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Research report

Anxiety and depression during pregnancy in women and men

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ABSTRACT

Background: High-anxiety and depression rates have been reported in women during pregnancy; however men and parity effects have not been studied as extensively. The purpose of this study was to analyze anxiety and depression in women and their partners during pregnancy, namely differences between the 1st, 2nd and 3rd pregnancy trimesters, between women and men, and between primiparous and multiparous.

Methods: A sample of 300 women and their partners ($n=560$) were recruited during the 1st pregnancy trimester and have completed the STAI-S (State Anxiety Inventory) and the EPDS (Edinburgh Postnatal Depression Scale) in the 1st, 2nd and 3rd pregnancy trimesters.

Results: Anxiety symptoms follow a U pattern in pregnancy, while depression symptoms decrease throughout pregnancy. Women show higher anxiety and depression values than men, although patterns of time variation are similar. Primiparous women and men display higher anxiety levels in the 1st than in the 3rd trimester, while multiparous register higher values in the 3rd than in the 1st pregnancy trimester.

Conclusion: Different time variation in pregnancy was found for anxiety and depression symptoms; however anxiety and depression symptoms are particularly high during the 1st trimester. Intervention needs will be analyzed according to the results.

1. Introduction

Pregnancy and the transition to parenthood involve major psychological and social changes in future parents. These changes have been linked to an increase in anxiety rates and depression symptoms (Condon et al., 2004). Medical and obstetric complications, as well as adverse effects on child development due to the presence of psychopathology during pregnancy have also been pointed out (e.g. Buitelaar et al., 2003).

The prevalence of anxiety disorders in pregnancy varies according to studies and evaluation moments. In a recent study by Lee et al. (2007), 54% of the women had antenatal anxiety during at least one trimester. Estimated anxiety in the 2nd pregnancy trimester was found to be lower; in most studies, it was found to be from 6.6% to about 15% (Andersson et al., 2003, 2006; Heron et al., 2004). Anxiety levels seem to be higher in the 1st and 3rd trimesters, when compared with the 2nd pregnancy trimester (Lee et al., 2007). In fact, a non linear pattern for anxiety has been pointed out in women, with the 1st and 3rd pregnancy trimesters being identified as high risk periods (Lee et al., 2007). As far as men are concerned, the peak of distress seems to be at mid-pregnancy (18%) and decreases steadily in the postpartum period (Buist et al., 2003; Condon et al., 2004). There is some evidence that multiparity is a risk factor for high-anxiety levels in pregnancy (DiPietro et al., 2008), and that having another child constitutes an environmental stressor (Glazier et al., 2004). However, this is not consensual (Faisal-Cury and Rossi Menezes, 2007; Andersson et al., 2006; Fatoye et al., 2004), and most studies only include women.

The prevalence of mood symptoms during pregnancy seems to be higher than in other periods of a woman's life (Halbreich, 2004). Also, rates of depression seem to be higher during pregnancy than in the postpartum period (Da Costa et al., 1999). In a recent cohort study (Evans et al., 2001), 13.5%

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of the women were depressed at 32 weeks of pregnancy and 9.1% at 8 weeks postpartum. A substantial amount of women who had a postnatal depression were already depressed during pregnancy (Evans et al., 2001; Gorman et al., 2004; Figueiredo et al., 2006). Depression rates seem to decrease throughout pregnancy (Perren et al., 2005). A depression point prevalence of 15.5% was found at early and mid-pregnancy, 11.1% in the 3rd pregnancy trimester and 8.7% in the postpartum period (Felice et al., 2004). During pregnancy women usually present higher depression rates (12–20%) than men (4–6%) (Matthey et al., 2000). However, this is not consensual (Areias et al., 1996b), and depression scores in depressed pregnant women and men do not differ significantly in some reports (e.g., Field et al., 2006). The influence of parity on pregnancy depression is also not consensual. While some studies show that multiparity is a risk factor for pregnancy depression (Halbreich, 2004; Glazier et al., 2004; DiPietro et al., 2008), others reveal no association between parity and pregnancy depression (Pajulo et al., 2001; Andersson et al., 2006; Fatoye et al., 2004).

Comorbidity between anxiety and depression symptoms is common and has been frequently reported during pregnancy (Field et al., 2003; Heron et al., 2004; Wenzel et al., 2005; Matthey, 2007; Matthey et al., 2003; Littleton et al., 2007; Austin et al., 2007). In a study by Ross et al. (2003), nearly 50% of clinically depressed pregnant and postpartum women had clinically significant comorbid anxiety; and according to Andersson et al. (2006) 20.5% of women who were given a psychiatry diagnosis in the 2nd pregnancy trimester presented comorbid anxiety and depression symptoms. The overlap of anxiety and depression symptoms in pregnancy has also been reported as a risk factor for postnatal depression (Heron et al., 2004).

The aim of this was to analyze anxiety, depression, comorbid anxiety and depression during pregnancy in a sample of primiparous and multiparous pregnant women and their partners. Specifically, it was our aim to analyze the differences between: 1) the 1st, 2nd and 3rd trimesters; 2) women and men; 3) primiparous and multiparous.

2. Methods

2.1. Participants

A sample of 300 women and their partners were recruited in an Obstetrics Out-patients Unit (Oporto, Portugal), during their first appointment, up to 14 weeks of gestation. Participation in the study involved the following criteria for inclusion: 1) knowing how to read/write in Portuguese, 2) gestational age less than 15 weeks to the date of the first contact; 3) resident in Portugal for over a year, in the case of foreign participants.

The great majority of the participants were Portuguese (92.1%), Caucasian (94.8%) and Catholic (90.6%). More than half of the participants were aged between 20 and 39 years old (mean = 28.94; SD = 6.49), had low and medium-low socioeconomic level; were employed in manual (qualified or not qualified) jobs, for more than 5 years (57.0%); were married or cohabiting, and living with the partner without any other family members in the household (81.5%); and had no other child (63.9%) (see Table 1).

2.2. Procedures

This research was conducted according to prevailing ethical principles and received previous approval from the Julio Dinis Maternity Hospital Ethical Commission. Participants were randomly recruited at the Julio Dinis Maternity Hospital Obstetrics Out-patients Unit (Oporto, Portugal), between January 2006 and December 2007. The aims and the procedures of the study were explained, and 84.1% of those contacted (90% of the women and 78.1% of the men) agreed to participate after signing an informed consent. The questionnaires were given to participants at routine appointments. From the eligible participants, 95.7% of women and 88.38% of men completed all three pregnancy assessments.

Pregnant women and their partners were interviewed separately to collect socio-demographic data, and the STAI-S and EPDS were handed in between 8 and 14 weeks of gestation. The STAI-S and EPDS were once again administered to both parents during the 2nd (between 20 and 24 weeks of gestation) and 3rd pregnancy trimesters (between 30 and 34 weeks of gestation).

2.3. Measures

2.3.1. Socio-demographic questionnaire

Information about the participants (e.g., age, ethnicity, nationality, occupational and marital status, household arrangements, education level, medical and obstetrical history, psychological well-being and substances consumption)

Table 1
Socio-demographics.

		Women	Men	Total
		N = 270	N = 213	N = 483
		%	%	%
Age (years)	≤19	13.4	4.4	9.2
	20–29	44.5	39.0	42.0
	30–39	40.0	48.2	43.8
	≥40	2.1	8.4	5.0
Socio-economic level	High	15.6	9.0	12.1
	Medium high	6.8	14.3	10.7
	Medium	19.5	18.8	19.2
	Medium low	26.3	30.0	28.3
	Low	31.7	27.8	29.7
Professional status	Employed	69.7	88.0	78.6
	Unemployed	23.4	9.2	16.8
	Household or student	6.9	2.0	4.6
Occupation	Non manual qualified	22.4	23.3	22.9
	Non manual not qualified	19.5	18.8	19.2
	Manual qualified	26.3	30.0	28.3
	Manual not qualified	31.7	27.8	29.7
Education (in years)	<9	29.1	40.0	34.1
	[9–12]	53.6	48.4	51.2
	>12	17.3	11.6	14.7
Matrimonial status	Married	51.9	55.0	53.3
	Cohabitation	33.2	33.1	33.1
	Single	13.5	10.4	12.0
	Divorced/widow	1.4	1.6	1.5
Household	Partner	76.6	80.1	78.2
	Partner and family	9.0	9.2	9.1
	Family (only)	11.7	9.6	10.7
	Alone	2.8	1.2	2.0
Parity	Primiparous	63.4	62.9	63.2
	Multiparous	32.1	31.9	32.0

Table 2
Anxiety (STAI≥45), depression (EPDS≥10), and anxiety (STAI≥45) and depression (EPDS≥10) comorbidity during pregnancy (1st, 2nd and 3rd trimesters).

		1st trimester (%)	2nd trimester (%)	3rd trimester (%)
Women	STAI≥45	15.0	12.3	18.2
	EPDS≥10	22.0	20.6	18.5
	STAI-S<45∩EPDS<10	73.7	74.5	74.8
	STAI-S≥45∩EPDS≥10	10.6	7.7	11.1
Men	STAI≥45	10.1	8.0	8.2
	EPDS≥10	11.3	6.2	6.4
	STAI-S<45∩EPDS<10	83.9	87.6	89.4
	STAI-S≥45∩EPDS≥10	5.9	2.2	2.8
Total	STAI≥45	13.0	10.7	13.7
	EPDS≥10	17.4	14.2	13.3
	STAI-S<45∩EPDS<10	78.1	80.1	81.4
	STAI-S≥45∩EPDS≥10	8.8	5.4	7.3

was collected through an interview, and then coded in a Socio-Demographic Questionnaire (Figueiredo et al., in press).

2.3.2. State Anxiety Inventory

The State Anxiety Inventory (STAI-S) consists of a twenty-item self-report scale for measuring the temporary condition of "state anxiety" (anxiety in a specific situation) (STAI-S/T, Spielberger et al., 1983). Several studies have been using this instrument during pregnancy (Austin et al., 2005), both in women and men (Figueiredo et al., 2008). The Portuguese version has shown good internal consistence (Trait and State Cronbach's alpha = 0.87 and 0.88); authors advise a score equal to or higher than 45 in screening high-anxiety states (Biaggio et al., 1976).

2.3.3. Edinburgh Postnatal Depression Scale

The Edinburgh Postnatal Depression Scale (EPDS, Cox et al., 1987) is a self-report questionnaire composed of 10 items scored on a 4 point Likert scale (0–3), designed to assess postpartum depression. This scale addresses the intensity of depressive symptoms within the previous seven days and has been used in several studies both with pregnant and postpartum women (e.g., Rich-Edwards et al., 2006; Ross et al., 2003), also in Portugal (Areias et al., 1996a,b; Augusto et al., 1996; Figueiredo et al., 2006, 2007), as well as with men (Matthey et al., 2003; Buist et al., 2003). EPDS Portuguese version showed good internal consistency (Cronbach's alpha = 0.85) and test–retest reliability (Spearman Correlation = 0.75). A score equal or higher than 10 indicates the need to screen for a *major* depressive episode with a sensibility of 65% and specificity of 96% (Areias et al., 1996a).

2.4. Statistical analysis

ANOVA general linear model repeated measures were used in order to study differences in anxiety and depression symptoms throughout pregnancy. For this purpose, the model included anxiety (STAI-S values) and depression (EPDS values) as measures, and pregnancy trimesters were used as the within-subject effects factor. Gender and parity variables were considered between-subjects factors.

Cochran's Q statistic for K related samples was used to analyze time differences between trimesters for rates of STAI≥45 and EPDS≥10, as well as for comorbid STAI≥45 and EPDS≥10 (STAI-S≥45∩EPDS≥10). Also, McNemar 2 related sample test was used for post hoc comparisons between pair (s): 1st and 2nd trimesters, 2nd and 3rd trimesters, 1st and 3rd trimesters. Bonferroni correction was used, so results are reported at a 0.02 significance level.

Pearson chi-square and odds ratio statistics were used to analyze the association for STAI≥45, EPDS≥10, and for comorbid STAI≥45 and EPDS≥10, with gender and with parity, in the 1st, 2nd, and 3rd pregnancy trimesters.

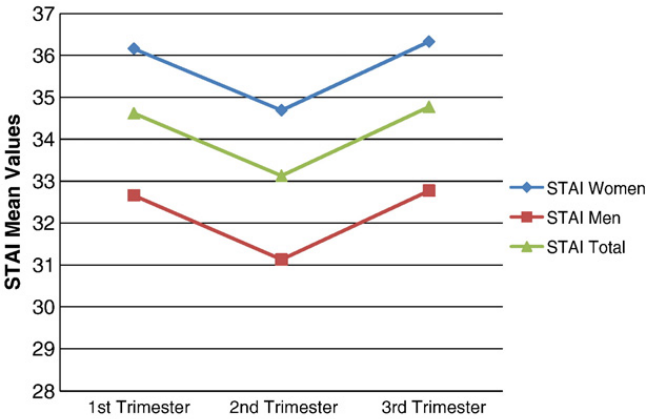
3. Results

3.1. Differences between the 1st, 2nd and 3rd pregnancy trimesters

High rates of anxiety, depression and comorbid anxiety and depression were found during pregnancy. Anxiety symptoms and rates (STAI-S≥45) were higher in the 1st and 3rd pregnancy trimesters and lower at the 2nd trimester. Regarding depression symptoms and rates (EPDS≥10), higher values were found in the 1st trimester, decreasing in the 2nd and again in the 3rd pregnancy trimester (see Table 2).

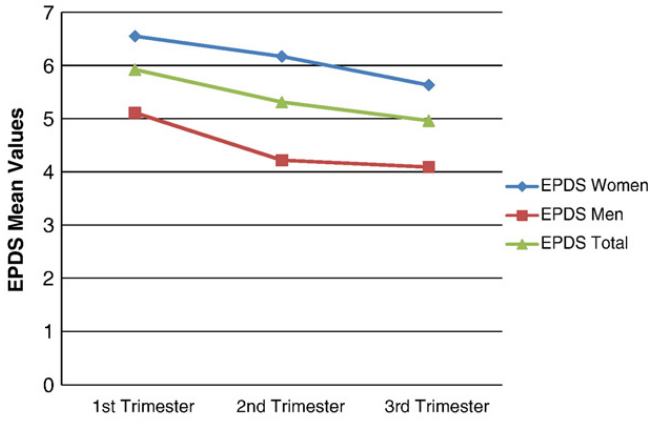
As regards comorbidity, higher values of STAI-S≥45∩EPDS≥10 were found during the 1st pregnancy trimester. On the other hand, for STAI-S<45∩EPDS<10 higher values were found in the 3rd pregnancy trimester (see Table 2).

Significant differences were found between pregnancy trimesters [$F(4) = 16.77$, $p < 0.05$, $r = 0.13$], and these differences were significant for anxiety [$F(2) = 10.90$, $p < 0.05$,



	1st trimester Mean (SD)	2nd trimester Mean (SD)	3rd trimester Mean (SD)
Women	36.16 (9.00)	34.69 (9.40)	36.33 (9.12)
Men	32.66 (8.43)	31.13 (7.98)	32.77 (7.94)
Total	34.62 (8.92)	33.13 (8.97)	34.77 (8.79)

Fig. 1. Anxiety symptoms during pregnancy (1st, 2nd and 3rd trimesters).



	1st trimester Mean (SD)	2nd trimester Mean (SD)	3rd trimester Mean (SD)
Women	6.55	6.17	5.63
	(4.22)	(4.39)	(4.27)
Men	5.11	4.22	4.09
	(3.97)	(3.38)	(3.32)
Total	5.92	5.31	4.96
	(4.17)	(4.09)	(3.95)

Fig. 2. Depression symptoms during pregnancy (1st, 2nd and 3rd trimesters).

$r=0.02$] as well as for depression [$F(1.87)=18.16$, $p<0.05$, $r=0.04$]. Analyzing anxiety time differences within-subjects factor (see Fig. 1), symptoms were higher in the 1st than in the 2nd trimester [$F(1)=11.37$, $p<0.05$, $r=0.02$], and in the 2nd they were lower than in the 3rd trimester [$F(1)=21.57$, $p<0.05$, $r=0.05$]. Post hoc comparisons show significant mean differences ($p<0.05$) in anxiety, being higher in the 1st than in the 2nd trimester, and lower in the 2nd than in the 3rd trimester; no significant differences were found between the 1st and 3rd trimesters ($p=0.94$). No significant differences were found for rates of STAI-S≥45 between trimesters [$Q(2)=3.68$, $p=0.159$] (see Table 2).

Regarding within-subjects differences in depression symptoms (see Fig. 2), the 1st trimester is higher than the 2nd [$F(1)=14.64$, $p<0.05$, $r=0.03$], and the 2nd is higher than the 3rd trimester [$F(1)=5.00$, $p<0.05$, $r=0.01$]. Significant mean differences ($p<0.05$) were found in post hoc comparisons for depression, being higher in the 1st than in the 2nd trimester, higher in the 1st than in the 3rd trimester, and also higher in the 2nd than in the 3rd trimester. Regarding rates of EPDS≥10, no significant differences were found between trimesters [$Q(2)=3.08$, $p=0.214$] (see Table 2).

No significant differences were found for rates of STAI-S<45∩EPDS<10 between pregnancy trimesters [$Q(2)=0.85$, $p=0.653$], neither for rates STAI-S≥45∩EPDS≥10 [$Q(2)=4.11$, $p=0.128$].

3.2. Differences between women and men

Women showed higher values than men, both regarding anxiety and depression symptoms. Significant differences were found for gender [$F(2.0)=14.58$, $p<0.05$, $r=0.06$], and these differences were significant for anxiety [$F(1)=24.38$, $p<0.05$, $r=0.05$], as well as for depression [$F(1)=25.75$, $p<0.05$, $r=0.05$]. No significant interaction was found between gender and pregnancy trimesters [$F(4)=0.86$, $p=0.49$] and between gender and parity [$F(2.0)=0.34$, $p=0.71$]. A significant association between gender and rates of STAI-S≥45 was found in the 3rd pregnancy trimester [X^2 $(1)=9.10$, $p<0.05$]: women were 2.38 times more likely to have STAI-S≥45 than men. No significant association was found in the 1st [X^2 $(1)=2.87$, $p=0.090$] and in the 2nd trimester [X^2 $(1)=2.40$, $p=0.121$]. A significant association was found for gender and rates of EPDS≥10 in the 1st [X^2 $(1)=10.54$, $p<0.05$], 2nd [X^2 $(1)=19.46$, $p<0.05$], and during the 3rd pregnancy trimester [X^2 $(1)=15.19$, $p<0.05$]: women were 2.20 times more likely to have EPDS≥10 than men in the 1st trimester, 3.62 times in the 2nd trimester, and 3.28 times in the 3rd trimester. Significant association was found for gender and STAI-S<45∩EPDS<10 in the 1st [X^2 $(1)=8.10$, $p<0.05$], in the 2nd [X^2 $(1)=12.55$, $p<0.05$] and in the 3rd pregnancy trimester [X^2 $(1)=13.09$, $p<0.05$]: men were 1.86 times more likely to have STAI-S<45∩EPDS<10 in the 1st trimester than women, 2.35 times in the 2nd and 2.54 times in the 3rd trimester. Significant associations were found between gender and rates of STAI-S≥45∩EPDS≥10 in the 1st [X^2 $(1)=4.57$, $p<0.05$], in the 2nd [X^2 $(1)=7.08$, $p<0.05$] and in the 3rd pregnancy trimesters [X^2 $(1)=9.56$, $p<0.05$]: women were more likely than men to have a STAI-S≥45∩EPDS≥10, 2.05 times in the 1st trimester, 3.56 times in the 2nd trimester and 3.80 times at the 3rd trimester (see Table 2).

3.3. Differences between primiparous and multiparous

No significant differences were found according to parity factor [$F(2)=1.52$, $p=0.22$]. Also, no significant differences were found between parity and pregnancy trimesters [$F(4)=1.97$, $p=0.10$]. However, a significant interaction was found between parity and trimesters for anxiety symptoms [$F(1.99)=3.24$, $p<0.05$, $r=0.01$] (see Fig. 3), but not for depression symptoms [$F(2)=0.50$, $p=0.609$]. No significant interaction was found between gender and parity [$F(2.0)=0.34$, $p=0.71$]. Primiparous women and men showed higher anxiety symptoms in the 1st when compared with the 3rd pregnancy trimester, while for multiparous women and men higher anxiety symptoms were obtained in the 3rd, in comparison with the 1st pregnancy trimester. For rates of STAI-S≥45 no significant association was found for parity; neither in the 1st [X^2 $(1)=0.02$, $p=0.893$], nor in the 2nd [X^2 $(1)=2.22$,

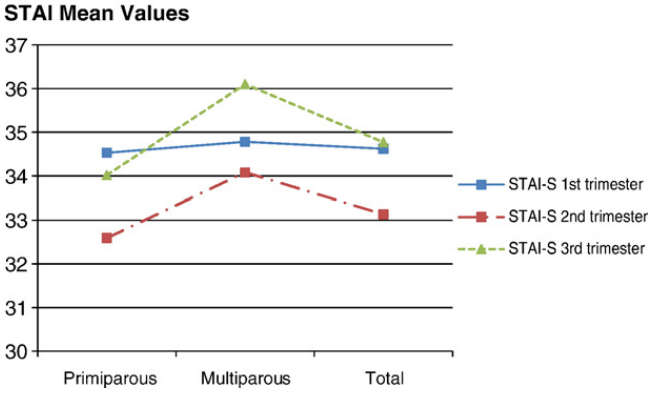


Fig. 3. Interaction in anxiety measure between time*parity.

$p = 0.136$] nor in the 3rd trimester [X^2 (1) = 3.88, $p = 0.049$]. For rates of EPDS ≥ 10 no significant association was found for parity; neither in the 1st [X^2 (1) = 0.17, $p = 0.681$], nor in the 2nd [X^2 (1) = 0.06, $p = 0.807$] nor in the 3rd trimester [X^2 (1) = 0.83, $p = 0.363$]. No significant association was found between parity and STAI-S < 45 ∩ EPDS < 10 in the 1st [X^2 (1) = 0.19, $p = 0.661$] and in the 2nd pregnancy trimesters [X^2 (1) = 0.95, $p = 0.330$]. However, a significant association was found in the 3rd trimester [X^2 (1) = 4.92, $p < 0.05$]. Primiparous parents were 1.70 times more likely to have STAI-S < 45 ∩ EPDS < 10 in the 3rd trimester than multiparous ones. No significant association was found between parity and rates of STAI-S ≥ 45 ∩ EPDS ≥ 10 in the 1st [X^2 (1) = 0.01, $p = 0.922$], 2nd [X^2 (1) = 0.34, $p = 0.562$] and 3rd pregnancy trimester [X^2 (1) = 1.15, $p = 0.284$].

4. Discussion

Significant changes were observed in anxiety and depression symptoms throughout pregnancy. Symptoms of anxiety followed a U pattern in pregnancy, being higher at the 1st trimester, registering a significant decrease in the 2nd trimester and an increase in the 3rd one, results which are consistent with previous literature (Da Costa et al., 1999; Lee et al., 2007). Symptoms of depression decreased throughout pregnancy, with a significant decrease occurring from the 1st to the 2nd trimester and again from the 2nd to the 3rd trimester. This decrease is also consistent with some investigations that used repeated measures for depression in pregnancy (Perren et al., 2005; Felice et al., 2004). On the other hand, no significant differences were found between trimesters for rates of STAI-S ≥ 45 as well as for rates of EPDS ≥ 10. Thus, anxiety and depression morbidity seems to be relatively stable during pregnancy. Stability in morbidity rates in pregnancy has also been reported (Heron et al., 2004). The increase of anxiety and depression symptoms in pregnancy and postpartum does not necessarily correspond to an increase in psychopathological disorders (Halbreich, 2004).

High rates of comorbid STAI-S ≥ 45 ∩ EPDS ≥ 10 were also found, again comorbidity being higher at the 1st pregnancy trimester. For instance, in the 1st pregnancy trimester, a total sample point prevalence of 8.8% STAI-S ≥ 45 ∩ EPDS ≥ 10 was found, while the presence of only EPDS ≥ 10 was of 8.7% and the presence of only STAI-S ≥ 45 was of 4.4%, in consonance with prior studies (Matthey, 2007; Littleton et al., 2007; Austin et al., 2007).

Analyzing time variation of symptoms, it is noteworthy that the 2nd pregnancy trimester seems to be a period of relative calm in terms of psychological morbidity, and significant decreases both in anxiety and depression symptoms were observed. For anxiety symptoms, there was an increase again in the 3rd trimester, but not as regards depression, where it was registered a continuous decrease over time. These results are also in agreement with the literature of psychological adjustment to pregnancy pointing to the 2nd trimester as a period of higher stability after the turbulence of the initial adaptation and prior to the stress of partum anticipation. The depression decrease verified at the 3rd trimester may be due to the proximity of birth, which can promote positive expectancies (e.g., Colman and Colman, 1971).

Women showed higher values than men in all pregnancy trimesters, for both anxiety and depression symptoms. In comorbidity rates, women also presented a higher estimated risk than men in all pregnancy trimesters for STAI-S ≥ 45 ∩ EPDS ≥ 10. Rates of STAI-S ≥ 45 showed a significant association with gender in the 3rd pregnancy trimester, revealing that women were 2.38 times more likely to have STAI-S ≥ 45 during the 3rd trimester than men. This higher risk present in women in the 3rd trimester may be explained due to delivery proximity, which is more feared and requires more preparation by women than by men. For rates of EPDS ≥ 10, a significant association was found for gender in all pregnancy trimesters, which associated women with a higher risk for depressive morbidity in pregnancy than men. This result is in consonance with prior investigation data (Matthey et al., 2000). No significant interaction between gender and pregnancy trimesters was found, which means that variation in time is similar both for men and women. This similarity in gender time variation suggests that women and men face parallel psychological adaptations in pregnancy regarding developmental tasks in the transition to parenthood.

No differences were found regarding parity, however a significant interaction was found between parity effect and pregnancy trimesters in anxiety. Anxiety symptoms seemed to differ according to time moment measure, as primiparous presented higher anxiety in the 1st than in the 3rd trimester, while multiparous registered higher anxiety in the 3rd than in the 1st pregnancy trimester. The presence of higher anxiety in the 1st trimester for primiparous women and men is understood in the light of their adaptation to the challenge of becoming first time parents. Early pregnancy is an important moment in terms of psychological adaptation and lifestyle changes that having a child involves for first time parents (Colman and Colman, 1971; Condon et al., 2004). On the other hand, the presence of higher values of anxiety in the 3rd trimester for multiparous women and men may be due to a prior negative delivery experience, and/or to the conflict in life roles that having another child may imply. Corroborating this is the result which indicated that comorbid STAI-S < 45 ∩ EPDS < 10 is 1.70 more likely to occur in primiparous than in multiparous women/men at the 3rd pregnancy trimester. In fact, prior data report that having another child to raise may be a stressful event in pregnancy (Glazier et al., 2004; O'Hara and Gorman, 2004). Also, interventions to promote social networks should be considered, as it has been shown that multiparous women have less support during pregnancy and postpartum (Glazier et al., 2004).

Although significant effects of anxiety and depression time variation on symptoms, gender differences, and interaction between parity and time for anxiety were found, these differences showed, overall small scale effects. In spite of this, data corroborate the perspective that pregnancy anxiety and depression symptoms are the result of a multivariate model of combined influences of socio-demographic factors (socioeconomic status, age, parity), stress (life events, partner conflicts, medical or obstetric complications) and social support (Glazier et al., 2004; O'Hara and Gorman, 2004; Halbreich, 2004). Still, the influence of these factors and their variation throughout pregnancy gives a more comprehensive

view of the progression of symptoms and of the needed intervention during this period.

A few methodological limitations can be pointed out in this investigation. First, we have to consider that the voluntary nature of the participation in the study may have led to a selection bias, in the sense that those who agreed to participate, and also those who complied with all evaluations, may in fact be those who feel more involved and satisfied with the pregnancy experience. The fact that many men do not follow every obstetric consultation throughout pregnancy posed a challenge to their collaboration in the study design. Another limitation was the use of only self-report questionnaires which may have contributed to the high prevalence of anxiety and depression rates, as the cut-off measures only indicate the probable presence of a disorder.

Prevalence of anxiety and depression was high during the entire course of pregnancy, and higher during the first trimester. Both in women and men, higher anxiety symptoms were present at the 1st and 3rd trimesters and depression symptoms decreased throughout pregnancy. Women presented higher symptoms in all pregnancy trimesters, however variations in time between pregnancy trimesters were similar for both men and women. Primiparous women and men have higher anxiety symptoms in the 1st than in the 3rd trimester, while multiparous women and men show higher anxiety in the 3rd than in the 1st pregnancy trimester.

The present data seem to highlight the 1st pregnancy trimester as a period of higher psychological vulnerability and morbidity both for women and men and specifically for first time parents. This needs to be a focus of health professionals' intervention in order to prevent parents' psychological morbidity during pregnancy and the postpartum period. The 3rd pregnancy trimester also seems to be of particular interest for health professionals and should be regarded in terms of stress reduction interventions, namely for multiparous women and men. An effort should be made to integrate men in psychological/psychiatric interventions and to ensure that information is available to both parents, as anxiety and depression symptoms also seem to have a significant expression in men, although not as prevalent as in women. This is important as it has also been shown that there is a relation between anxiety and depression symptoms in the couple (Areias et al., 1996b; Figueiredo et al., 2008; Matthey et al., 2000).

More attention should be focalised on the continuity of anxiety, depression, and comorbidity symptoms during the course of pregnancy and also in the postpartum period, as these parents represent a high risk group for their own well-being, as for the proper development of the foetus/neonate (e.g. Buitelaar et al., 2003; Field et al., 2003; Perren et al., 2005).

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Conflict of interest

This work has no conflict of interest.

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