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Mental disorders in pregnancy and newborn conditions: longitudinal study with pregnant women attended in primary care

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Abstract *This study aimed to determine the presence and association of possible mental disorders diagnoses in primary care pregnant women and newborns' conditions. This is a longitudinal study with pregnant women (18-39 years), in the second and third trimesters of pregnancy, attended at primary care facilities in the metropolitan region of São Paulo (February to August/2014). The following tools were used: sociodemographic questionnaire; Mental Disorders in Primary Care Assessment tool; and an interview with information and mother´s perception of the behavior of newborns. Of the 300 pregnant women interviewed, 76 had possible diagnosis of mental disorders, 46 women had depression/dysthymia and 58 anxiety/panic symptoms. Low birth weight and prematurity was observed in 14 and 19 newborns, respectively, and there was no association with the probable diagnosis of mental disorders; the possible presence of mental disorders was associated with the mother's perception of newborns behavior. Pregnant women attended at low risk prenatal care showed relevant frequency of mental disorders; thus, the identification of these changes during pregnancy can also contribute to a better understanding of the mother-and-child dynamics and in the quality of family care.*

Key words *Pregnancy, Mental disorders, Birth weight, Preterm*

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Introduction

Mental Disorders (MD) are a public health problem. According to the World Health Organization, some 450 million people suffer from some MD, responsible for 8.8% of mortality and 16.6% of disability among diseases in low- and middle-income countries[1]. In this context, previous publications have shown that women have higher prevalence in relation to men, mainly in relation to depressive, anxiety-related and somatoform disorders[2,3].

Pregnancy and the puerperium are recognized as risk factors for the development and exacerbation of mental health problems, with similar prevalence of MD in both pregnancy and postpartum[4]. However, it is believed that the diagnosis in this period is neglected and there is little research that seeks to identify psychological changes during pregnancy and obstetric outcomes[5].

Epidemiological studies are almost consensual in pointing out that MD, such as anxiety and depression may result in an increased risk for negative outcomes to the fetus[6-8]. Research has identified prevalence of depression in the gestational period of approximately 7% to 15% and anxiety around 20%[7,8]; these untreated conditions during pregnancy also increase the risk of exposure to tobacco, alcohol and other drugs, as well as the risk of malnutrition and the difficulty of following medical guidelines in the prenatal period, even reducing the frequency of visits, which has been associated to the risk of neonatal mortality[9].

Research on MD in basic care is still a challenge for health professionals, with difficulties even in the elaboration of the diagnosis[10]. Among the studies performed with pregnant women during prenatal care, most used tools that only detect depression and anxiety[7,8] symptoms, since diagnoses depend on clinical evaluation.

Considering the magnitude of MD prevalence during the gestational period and the associated risks, this study aimed to verify the presence and association between probable MD diagnoses in pregnant women using primary care and NB conditions.

Methods

The study "Relationship between Mental Disorders during Pregnancy, Low Birth Weight and Prematurity: A Study with Pregnant Women Attended in Basic Care" is the product of a dissertation research approved by the Ethics Committee of the Federal University of São Paulo.

This is a longitudinal study with 340 pregnant women between the second and third trimester of gestation, attended at five PHC Facilities (UBS) in the Metropolitan Region of São Paulo, Brazil. The UBS were chosen for ease of access and for having schedules and number of weekly consultations that allowed interviews to be conducted during the study period.

Population: The study comprised primiparous and multiparous women, aged between 18 and 39 years, who were between the second and third trimester of gestation and were followed-up in the low-risk prenatal program in one of the five UBS selected for the study. The five UBS were visited during six months (February to August/2014) for the first contact and interview with the pregnant women.

Exclusion criteria used: multiple gestation, women under the age of 18 and greater than 40 years. Pregnant women in the first trimester were not interviewed because they were more likely to be at risk of termination of pregnancy and required prolonged time for new contact, that is, after the child was born.

The first interview with pregnant women was performed during the prenatal visit and after signing the Informed Consent Form (ICF). In order to standardize the data collection and the number of visits to the UBS, a weekly schedule was observed following the facility's attendance schedule.

A tool consisting of nationally validated questionnaires was used for data collection, as described below:

1. Sociodemographic questionnaire: age, schooling, paid activity, household income, marital status, number of people living in the household, parity, socioeconomic classification according to ABEP[11], partner's information (education, paid work, alcohol, tobacco and illicit drugs use).

2. Pregnant women's health: current pregnancy planning, presence of chronic disease (diabetes mellitus, arterial hypertension), alcohol and tobacco consumption.

3. Psychiatric symptoms: The Primary Care Evaluation of Mental Disorders (PRIME-MD) tool[12,13]. In this study, PRIME-MD was considered a screening tool for probable diagnoses, similar to the study by Almeida et al.[14], and applied by the same interviewer. From the collected data, we could identify five probable diagnostic categories: major depressive disorder, dysthymia,

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panic disorder, generalized anxiety disorder and bulimia nervosa, using diagnostic criteria from the Diagnostic and Statistical Manual of Mental Disorders – DSM III.

The tool is divided into two parts: the Patient Questionnaire and the Clinical Assessment Guide. The Patient Questionnaire contains 12 questions, of which 10 are yes-no answers, one question measures the symptom's intensity and one measures overall health. In the case of an affirmative answer to any of the first ten questions (initial section), the corresponding module in the Clinical Assessment Guide (final section) is used to obtain additional information for each probable diagnosis.

The second interview was held after birth, by telephone and by the same researcher. There were difficulties in locating some mothers; thus, the newborns (NB) data of the mothers not located by telephone were collected in the records of the UBS. The following information was collected:

1. Delivery information: type of delivery, complications and gestational age at delivery.

2. Information about the newborn: gender, birth weight, prematurity, malformation and hospitalization at birth.

3. Mother's support: care guidelines for newborns at discharge, home help to care for the child.

4. Mother's perception of the behavior of newborns: crying, colic, breastfeeding and sleep.

Data was tabulated and consolidated into an Excel worksheet (Microsoft Office ® 2010). Statistical analysis was performed with the SPSS 20.0 program (IBM®). Continuous variables were assessed for distribution using the Kolmogorov-Smirnov test and shown as median and minimum/maximum values. Qualitative variables were shown in absolute and percentage value contingency tables. The Chi-square or Fisher's exact test was used to compare them. The significance level adopted was 5%.

The Research Ethics Committee of the Federal University of São Paulo and the Municipal Health Secretariat approved this study.

Results

Three hundred and forty pregnant women with characteristics compatible with the inclusion criteria were invited to the interview. Of these, 300 accepted to participate in the study. Table 1 shows the sociodemographic characteristics of pregnant women. The median age was 25.5 years (18.1, 38.6); most of them had schooling over eight years (82.3%), lived with their partner (80.7%) and had paid work (50.7%).

The variables related to complications during pregnancy, delivery conditions and newborns of pregnant women who completed all the stages of the questionnaire are shown in Table 2. A weight below 2,500 g (low birth weight-LBW) and greater than 4,000 g in 14 (4.9%) and 22 (7.7%) of the newborns, respectively, was observed. Prematurity was found in 19 (6.7%) of the children. Among NBs with LBW, seven (50%) were classified as preterm.

Most newborns were discharged from the hospital with their mother, received guidance for nursing care by a nurse or doctor, and mothers said that they had support from a family member (41.7%). Of the 284 mothers interviewed, 49 had no reports on the perception of the behavior of the newborn, since data of the child's birth were collected in the medical records. The complaints reported by mothers regarding changes in the behavior of the newborn are described in Table 2.

No variables of mother's health, habits, socioeconomic status, mother/father schooling and complications during pregnancy were associated with the probable diagnosis of mental disorders, analyzed in a group or separately (Table 3). Regarding the association of maternal variables and LBW and prematurity, only pregnancy-specific hypertensive disease (PSHD) was associated with prematurity ($p = 0.016$).

Among the pregnant women evaluated, 76 (26.6%) cases of changes compatible with probable mental disorders were found, with symptoms of depression / dysthymia ($n = 46$; 16.2%) and anxiety/panic disorder ($n = 58$, 20.4%). The report of alcohol consumption in the initial section of the questionnaire was related to prematurity ($p = 0.037$); however, none of the pregnant women met the final criteria that characterized alcohol dependence.

The analysis of the changes compatible with probable MD showed that there was no statistically significant association with LBW or prematurity; however, it was associated with the mother's perception of changes of the behavior of the NB, in a group ($p = 0.001$) or isolated, for depression / dysthymia and anxiety / panic ($p < 0.001$) (Table 4).

Two cases of neonatal death, with full term birth, and one case of stillbirth occurred among the pregnant women interviewed. It was not possible to obtain the etiological diagnosis in telephone interviews. Among the health conditions

Table 1. Sociodemographic characteristics of the pregnant women included in the study.

Variable		N = 300	%
Mother's age	Years	25.5 (18.1; 38.6)	
Partner's age	Years	28.0 (17.0; 55.0)	
Ethnicity	White	132	44.0
	Non-white	168	56.0
Mother's schooling	< 4 years	4	1.3
	4 ¬ 8 years	49	16.4
	> 8 years	247	82.3
Partner's schooling *	< 4 years	7	2.7
	4 ¬ 8 years	81	31.3
	> 8 years	171	66.0
Marital status	Living with partner	242	80.7
	Not living with partner	58	19.3
Household's livelihood	Woman	43	14.3
	Father	219	73.0
	Grandparents	35	11.7
	Other	3	1.0
Per capita income	Reals	500.00 (66.60;3,330.00)	
Per capita income	< 1	199	66.3
(Minimum wages)	1 ¬ 2	86	28.7
	> 2	15	5.0
Socialeconomic classification	A	1	0.3
	B	55	18.3
	C	211	70.4
	D	30	10.0
	E	0	0.0
Opinion on monthly income	A lot of difficulty	17	5.7
	Difficulty	39	13.0
	Some difficulty	143	47.7
	Some facility	44	14.6
	Facility	57	19.0
Current employment	Paid work	152	50.7
	No paid work	148	49.3
Partner's	Paid work	247	95,4
occupation *	No paid work	12	4,6
Children	0	139	46.3
	1	98	32.7
	2	45	15.0
	≥ 3	18	6.0
Age at first pregnancy	Years	19.0 (13.0; 36.0)	
Religion	Catholic	147	49.0
	Protestant / Evangelical	107	35.7
	None	43	14.3
	Other	3	1.0
Partner's alcohol consumption *	Does not consume	125	48.3
	Consumes moderately	131	50.6
	Consumes frequently	3	1.1
Partner's tobacco use *	Smoker	55	18.3
	Never smoked	174	67.1
	Former smoker	30	11.6
Partner's illicit drugs *	User	3	1.1
	Never used	239	92.3
	Former user	17	5.6

N (%). * Total number 259.
Source: Masters dissertation. Universidade Federal de São Paulo. São Paulo, 2015.

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Table 2. Description of the trend, complications, birth weight, prematurity and discharge conditions of the newborns of the pregnant women who completed all the stages of the questionnaire.

Variable		N = 284	%
Planned pregnancy	Yes	134	47.2
	No	150	52.8
Gestational age at interview	Weeks	29.0 (16.0; 40.0)	
Partner was	Satisfied	217	77.0
	Not satisfied	12	4.2
	Indifferent	19	6.8
	No partner	34	12.0
Attempted termination	Yes	8	2.8
	No	276	97.2
Smoked during pregnancy	Yes	31	10.9
	No	253	89.1
Drug use during pregnancy	Yes	1	0.3
	No	283	99.7
Gestational diabetes	Yes	6	2.1
Pregnancy-Specific Hypertensive Disease (PSHD)	Yes	18	6.3
Type of delivery	Vaginal	162	57.5
	Cesarean	120	42.5
Prematurity	Yes	19	6.7
	No	265	93.3
Gender	Male	143	50.3
	Female	141	49.7
Birth weight	< 2500 g	14	4.9
	2500g ¬ 4000 g	248	87.3
	> 4000 g	22	7.8
Birth weight	Grams	3327 (1425; 4615)	
Complications at birth*	Yes	27	11.3
	No	213	88.7
Type of complication	Infectious	2	7.4
	Jaundice	7	25.9
	Metabolic	3	11.1
	Respiratory	8	29.6
	Tocotrauma	3	11.1
Infant remained at the hospital after mother's discharge*	Yes	17	7.1
	No	223	92.9
Guidance at discharge**	Yes	164	69.8
	No	71	30.2
Professional who provided guidance	Nurse	110	67.1
	Doctor	54	32.9
	No guidance received	88	37.4
Help at home	Grandparents	88	59.9
	Sister	12	8.2
	Partner	24	16.3
	Other	23	15.6
Other's perception of newborn behavior**	With complaint	43	18.3
	No complaint	192	81.7
What is the complaint	Cries a lot	4	9.3
	Colic	22	51.1
	Breastfeeds a lot (hungry)	12	27.9
	Does not sleep much	5	11.7

N (%). * Total number 240. ** Total number 235.
Source: Masters dissertation. Universidade Federal de São Paulo. São Paulo, 2015.

of these mothers, one had a history of PSHD and two had symptoms compatible with a probable diagnosis of anxiety.

Discussion

In this study, we observed that 26.6% of pregnant women evidenced criteria for a probable mental disorder. The high frequency of MD during pregnancy is supported by the literature in national studies with populations of low socioeconomic status[2,5] and attended by PHC[14]. In international research, the prevalence of psychiatric symptoms, particularly anxiety and depression, varies from 11.8% to 34.9%[15-19], depending not only on the socioeconomic aspects of the period of time investigated, but also on the tool used in the detection.

Our findings showed that the pregnant women interviewed had a good level of schooling, most of them living with the partner who was responsible for the family's subsistence. In relation to pregnancy, most planned the pregnancy, reported the satisfaction of the partner with the child and was assisted after delivery, especially by

Table 3. Presence of a probable diagnosis of mental disorder according to variables related to mother's health, habits, socioeconomic level, schooling and parity (n = 284).

Variable		Yes (n = 76)	No (n = 208)	p value*
Mother's schooling	< 8 years	13	36	0.562
Marital status	With partner	60	172	0.490
Current employment	Working	36	110	0.424
Per capita income	< 360,00	23	65	0.498
Partner	Working	61	175	0.625
Partner's schooling	< 8 years	20	63	0.759
Previous children	Yes	60	173	0.485
Planned pregnancy	Yes	32	86	0.507
Tobacco use during pregnancy	Yes	11	20	0.283
Pregnancy-Specific Hypertensive Disease (PSHD)	Yes	14	21	0.068
Diabetes	Yes	4	3	0.085
Type of delivery	Vaginal	40	122	0.497

* Significance level of the Chi-square test.
Source: Masters dissertation. Universidade Federal de São Paulo. São Paulo, 2015.

Table 4. Mother's perception about the behavior of the newborn according to the probable diagnosis of mental disorder (MD) during pregnancy (n = 235).

Variable		With complaint (n = 43)	%	Without complaint (n = 192)	%	p value*
Probable mother's MD	Yes	20	46,5	40	20.8	0.001
	No	23	53,5	152	79.2	
Depression/Dysthymia	Yes	12	27,9	22	11.5	< 0.001
	No	31	72,1	170	88.5	
Anxiety/Panic	Yes	18	41,9	29	15.1	< 0.001
	No	25	58,1	163	84.9	

* Significance level of the Chi-square test.
Source: Masters dissertation. Universidade Federal de São Paulo. São Paulo, 2015.

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the grandparents of the newborn, which shows that there was an important family support network at the time.

These characteristics may be related to the studied age group, which may have greater emotional and psychosocial maturity and financial stability; on the other hand, they also suggest that socioeconomic status and unfavorable living conditions do not necessarily lead to risk of disorders and disaggregation. Family support is the main source of mother's support, which is fundamental for the pre- and postnatal care received by the mother and that even leads to reduced occurrences of stressful events[20].

The frequency of LBW was low (4.9%) in this study, lower than that observed for the population in the State of São Paulo (9.1% in 2013)[21]. The literature shows a higher risk of LBW for adolescent mothers (under 18 years of age), and also for women over 40 years[22,23], which may have influenced the results due to age group selection for the study.

Prematurity was observed in 19 (6.7%) children and was associated with the presence of PSHD. It should be noted that PSHD had a frequency of 6.3% of pregnant women, although pregnant women were not included in high-risk prenatal care.

The presence of symptoms suggesting a diagnosis of probable depressive disorder was verified in 14.4% of the pregnant women evaluated; although this finding is lower than that of other countries, ranging from 22.0% to 34.9%,[17,19] our results are similar to the national studies performed with low socioeconomic pregnant women in the second and third trimesters of pregnancy[6,24].

The association between depression and obstetric outcomes is still poorly understood. However, some studies have pointed to this disorder as a possible risk factor for low birth weight and prematurity[6,17,25].

In this study, no association was found between probable diagnosis of depressive disorder and LBW and prematurity. Studies in developed countries have shown that depression is not an independent risk factor for LBW[25,26]; on the other hand, a positive association was found in developing countries and was influenced by low income and alcohol consumption during pregnancy. However, research that found this association identified prenatal depression as a significant predictor of LBW without gestational age control[6,27].

With regard to the probable diagnosis of generalized anxiety disorder, the frequency was elevated (19.3%), as already described in other studies with women during the gestational period[15,18], which was also observed in a study carried out in the South of the country with pregnant women treated in 18 UBS, which found a very similar frequency (19.8%) to this study using the same screening tool[14].

The frequency of other MDs evaluated (bulimia nervosa, panic disorder and alcohol dependence) was lower than that found for depression and generalized anxiety; it was not associated to any mother's health variable, habits, socioeconomic status, schooling (mother and father), complications during pregnancy and NB conditions. This is due to the homogeneity of the sample regarding the aforementioned aspects, which did not allow a significant difference between the groups with and without MD symptoms.

In this study, there was an association between the probable diagnosis of MD in mothers and the perception of changes in the behavior of the newborn. This suggests that the mother's psychiatric symptoms may influence the mother-newborn relationship in the puerperium. Thus, the primary care professional should be alert to identify possible psychological changes during pregnancy and postpartum, in order to provide adequate shelter for each pregnant woman/mother. When considering this possibility, the professional can advance the understanding of the mother-child dynamics, addressing complaints with regard to child's symptoms and behaviors and acting more safely to guide the family.

Mental health care in primary care is important in early case detection and early termination of the disease process; thus, professional mental health training becomes necessary. However, despite the high prevalence of mental suffering in the patients attended in the primary health care network, there is still no adequate detection. This is because professionals have a hard time in correctly diagnosing and, consequently, providing the proper care[10].

Research on psychiatric symptoms uses several scales for screening; among the most commonly used are: self-assessment scale (IDATE)[28], most commonly used in epidemiological research, to identify the presence of anxiety; the HADS scale (Hospital Anxiety and Depression Scale), developed for research in non-psychiatric general hospital patients in order to identify the symptoms of anxiety and depression[29]. In this study, the PRIME-MD instrument was used to track symptoms suggestive of probable diagnosis, following the diagnostic criteria of DSM-III,

although the currently recommended classification is based on DSM-V. It is a questionnaire that is easy and quick to apply and can be incorporated into primary care.

The results described herein cannot be generalized to the population. It is worth noting, however, that people with MD may have reduced self-care, causing increased consumption of alcohol, tobacco and other drugs; reduced food quantity and worse food quality, in addition to non-adherence to prenatal care[9]. Such behaviors during pregnancy may lead to higher rates of neonatal morbimortality, prematurity, LBW, intrauterine growth restriction and maternal mortality[30]. Our results will be shown to local managers to contribute to the quality of care to pregnant women and children.

Despite the important aspects demonstrated in this study, some limitations should be kept in mind. The sample size may have influenced the lack of associations in the analysis with the outcomes (LBW and prematurity); in addition, it was not possible to gauge the anthropometric conditions of pregnant women, the weight gain during pregnancy, the number of consultations and the quality of prenatal care. We should also remember that information on PSHD and gestational diabetes was self-reported. Thus, larger sample studies with recruitment of pregnant women with similar characteristics may contribute to the production of new evidence about the association between MD and newborn conditions, as well as other maternal characteristics that may influence this relationship.

Final considerations

In conclusion, pregnant women in the 18-39 age group monitored in low-risk prenatal care, in the second and third gestational trimesters had a relevant frequency (26.6%) of symptoms suggesting probable MD diagnoses. Although there was no association with LBW and prematurity, it is worth noting the association of these MDs with the mother's perception of changes in the behavior of the newborn.

Clinical evaluation and follow-up in primary care are fundamental because prenatal care may be the only contact a woman of reproductive age has with health services, making it crucial for interventions aimed at promoting women's health. The identification of possible MDs during pregnancy may also contribute to a better understanding of the mother-child binomial dynamics and contribute to quality family care.

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Collaborations

DO Costa participated in all stages of the research and elaboration of the paper; MWL Strufaldi and GC Pedroso participated in the orientation, analysis and interpretation of data, writing, critical review and final paper review; FIS Souza participated in the analysis and interpretation of data, critical review and final paper review.

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