes	28 (3.3)	1 (0.5)	0.254•	1 (1.6)	2 (1.1)	0.381•
Family *Apgar*						
Good family	17 (28.3)	82 (44.6)		21 (33.3)	78 (43.1)	
Mild D	14 (23.3)	53 (28.8)	**0.009**	16 (25.4)	51 (28.1)	0.142
Moderate D	13 (21.7)	28 (15.2)	0.011•	11 (17.4)	30 (16.5)	0.155•
Severe D	16 (26.7)	21 (11.4)		15 (23.8)	22 (12.1)	

• = Exact Fischer test

Source: Prepared by the authors.

multivariate analysis using the binomial regression log found that having a family history of depression in the first or second degree doubles the risk of having depression during pregnancy to a PR of 2.0, 95 % CI (1.1 - 3.7). Similarly, a statistically significant association was found with the presence of anxiety at a PR of 22.5, 95 % CI (9.4 - 53.7) and with alcohol consumption at a PR of 2.9, 95 % CI (1.1 - 8.2). In addition, having two income providers during the pregnancy (spouse and family) reduces the risk of exhibiting or exacerbating depression during pregnancy by 40 % at a PR of 0.6, 95 % CI (0.4-0.8).

In the case of anxiety, the prevalence in the sample was 25.8 %, corresponding to sixty-three women. 96.8 % of the group was either in the second or third trimester of pregnancy; 63.5 % of them had not planned their pregnancy, and 36.5 % did not desire it; 58.7 % had been victims of verbal violence at some point in their lives, 38.1 % victims of physical violence, and 52.4 % of psychological violence. With regard to a history of depression, 28.6 % of the group claimed to have a family history and 57.1 % have personal histories. 23.8 % referred to alcohol consumption during the pregnancy, and a woman from this group claimed to have used psychoactive substances. Forty-two of these expectant mothers (66.7 %) displayed some degree of

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family dysfunction; and finally, fifty-two (82.5 %) perceives adequate social support, as observed in **tables 1, 2 and 3**.

The main factors associated with the presence of anxiety during pregnancy were: being satisfied in the couple's relationship, conflicts with the spouse, perceiving stability in the relationship, emotional support from the spouse, trust in the spouse, self-esteem, a history of difficult situations and experiences over the last year, being the victim of verbal and psychological violence and referring to a personal history of depression. Nevertheless the multivariate analysis using the binomial regression log demonstrated that the presence of depression increased the risk of anxiety during pregnancy 13 times, at a PR of 13.3, 95 % CI (6.3 - 28.1). A positive association was found with psychological violence at a PR of: 2.3, 95 % CI (1.1 - 4.8) and lack of trust in the spouse at a PR of 3.4, 95 % CI (1.5 - 8.2).

Discussion

The target population has a high-risk profile of exhibiting depression and anxiety during pregnancy. Anxiety was observed as the co-morbidity and predictive factor most frequently associated with gestational depression. The factors associated with anxiety during pregnancy are primarily psychosocial.

The prevalence of depression of approximately 25 % found in the study is high, and it is also consistent with some recent international estimates, such as a meta-analysis conducted in Ethiopia that included 5 national studies, which determined a prevalence of depression of 21.2 % (57). This country in the horn of Africa has a human development index (HDI) of 0.46, a much lower indicator than Colombia's, which was 0.74 in 2017. Another meta-analysis from 2016 that included 51 observational studies with 48,904 women from 20 low-income and middle-income countries established a prevalence of depression of 25.3 % (18). These specific prevalences in the Colombian expectant mother population are deemed high if we compare them with figures of prevalence over the last twelve months for any mood disorder and anxiety disorder in the non-expectant population. Figures reported by the National Mental Health Study in 2015 were 18.2 % (16.8 - 19.8) and 15.6 % (14.3 - 17.0), respectively (30).

Upon analyzing the data in the primary studies, the prevalence of depression during pregnancy in Bucaramanga and Floridablanca was greater than what was found in the cross-sectional study conducted in Barranquilla in 2012. In the latter, when applying the Edinburgh Postnatal Depression Scale with a score of > 13, the prevalence was 19.2 % (22). Similarly, it was greater if compared with other studies conducted in the Mexican population. (24.58). The first, developed in the perinatology outpatient clinic for women between 28 and 34 weeks of gestation assessed with the Edinburgh Postnatal Depression Scale at the same cut-off point found a prevalence of 21.7 % (38). The second study, conducted at three institutions in Yucatan, found a prevalence of gestational depression of 16.6 % (39). On the other hand, some studies undertaken in Lima, Peru, show prevalences as high as 34.1 % (27). Finally, figures of both depression and anxiety were similar to those found in an Italian study from 2012 with 590 women at 28 to 32 weeks of pregnancy, and using a lower cut-off point (Edinburgh > 10), it estimated a prevalence of depression of 21.9 % and anxiety of 25.3 % using the STAI-Y scale (40).

With regard to the presence of probable anxiety in the study (25.8 %), the data is very similar to the data found in the last meta-analysis of 2017 conducted with 102 studies of expectant mothers from 34 countries, which demonstrated an increase in anxiety disorders as pregnancy progresses, with 18.2 % in the first trimester, 19.1 % in the second trimester, and 24.6 % in the third trimester (29).

In terms of risks factors, the results were consistent with those reported by the literature showing the epidemiological behavior of low and middle income countries, especially those that assessed psychosocial determinants (17,45,57). The factor most strongly associated with depression during pregnancy was anxiety at a PR of 22.5, a finding which had been previously established in several research studies. (17). Having a family history of depression increases the risk of having probable depressive symptoms during pregnancy by two, and alcohol use increases nearly three times. Although alcohol consumption is a determinant associated with the presence of mental disorders, there are few observational studies that show the association in the expectant population. The National Mental Health Study from 2003 showed a particular association between depression and alcohol, but in the male population (59). It determined that having a higher level of economic resources protects from the previous condition at a PR of 0.6. Other studies have measured food insecurity. The multivariate analysis of this study did not find an association with the family history of depression, a

determinant considered to be a strong predictor of depression and anxiety during pregnancy and postpartum. This situation can be explained by the homogeneity of exposure between the two comparison groups.

Thus, frequency figures for these mental disorders vary depending on the population, country, measurement scale used, period of assessed pregnancy and type of study. Moreover, measures of association may be biased, since they tend to use logistical regression for the statistical analysis.

This study's limitations derive from the type of epidemiological design because it is a cross-sectional study that assesses both risk factors as well as outcomes studied at just one point in time. The results must be considered to be exploratory, not causal. Additionally, the cases of these two mental conditions are considered probable because they were not confirmed via a structured clinical interview.

Early detection of depression and anxiety symptoms in pregnant women may facilitate a course of action that would include timely intervention strategies in order to avoid serious consequences for the mothers and their children, spouses and families (41). Furthermore, knowing the associated variables makes it possible to create mental health promotion and prevention programs to help expectant and post-natal mothers. In order to develop these actions, health care system actors must have valid and reliable information that allows them to focus their efforts on at-risk populations and design strategies in line with their realities.

These results highlights the urgent need to implement health care strategies designed for early detection in at-risk populations, as well as create and implement screening, diagnosis and treatment protocols for these two mental disorders during the perinatal period. In that regard, there is an urgent need to establish public policies related to mental health care with a gender focus that are sensitive to the biological, psychosocial and economic vulnerabilities associated with a deficient state of mental health in women.

The study is one of the first local studies. It allows addressing the situation of depression and anxiety during pregnancy in the population classified as low-obstetric risk. In addition, it used the most internationally recommended and locally validated screening scales. Furthermore, it used an analytical methodology in accordance with the prevalence of the outcome, which allowed it to reliably approximate the reason for prevalences at a relative risk. It should be noted that these estimates are not as high as those found in studies that used logistical regression.

Although the study made it possible to demonstrate the existence of different factors associated with both depression and anxiety, the majority of these variables are of a psychosocial and clinical nature. Therefore, they are easy to detect during a prenatal visit. The study also invites further studies to determine the real effect in time of each of these variables.

Efforts are required to increase the availability of programs that comprehensively address the needs derived from caring for maternal mental health. Similarly, it is necessary to create simple intervention programs that focus on reducing the stress related to maternity and can be used by health care professionals that work in primary perinatal care.

Conclusions

The expectant population studied in Bucaramanga and Floridablanca has a high-risk profile of exhibiting depression and anxiety during pregnancy. A high prevalence of approximately 25 % was estimated for these two mental disorders. These figures are similar to those found in studies conducted in low income settings. It was determined that depression as an outcome is associated with clinical factors such as a family history of depression at the first or second degree, anxiety, and alcohol consumption. The main identified protection factor is having two providers or sources of economic income. Anxiety was associated with the presence of depression and psychosocial determinants such as the presence of psychological violence and lack of trust in the spouse.

While the study presents some limitations particularly related to the type of design, it is an important benchmark for conducting future studies. It is important to stress the need to routinely assess prenatal visits in order to determine the presence of depression or anxiety, as recommended by many international health authorities, and to delve deeper into identifying psychosocial variables, particularly in populations that are vulnerable or have an increased risk profile. Finally, the authors recommend further future studies that prospectively measure the different variables of exposure that influence depression and anxiety during pregnancy, and have an adequate sample size to determine the estimates of a multivariate predictive model.

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