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Stress and Anxiety in Pregnant Women from a Screening Program for Maternal-Fetal Risks

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Abstract

Aim: The aim of this study was to discuss associations between stress and anxiety and their relation with mental health during pregnancy based on data from pregnant women who participated in a program for screenning maternal-fetal risks in order to implement a follow up service of maternal mental health.

Study design: A cohort of 90 pregnant women at 1st trimester of pregnancy was investigated using the Beck Anxiety Inventory (BAI) to evaluate symptoms of general anxiety and the Lipp Stress Symptoms Inventory for Adults, a Brazilian scale which evaluates stress symptoms. The participants were recruited during eight months and evaluated while they were waiting for exams to identify maternal-fetal risks at the Screening Program of *Maternidade Escola da Universidade Federal do Rio de Janeiro* (ME-UFRJ). This is a public hospital that receives patients on demand. All adult pregnant women at the begining of pregnancy who came to the prenatal care at the ME-UFRJ were included.

Results: Mild to severe levels of anxiety were reported for 34.4% of the participants, and half of the sample was classified in the resistance phase of stress. Statistically significant correlations were found between anxiety and stress (r=0.46; $p \leq .05$); however, no significant correlations were found among stress, anxiety scores and socidemographic variables, such as marital status, education and age.

Conclusions: Considering our findings, especially the high frequency of resistance stress and the association between stress and anxiety, we can affirm that it is important to implement follow up services to prevent psychological risks and ensure women mental health during pregnancy.

Keywords: Stress; Anxiety; Pregnancy; Maternal mental health

Introduction

Physical and psychological changes have impact on the subjective experience of pregnant women. Pregnancy is a period characterized by affective ambivalence, fears and mood swings, which can result in stress and anxiety, and affect maternal mental health [1-5]. It is important to investigate stress and anxiety during pregnancy because of their potential association with negative obstetric outcomes and problems on infant development [3-8].

Stress is a pattern of specific and nonspecific responses that disturbs the equilibrium of an organism [9]. According to the Selye model [10], stress is a non-specific response (physical, mental or emotional) of the body to any demand or change (stressors), and can be studied based on a concept of the General Adptation Syndrome (GAS). The GAS is divided into stages, ranging from an alarm to an exhaust phase. The alarm phase is characterized by the increase of adrenaline and various psychological mechanisms that prepare to combat the stressor and to deal with an emergency situation, while in the exhaust phase there is a functional disability that affects individual's health, emotional state and self-esteem. There is an intermediate stage if the stressor persists: the resistance phase. On this phase, the person can present physical and mental fatigue and memory difficulties. In sum up, the stress is an adaption/coping-response process that helps people to prepare for challenging situations, and can be either negative or positive, depending on the stressor.

Based on the GAS model, Lipp [11] purposed the Lipp Stress Symptoms Inventory for Adults (LSSI), a Brazilian normative scale with consistent psychometric properties to evaluate stress based on the identification of physical and psychological symptoms. It classifies the stress into four phases (alarm, resistance, almost-exhaustion, and exhaustion). The almost-exhaustion phase is an intermediate stage of stress insert by apathy, insecurity, difficulty in cognitive abilities, like memory and concentration, and decreased of the libido [11]. Studies confirm that 25% of pregnant women show significative signs of stress [2]. It can affect neurological development of babies resulting on negative outcomes for child development[6].

Anxiety is an anticipation of future threat expressed by an intense emotional response caused by the preconscious recognition of a conflict [9,12]. It is characterized by different physical and emotional symptoms, such as difficulty to relax, tachycardia, nervousness and fear [13]. Anxiety in pregnancy can be related to the worries of pregnant women about their health, infant health, and childbirth [4], with increased risk of negative neonatal outcomes [3,5,6,7]. Furthermore, stress and anxiety can be related to puerperal depression, a severe disorder that can affect not only the maternal mental health but also the relationship between the mother and her child [6,14,15]. Pregnant women with high levels of anxiety can show more physical symptoms during pregnancy, like nausea and vomiting [3,12]. Also, literature has been discussing associations between distress conditions during pregnancy and risks for preeclampsia (PE) by altering cortisol levels and other biomarkers [8]. PE is an important cause of maternal and perinatal mortality, with prevalence ranges from 5% to 10% in Brazil [17,18]. This gestational risk increases when woman has high levels of anxiety and stress, associated or not with others factors [8,12,13].

Emotional conditions, like stress and anxiety, have increased in Brazilian population in recent years. A recent Brazilian study with 2195 people found that 34.4% of normal population reported being stressed. Epidemiological research [17] among Brazilian adults found a prevalence of anxiety of 35.4% in Rio de Janeiro, Brazil, city where this study was conducted. These can be considered a high prevalence comparing to other countries [18]. Even though there are no epidemiological studies about prevalence of anxiety and stress during pregnancy, the prevalence of common mental disorders in pregnant women is high in Brazil: 20.2% [19].

Follow up services based on an integrative and multiprofissional approach are important to prevent the development of these risks,

and to promote the mental health of pregnant women [6], our theme of discussion. Based on this, the aim of this study was to discuss associations between stress and anxiety with maternal mental health in pregnant women from a program of screening for maternal and fetal risks at the ME-UFRJ, Brazil, to support the implementation of a follow up service of maternal mental health.

Methods

This is a prospective cohort study which is part of a screening program for maternal-fetal risks conducted in the prenatal care service at ME-UFRJ. It is a public hospital that attends patients on demand. The screening program is routinely carried out in the institution by a multidisciplinary team (physicians, nurses, psychologists). All adult pregnant women at the beginning of pregnancy around the 1st trimester who came to begin her prenatal care were included in the study. Data were collected from a sample of 90 pregnant women. Socio-demographic data are shown on Table 1. The average age was 28.4 years old, more than half had High school education (53.3%), were married (66.7%) and had at least one child (63.3%).

The program in progress aims to screen maternal and fetal risks, such as aneuploidy, preeclampsia, fetal growth restriction and preterm delivery. These risks were calculated by Fetal Medicine Foundation algorithm, version 2.8.0, at 11 to 13+6 gestational weeks, which is based on demographic and biophysical factors (Table 2). This calculation was performed only for 75 participants because they had exactly 13+6 gestational weeks or less.

Prior to the ultrasound exam, which is one of the tests included on the screening program, patients were invited to participate. At this moment, they signed an Informed Consent form according to Ethical Committee for Research with Human Beings approved bt the Ethical Committee of the ME-UFRJ. Afterwards, patients were evaluated using two instruments for psychological assessment of symptoms of stress and general anxiety. First, the Lipp Stress Symptoms Inventory for Adults (LSSI) [11] was used to evaluate stress. The LSSI is a Brazilian normative scale to evaluate stress with good psychometric properties (Cronbach's alpha, 0.91) validated on a study with 1853 people between 15 to 75 years old [11,12]. It classifies the stress into four phases (alarm, resistance, almost-exhaustion, and exhaustion) based on the identification of physical, psychological or mixed stress symptoms typical of each phase [11]. The severity of general anxiety was evaluated using the BAI. The BAI has also consistent psychometric properties, and is widely used to measure anxiety [20]. It was validated according to Brazilian psychometric standard properties [13]. The BAI is a 21 items self-report inventory that classifies anxiety on a 0-3 point Likert scale resulting in four levels of anxiety (minimal, mild, moderate, and severe).

All data were processed based on the instruments standards. Socio-demographic data were analyzed descriptively in terms of means and standard deviations. Pearson correlation test was used for inferential analysis to search for associations among stress, anxiety, and sociodemographic data, such as marital status, education, parity and age. According to the literature [21,22] those variables were considered important social and psychological aspects related to stress and anxiety in pregnancy. The Statistical Package for Social Sciences (SPSS) version 17.0 (SPSS Inc., Chicago, IL, USA) was used for all analysis, adopting $p \leq .05$ as the significance level.

Results

The results of anxiety and stress are summarized in Table 3. Most pregnant women (64.4%) showed minimal levels of anxiety, followed by mild (18.9%), moderate (8.9%) and severe (7.8%) levels of anxiety. Regarding the stress, 27.8% of the participants did not show symptoms of stress. Among the women who had any symptoms of stress, half of them were classified in the resistance phase (50%), followed by almost-exhaustion (12.2%), alarm (5.6%) and exhaustion (4.4%) phases.

No significant correlations were found between anxiety or stress with sociodemographic data, such as marital status, education, parity and age. On the other hand, statistically significant correlation was found between anxiety and stress scores ($r = 0.46$; $p < 0.05$).

Discussion

Considering pregnancy as a stressfull period for women life because of the physical and psychological changes and the demands since the first trimester of gestation when the pregnant women must follow a rigorous protocols during prenatal care health [2,6], we conducted this study to discuss associations between stress and anxiety and their relation with mental health during pregnancy based in a sample of patients who participated in a screenning program for maternal-fetal risks aiming to implement a follow up service of maternal mental health.

Considering the alarm phase as one stage of stress for preparing people to cope with immediate critical situations, our hypothesis was that our sample would be on this stage of stress because the screening

Table 1: Sociodemographic data of pregnant women (N=90).

Sociodemographic variables	Range	M±SD
Age	18-44	28.4 ± 6.09
	n	**%**
Education		
Elementary School	32	35.6
High School	48	53.3
Higher Education	10	11.1
Marital Status		
Married	60	66.7
Single	30	33.3
Parity		
Primiparous	33	36.7
Multiparous	57	63.3

Note: M=mean; SD=Standard Deviation; Statistical Package for Social Sciences (SPSS).

Table 2: The statistics of screening program for maternal-fetal risks of the study sample (N=75).

Maternal-fetal risks	Range (n)
Aneuploidy	
Trisomy 21	1
Trisomy 18	1
Trisomy 13	1
Preeclampsia	22
Fetal growth restriction	35
Previous preterm delivery	15

Note: Statistical Package for Social Sciences (SPSS).

Table 3: Frequency of pregnant women by levels of anxiety and phases of stress (N=90).

Variables	level/phase	(f%)
Anxiety	minimal	64.4
	mild	18.9
	moderate	8.9
	severe	7.8
Stress	no stress	27.8
	alarm	5.6
	resistance	50.0
	almost-exhaustion	12.2
	exhaustion	4.4

Note: BAI- Beck Anxiety Inventory; LSSI - Lipp Stress Symptoms Inventory for Adults; Statistical Package for Social Sciences (SPSS).

Table 4: Pearson correlations among LSSI, BAI and sociodemographic data (N=90).

LSSI	BAI	Sociodemographic variables
0.14	0.48	Age
0.09	0.28	Education
0.26	0.43	Marital Status
0.38	0.41	Parity
-	0.46*	ISSL
0.46*	-	BAI

Note: BAI- Beck Anxiety Inventory; LSSI - Lipp Stress Symptoms Inventory for Adults; Statistical Package for Social Sciences (SPSS); * $p \leq .05$.

test situation is a critical moment, when they need to cope with the possibility of negative diagnosis. However, this hypothesis was not confirmed, and it can be explained by other reasons. Maybe, those women were stressed because they need to cope with other stressors, related or not with physical or psychological experience of pregnancy, like the demands of working or family [23-25]. It should be further investigated through a design study with measures of stress symptoms before and after the screening exam, for instance. Also, self-report measures, like interviews, could be included to investigate the women's perception about environmental and personal events related to stress.

On the other hand, the stress in resistance phase was showed by 50% of participants. This suggests that they were constantly coping with prior demands. Similar to alarm stress, resistance stress keeps blood pressure and hormones, such as adrenaline and cortisol, higher than normal, but not quite as high. Moreover, it is a critical phase because such symptoms can increase and result on a more severe stage of stress [2,5,6,8,10,11]. It is important to highlight that 16.6% of participants presented severe symptoms of stress (almost exhaustion and exhaustion phases). The pregnancy itself is a long nine months period that requires from women her involvement on a subjective process with constant psychological rearrangements and social adjustments [2,25]. Literature suggests a relationship between stress and demographic factors [26-28]. Nevertheless, no significant correlations between stress and sociodemographic variables (marital status, education, parity or age) were found.

In contrast, prevalence of minimum level of anxiety was found in 64.4% of women evaluated by the Beck Anxiety Inventory (BAI). During pregnancy, anxiety symptoms, such as fear, tension, worry and physiological adjustments can result from different changes throughout pregnancy [2,6,16]. However, minimum levels of anxiety were not related to clinical symptoms [19]. This suggests that those women experienced her pregnancy as a psychological process in an adaptive way. Also, they could present lower anxiety traits, hypothesis that should be investigated using an assessment tool like the Spielberg State-Trait Anxiety Inventory [29]. The study of the prevalence of prenatal anxiety and the difference between trait and state anxiety and their relation with obstetric and neonatal outcomes is in progress in our institution. These data would provide a more comprehensive analysis of these theme and support actions to prevent maternal mental health risks before, during and after pregnancy. This type of analysis would help to discriminate clinical cases that will require a long-term treatment from those that would benefit from brief interventions, with efficacy to control the stress and anxiety symptoms during pregnancy, such as acupuncture, yoga and relaxation [30-32]. It is important to highlight that our group is already investigating this on a clinical randomized study.

Levels of mild and severe anxiety were observed in 35.6% of participants. These anxiety levels are related to clinical signs, such as tremors, inability to relax, tachycardia, dyspnea, fear of dying and nervousness [15] For these pregnants, anxiety may result in a potential risk that can increase gestational problems like preeclampsia, for example [8,16]. Considering the high morbidity and mortality associated with preeclampsia [33], prenatal care should include follow-up service of maternal mental health to ensure emotional support during pregnancy.

Several studies confirm that high levels of stress and anxiety are related to maternal and fetal risks, with repercussions on the physical and mental health of pregnant woman and her baby [3,5-7,16]. According to the literature [14,34], we also found positive associations between stress and anxiety. Our findings confirm that it is valuable to offer an integral prenatal care service since the first trimester of gestation. Pregnancy is a dynamic, cyclical and longitudinal event that requires psychological adjustments. Therefore, it is important to offer an assistance based on the investigation of emotional factors, such as stress and anxiety [1-8]. Since the beginning of pregnancy, the mother has to deal with many demands, such as an extensive prenatal protocol with different screening tests to detect maternal and fetal risks. This can impact on the maternal mental health, resulting on negative outcomes, such as stress and anxiety [34,35]. Therefore, the prenatal care should be based on preventive and therapeutic approaches in order to also prevent these psychological risks. These approaches should include a prenatal care conducted by a multi professional team compromised with an integral assistance for supporting the physical and psychological health during pregnancy in a holistic approach.

Some limitations must be considered: firstly, our research was a study with a convenience sample, which interferes in the data generalization. Secondly, the study design did not include repetitive measures of stress and anxiety from the 2nd and 3nd trimesters of pregnancy, or after childbirth. This could be relevant to investigate associations among psychological factors during pregnancy and perinatal outcomes, like postpartum depression, preterm birth etc. Further studies are necessary to replicate these results, including other methodological procedures to strength these findings. Surely, these studies can provide evidences to support a prenatal care with the purpose of ensuring maternal mental health and preventing negative outcomes during and after pregnancy, that is a unique experience for any woman.

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