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Depression and paternal adjustment and attitudes during the transition to parenthood

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ABSTRACT

Background: Depression symptoms may negatively affect the achievement of developmental tasks within the transition to parenthood, increasing the risk of paternal adjustment problems and negative paternal attitudes.

Objective: This study analysed the effect of men's depression symptoms on paternal adjustment and paternal attitudes trajectories from the second trimester of pregnancy to six months postpartum.

Methods: A sample of 127 men completed measures of depression symptoms and paternal adjustment and paternal attitudes at the second trimester of pregnancy and at six months postpartum.

Results: From the second trimester of pregnancy to six months postpartum, men with more depression symptoms revealed a decrease on positive attitudes towards sex (while men with fewer depression symptoms revealed an increase), a steeper decrease in the satisfaction with marital relationship (than men with fewer depression symptoms), and a decrease in positive attitudes towards pregnancy and the baby (while men with fewer depression symptoms revealed an increase).

Conclusion: Depression symptoms early in pregnancy may represent a risk factor to increased paternal adjustment problems and negative paternal attitudes during the transition to parenthood.

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Introduction

The transition to parenthood is a major life transition that prompts both men and women to achieve several developmental tasks to prepare themselves for parenting. The transition to a second parenthood is considered to be a transition to parenthood as well, with not only similar but also different processes to be implemented for psychological adaptation (Cowan & Cowan, 2012; Demick, 2002; Figueiredo et al., 2018; Ketner, Gravesteyn, & Verschuur, 2018). A positive performance in these developmental tasks allows for an adaptive transition to parenthood, leading to paternal adjustment and to adequate parenting. In contrast, a negative performance of these developmental tasks may lead to an increase in paternal adjustment problems and to inadequate parenting (e.g. Cowan, 1991; Cowan & Cowan, 2000; Figueiredo, 2014).

Paternal adjustment and paternal attitudes refer specifically to men's adjustment to the transition and can provide key information on the performance of developmental tasks within the transition to parenthood. Paternal adjustment and paternal attitudes can be assessed through the way in which the sexual and marital relationship, the pregnancy and the baby are perceived by men (Marks, Wieck, Checkley, & Kumar, 1992).

Studies have shown that men's sexual desire, satisfaction, and activity decrease during the transition to parenthood (Bouchard, Boudreau, & Hébert, 2006; Boyce, Condon, Barton, & Corkindale, 2007; Condon, Boyce, & Corkindale, 2004), as has been previously found in women. A decrease in marital relationship quality and satisfaction during pregnancy and the postpartum period has also been found among men (e.g. Belsky & Pensky, 1988; Canário & Figueiredo, 2016; Figueiredo et al., 2008; Mitnick, Heyman, & Smith Slep, 2009), given that the quality of the marital relationship is associated with father-infant interaction (Feldman, 2000; Huang & Warner, 2005). Men with more negative attitudes towards pregnancy (e.g. lower perception of caregiving abilities) and the baby were found to interact poorly with their baby (Beitel & Parke, 1998).

Several studies have analysed men's psychological adjustment during the transition to parenthood, suggesting that they are at-risk of more depression symptoms, both during pregnancy and the postpartum period (e.g. Cameron, Sedov, & Tomfohr-Madsen, 2016; deMontigny, Girard, Lacharité, Dubeau, & Devault, 2013; Figueiredo & Conde, 2011a; Matthey, Barnett, Howie, & Kavanagh, 2003; Matthey, Barnett, Ungerer, & Waters, 2000; Parfitt & Ayers, 2014), as are women. Regarding this issue, a recent meta-analysis (Cameron et al., 2016) noted that the prevalence estimates for men's depression from pregnancy through 12 months postpartum was approximately 8%. However, this meta-analysis (Cameron et al., 2016) also suggested that the prevalence of men's depression during pregnancy and the postpartum period varies according to the country where the study was conducted and according to the measures used to assess depression.

Despite these differences, studies have indicated that men are particularly at-risk of more depression symptoms during the first trimester of pregnancy (e.g. Boyce et al., 2007; Condon, 2006; Figueiredo & Conde, 2011a; Parfitt & Ayers, 2014; Wee, Skouteris, Pier, Richardson, & Milgrom, 2011), which could be related to difficulties in achieving early developmental tasks within the transition to parenthood (e.g. pregnancy acceptance). Empirical studies have found that approximately 11% of men were depressed during the first trimester of pregnancy (e.g. Figueiredo & Conde, 2011b), approximately 7% were depressed during the second trimester of pregnancy (e.g. Figueiredo & Conde, 2011b; Korja et al., 2015; Wee, Skouteris, Richardson, McPhie, & Hill, 2015), and approximately 6% were depressed during the third trimester of pregnancy (e.g. Figueiredo & Conde, 2011b; Gawlik et al., 2014; Parfitt & Ayers, 2014).

The first 6 months postpartum were also reported to be a period of vulnerability for more depression symptoms; 7.2% of men were found to be depressed at 3 months postpartum (e.g. Cattaneo et al., 2015; Figueiredo & Conde, 2011b). A recent meta-analysis found that almost 15% of men were depressed between 3 and 6 months postpartum (Cameron et al., 2016), while another studies found that 8% of men were depressed at 12 months postpartum (e.g. Bronte-Tinkew, Moore, Matthews, & Carrano, 2007; deMontigny et al., 2013). Furthermore, evidence suggested that, contrarily to women, men are at-risk of more depression symptoms during the first months postpartum as much as they are at-risk during the first trimester of pregnancy (e.g. Figueiredo & Conde, 2011a). The adjustment

to parenting and to the new interactions within the family may be particularly challenging for men (e.g. Edhborg, Matthiesen, Lundh, & Widström, 2005; Matthey et al., 2000).

As with maternal depression, both antenatal and postnatal paternal depression can have negative effects on marital relationships, father-infant interactions, and children's development (e.g. Field, Hossain, & Malphurs, 1999; Paulson, Dauber, & Leiferman, 2006; Ramchandani et al., 2008a, 2008b; Ramchandani, Stein, Evans, O'Connor, & ALSPAC Study Team, 2005; Sweeney & MacBeth, 2016). Moreover, after adjustments were made for maternal depression and later paternal depression, men's depression at two months postpartum was found to double the risk of behavioural and emotional problems in children at 3.5 years of age (Ramchandani et al., 2005).

Depression symptoms may negatively affect the achievement of developmental tasks within the transition to parenthood, increasing paternal adjustment problems and negative paternal attitudes. In one study, men's depression symptoms were found to predict lower sexual affection at 12 months postpartum (Repokari et al., 2007). Men with more depression symptoms during pregnancy were found to report less marital relationship satisfaction during pregnancy and the postpartum period (e.g. Feeney, Alexander, Noller, & Hohaus, 2003; Ramchandani et al., 2011; Zelkowitz & Milet, 1996). Moreover, men with more depression symptoms were found to have a greater decline in marital relationship satisfaction from pregnancy to the postpartum period (e.g. Bower, Jia, Schoppe-Sullivan, Mangelsdorf, & Brown, 2013; Cox, Paley, Burchinal, & Payne, 1999). Other studies have also reported that men's depression symptoms during pregnancy predict less father-infant involvement and poorer father-infant interaction during the postpartum period (e.g. Bronte-Tinkew et al., 2007).

An analysis of the effect of depression symptoms on paternal adjustment and paternal attitudes during the transition to parenthood may be particularly relevant to explore men's prenatal and postpartum mental health. During the last several decades major changes in family structures have occurred. The role of men as fathers has changed, and an increase in their involvement in infant caregiving has been observed (e.g. Parke, 2004). Paternal adjustment problems and negative paternal attitudes during the transition to parenthood appear to negatively affect men's later psychological adjustment and parenting (Boyce et al., 2007; Matthey et al., 2000). Recent studies have also reported the negative effect of men's adjustment problems during the transition to parenthood on women's adjustment and parenting and mainly on infant development. These studies suggested that when men reveal adjustment problems in the transition to parenthood their partners show more psychopathological symptoms, more negative attitudes towards pregnancy and the baby, and poor mother-infant interaction (Cattaneo et al., 2015; Gutierrez-Galve, Stein, Hanington, Heron, & Ramchandani, 2015; Ramchandani et al., 2011). Altogether, this evidence highlights the importance of considering both women's and men's adjustment to the transition to parenthood to conceptualise the adjustment and health of the family. However, little attention has been paid to men's prenatal and postpartum mental health, namely, the effect of men's depression on paternal adjustment and paternal attitudes during the transition to parenthood. This study aimed to analyse the effect of men's depression symptoms (1) on paternal adjustment and paternal attitudes during the second trimester of pregnancy and (2) on paternal adjustment and paternal attitudes trajectories from the second trimester of pregnancy to six months postpartum. Guided by the developmental psychopathology framework (e.g. Cowan, 1991; Cowan & Cowan, 2000; Figueiredo, 2014), we hypothesise

that depression symptoms during the transition to parenthood may represent a risk factor for the emergence of paternal adjustment problems and negative paternal attitudes (via no achievement of the transition to parenthood developmental tasks). Specifically, more depression symptoms could represent not only a risk factor for paternal adjustment problems and negative paternal attitudes during pregnancy but also a risk factor for increased paternal adjustment problems and negative paternal attitudes from pregnancy to the postpartum period. This study could contribute to the literature on men's prenatal and postpartum mental health by (1) analysing the effect of men's depression symptoms on paternal adjustment and paternal attitudes trajectories from early pregnancy to the postpartum period; and (2) using a self-report measure specifically designed to assess these relevant dimensions of paternal adjustment and paternal attitudes during the transition to parenthood.

Method

Participants

The sample comprised 127 men derived from three larger longitudinal studies with similar designs (Pinto, Figueiredo, Pinheiro, & Canário, 2016; Pinto, Samorinha, Tendais, Silva, & Figueiredo, 2018; Samorinha et al., 2016; Tendais & Figueiredo, 2016). Inclusion criteria were being able to read or write in Portuguese and being married or cohabiting with the mother of their infant. No other inclusion criteria were considered. To derive the sub-samples to this study, all men who completed a socio-demographic questionnaire and measures of depression symptoms and paternal adjustment and attitudes using the same instruments at the 2nd trimester of pregnancy and at 6 months postpartum were selected. Of the 175 participants contacted in the three longitudinal studies, 166 (94.9%) agreed to participate and signed a consent form, and 161 (92.0%) completed the first assessment wave. Of the 161 participants who completed the first assessment wave, 127 (78.9%) completed both assessment waves and were included in the study analyses.

Nearly all participants were Portuguese (94.0%), Caucasian (94.0%), employed (91.4%), and primiparous (88.3%). More than half of the participants were married with the mother of their infant (74.2%), were between 30 and 39 years old (67.9%; $M = 32.03$, $SD = 4.87$), belonged to a medium socioeconomic level (67.7%), and had a spontaneous conception (69.3%; see Table 1).

No significant associations or differences were found between participants who did and did not complete both assessment waves with respect to the following socio-demographic characteristics: nationality, ethnicity, professional status, parity, age, socioeconomic level, and mode of conception. Likewise, no significant differences were found between participants who did and did not complete both assessment waves with respect to the following study variables: depression symptoms, attitudes towards sex, marital relationship, attitudes towards pregnancy and the baby, and paternal adjustment and paternal attitudes at both assessment waves.

Significant associations were found between depression (non-depressed = EPDS < 10 vs depressed = EPDS ≥ 10) and parity, $\chi^2(1) = 3.70$, $p = .048$, and mode of conception, $\chi^2(1) = 6.86$, $p = .009$. Depressed men at the second trimester of pregnancy were more likely to be primiparous, and the conception occurred after infertility treatment (IT).

Table 1. Men's socio-demographic characteristics at the second trimester of pregnancy (baseline).

Characteristic		Total <i>N</i> = 127 %
Age (years)	18–29	26.6
	30–39	67.9
	40–49	5.5
Socio-economic level	High	17.4
	Medium high	12.4
	Medium	24.7
	Medium low	30.6
	Low	14.9
Professional status	Employed	91.4
	Unemployed	7.8
	Household or student	0.8
Education (in years)	< 9	33.6
	[9–12]	39.8
	> 12	26.6
Parity	Primiparous	88.3
	Multiparous	11.7
Conception	Spontaneous	69.3
	After successful infertility treatment	30.7

Thus, adjustments were made for these variables in the statistical analyses. No significant associations or differences were found between the groups in terms of nationality, ethnicity, professional status, age, and socio-economic level.

Procedure

The present research was conducted in accordance with the Helsinki Declaration and received previous approval from all institutions involved. Men were randomly recruited during the 1st trimester of pregnancy at public health services in northern Portugal. In the Obstetrics Outpatient Unit, two strategies were used to recruit the participants: (1) directly, when men were in the Obstetrics Outpatient Unit accompanying their partner; and (2) through the contact with their partners, if the men were not accompanying their partners at the time. The aims and the procedures were explained. Men willing to participate signed an informed consent form. Two assessments were performed: (1) second trimester of pregnancy ($M = 13.89$ gestational weeks, $SD = 2.23$) and (2) the postpartum period ($M = 24.59$ weeks postpartum, $SD = 4.42$). Participants completed the same measures in both assessment waves. The questionnaire administration was different in the three longitudinal studies. In two of the studies, the questionnaires were sent to the participants by mail or email and were returned by them in the same way; in the other study, the questionnaires were completed by the participants at the public health service.

Measures

Socio-demographic characteristics

A Socio-demographic Questionnaire was used to assess men's socio-demographic characteristics (e.g. nationality, ethnicity, marital status, age, socio-economic level, professional status, years of education, parity, and mode of conception).

Depression symptoms

The Edinburgh Postnatal Depression Scale (EPDS; Cox, Holden, & Sagovsky, 1987) was used to assess depression symptoms. The EPDS comprises 10 self-report items scored on a 4-point Likert-type scale and is designed to assess the intensity of depression symptoms within the previous 7 days. This measure has been used in several studies with men during pregnancy and the postpartum period (e.g. Cameron et al., 2016; Figueiredo & Conde, 2011a; Matthey et al., 2000). The Portuguese version of the EPDS showed good internal consistency during pregnancy ($\alpha = .85$; Figueiredo & Conde, 2011a) and the postpartum period ($\alpha = .88$; Pinto et al., 2016) and an optimal clinical cut-off of 10 to screen for depression in men (Areias, Kumar, Barros, & Figueiredo, 1996). In the present sample, Cronbach's alpha coefficients ranged from .77 to .80.

Paternal adjustment and attitudes

The Portuguese versions of the Paternal Adjustment and Paternal Attitudes Questionnaire (PAPA; Pinto, Samorinha, Tendais, Nunes-Costa, & Figueiredo, 2017) were used to assess paternal adjustment and paternal attitudes. The PAPA was specifically designed to assess paternal adjustment and paternal attitudes during the transition to parenthood and is composed of an antenatal (PAPA-AN) and a postnatal (PAPA-PN) version (Marks et al., 1992). Both versions of the PAPA comprise 30 items scored on a 4-point Likert-type scale. The PAPA-AN subscales are the following: (1) attitudes towards sex, (2) marital relationship, and (3) attitudes towards pregnancy and the baby. Similarly, PAPA-PN subscales are the following: (1) attitudes towards sex, (2) marital relationship, and (3) attitudes towards the baby. Each subscale has 10 items. Higher scores on the PAPA indicate higher paternal adjustment and more positive paternal attitudes. PAPA Portuguese versions showed good internal consistency ($\alpha = .91$ for the PAPA-AN; $\alpha = .91$ for the PAPA-PN; Pinto et al., 2017). In the present sample, Cronbach's alpha coefficients ranged from .90 to .91 for the PAPA total score, .81 to .82 for the attitudes towards sex subscale, .84 to .87 for the marital relationship subscale, and .71 to .74 for the attitudes towards pregnancy and the baby subscale.

Data analytic strategy

Growth curve models were estimated using multilevel modelling (e.g. Heck, Thomas, & Tabata, 2010) to analyse the effect of depression symptoms (1) on paternal adjustment and paternal attitudes at the second trimester of pregnancy, and (2) on paternal adjustment and paternal attitudes trajectories from the second trimester of pregnancy to six months postpartum. Time 0 was defined as the date of the first assessment at the second trimester of pregnancy (baseline) and the time variable was scored in weeks from the baseline to six months postpartum. The intercept corresponds to the outcome variables (attitudes towards sex, marital relationship, attitudes towards pregnancy and the baby, and paternal adjustment and paternal attitudes – PAPA total score) at the baseline (second trimester of pregnancy) and the slope for time represents the extent to which the outcome variables change each week. Scale scores for depression symptoms (EPDS scores) and paternal adjustment and paternal attitudes (PAPA subscales scores – attitudes towards sex, marital relationship, and attitudes towards pregnancy and the baby – and PAPA total score) were examined at both assessment waves. Fixed effects for depression

symptoms (time-varying effect centred on their grand mean) were included in the models. Different models were performed for each outcome variable. All models were adjusted for parity and mode of conception as significant associations were found between depression and these variables. Significant interactions with the continuous predictor (depression symptoms) were interpreted and graphed using one standard deviation above and below the grand mean of the predictor variable as high and low values for this variable. Deviance difference tests were performed between unconditional models and models with the predictor to examine model fit improvements.

Statistical analyses were performed in a person-period dataset using SPSS version 23.0 (SPSS Inc., USA). Each participant had a record for each time point. The resulting data consisted of 254 observations (127 participants by two time points). The effect size r (Rosenthal, Rosnow, & Rubin, 2000) was estimated for all significant effects and interpreted according to Cohen's guidelines (1988).

Results

Descriptive statistics (means and standard deviations) for all study variables (scores of depression symptoms, attitudes towards sex, marital relationship, attitudes towards pregnancy and the baby, and paternal adjustment and paternal attitudes – PAPA total score) were performed at both assessments (see Table 2). Significant medium to large size correlations were found among the study variables at the baseline (see Table 3). Deviance difference tests showed that the models provided good fit to the data, $\chi^2(2) = 28.64$, $p < .001$, $\chi^2(2) = 50.89$, $p < .001$, $\chi^2(2) = 57.84$, $p < .001$, and, $\chi^2(2) = 60.64$, $p < .001$.

The effect of depression symptoms on paternal adjustment and paternal attitudes at the second trimester of pregnancy

Main effects of depression symptoms were found on attitudes towards sex, marital relationship, attitudes towards pregnancy and the baby, and paternal adjustment and

Table 2. Descriptive statistics of study variables at each assessment wave.

	Second trimester of pregnancy		Six months postpartum	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Depression symptoms	4.59	3.56	4.41	3.54
Attitudes towards sex	32.09	5.72	32.09	5.27
Marital relationship	31.88	5.17	30.86	6.62
Attitudes towards pregnancy and baby	32.11	4.62	31.84	3.49
PAPA (total score)	96.09	14.25	94.79	13.57

M = Mean; *SD* = Standard deviation

Table 3. Correlations among the study variables at the baseline.

	1	2	3	4	5
1. Depression symptoms	1.00				
2. Attitudes towards sex	-.395***	1.00			
3. Marital relationship	-.481***	.776***	1.00		
4. Attitudes towards pregnancy and baby	-.464***	.726***	.788***	1.00	
5. PAPA (total score)	-.484***	.919***	.931***	.903***	1.00

*** $p < .001$

paternal attitudes (PAPA total score). At the second trimester of pregnancy, men with more depression symptoms revealed fewer positive attitudes towards sex, $b = -0.52$, $p < .001$, effect size $r = .336$, lower satisfaction with the marital relationship, $b = -0.71$, $p < .001$, effect size $r = .453$, fewer positive attitudes towards pregnancy and the baby, $b = -0.52$, $p < .001$, effect size $r = .449$, and lower paternal adjustment and paternal attitudes (PAPA total score), $b = -1.76$, $p < .001$, effect size $r = .446$ (see Table 4).

The effect of depression symptoms on paternal adjustment and paternal attitudes trajectories from the second trimester of pregnancy to six months postpartum

Interaction effects of depression symptoms and time were found on attitudes towards sex, $b = -0.01$, $p = .023$, effect size $r = .143$, marital relationship, $b = -0.02$, $p < .001$, effect size $r = .305$, attitudes towards pregnancy and the baby, $b = -0.01$, $p < .001$, effect size $r = .226$, and paternal adjustment and paternal attitudes, $b = -0.04$, $p < .001$, effect size $r = .245$ (PAPA total score; see Table 4). From the second trimester of pregnancy to six months postpartum, men with more depression symptoms revealed a decrease on positive attitudes towards sex, while men with fewer depression symptoms revealed an increase (see Figure 1). When compared with men with fewer depression symptoms, men with more depression symptoms revealed a steeper decrease in marital relationship satisfaction from the second trimester of pregnancy to six months postpartum (see Figure 1). Additionally, from the second trimester of pregnancy to six months postpartum, men with more depression symptoms revealed a decrease in positive attitudes towards pregnancy and the baby, while men with fewer depression symptoms revealed an increase (see Figure 1). Likewise, from the second trimester of pregnancy to six months postpartum, men with more depression symptoms revealed a decrease in paternal adjustment and paternal attitudes (PAPA total score), while men with fewer depression symptoms revealed an increase (see Figure 2).

Discussion

This study found an effect of depression symptoms on paternal adjustment and paternal attitudes at the second trimester of pregnancy. At the second trimester of pregnancy, men with more depression symptoms revealed fewer positive attitudes towards sex, lower satisfaction with the marital relationship, fewer positive attitudes towards pregnancy and the baby, and lower paternal adjustment and paternal attitudes (PAPA total score). The effect of depression symptoms on attitudes towards sex was similar to that revealed in a previous study that found lower sexual affection at 12 months postpartum in men with more depression symptoms during pregnancy (Repokari et al., 2007). The effect of depression symptoms on marital relationship satisfaction is congruent with those shown in previous studies that found lower marital relationship satisfaction during pregnancy in men with more depression symptoms (e.g. Feeney et al., 2003; Ramchandani et al., 2011; Zerkowicz & Milet, 1996). Similarly, the effect of depression symptoms on attitudes towards pregnancy and the baby was in line with those of previous studies that found less father-infant involvement and poorer father-infant interaction in men with more depression symptoms during pregnancy (e.g. Bronte-Tinkew et al., 2007).

Table 4. The effect of depression symptoms on attitudes towards sex, marital relationship, attitudes towards pregnancy and the baby, and PAPA total score at the second trimester of pregnancy and from the second trimester of pregnancy to six months postpartum.

Fixed effects	Attitudes towards sex			Marital relationship			Attitudes towards pregnancy and baby			PAPA total score		
	<i>b</i>	<i>SE</i>	95% <i>CI</i>	<i>b</i>	<i>SE</i>	95% <i>CI</i>	<i>b</i>	<i>SE</i>	95% <i>CI</i>	<i>b</i>	<i>SE</i>	95% <i>CI</i>
Intercept	34.50	0.70	[33.26,35.73]***	35.12	0.58	[33.97,36.27]***	34.51	0.44	[33.63,35.38]***	104.15	1.51	[101.18,107.12]***
Time	-0.01	0.22	[-0.05,0.04]	-0.04	0.02	[-0.09,-0.01]*	-0.01	0.02	[-0.05,0.02]	-0.06	0.05	[-0.17,0.04]
Depression symptoms	-0.52	0.09	[-0.71,-0.34]***	-0.71	0.09	[-0.89,-0.53]***	-0.52	0.07	[-0.65,-0.39]***	-1.76	0.22	[-0.65,-0.39]***
Depression symptoms x Time	-0.01	0.01	[-0.02,-0.01]*	-0.02	0.01	[-0.02,-0.01]***	-0.01	0.01	[-0.01,0.00]***	-0.04	0.01	[-0.05,-0.02]***
Random effects												
Intercept + Time	0.01	0.00	[0.01,0.01]***	0.02	0.01	[0.01,0.04]***	0.02	0.01	[0.01,0.04]***	0.01	0.03	[0.00,0.04]***
Residuals	29.72	2.64	[24.97,35.98]***	20.58	2.60	[16.06,26.37]***	13.59	1.21	[11.42,16.19]***	156.12	19.74	[121.85,100.02]***

SE = Standard error; CI = Confidence interval; Models were adjusted for parity and mode of conception. **p* < .05; ****p* < .001

Figure 1. Estimated trajectories of attitudes towards sex, marital relationship, and attitudes towards pregnancy and the baby in men with more and less depression symptoms.

Figure 2. Estimated trajectories of paternal adjustment and paternal attitudes (PAPA total score) in men with higher and lower depressive symptoms.

The effect of depression symptoms was found on paternal adjustment and paternal attitudes trajectories. From the second trimester of pregnancy to six months postpartum, men with more depression symptoms revealed a decrease in positive attitudes towards sex, a steeper decrease in marital relationship satisfaction, a decrease in positive attitudes towards pregnancy and the baby, and a decrease in paternal adjustment and paternal attitudes (PAPA total score), while men with fewer depression symptoms revealed an increase in positive attitudes towards sex, a lower decrease in marital relationship satisfaction, an increase in positive attitudes towards pregnancy and the baby, and an increase in paternal adjustment and paternal attitudes (PAPA total score). These results are congruent with those of previous studies that suggested a greater decline in marital relationship quality and satisfaction during the transition to parenthood in men with more depression symptoms (e.g. Bower et al., 2013; Cox et al., 1999).

The transition to parenthood was associated with a decrease in proximity and communication and an increase in conflict and ambivalence between the two members of the couple, which may lead to a decrease in marital relationship satisfaction from the second trimester of pregnancy to six months postpartum. Men with more depression symptoms may experience a higher decrease in proximity and communication and a higher increase in conflict and ambivalence, leading to a higher decrease in marital relationship satisfaction from the second trimester of pregnancy to six months

postpartum (e.g. Kluwer & Johnson, 2007; Perren, Wyl, Bürgin, Simoni, & Klitzing, 2005). To our knowledge, this was the first study that explored the effect of depression symptoms on the trajectories of attitudes towards sex, pregnancy, and the baby.

According to a developmental framework (e.g. Cowan, 1991; Cowan & Cowan, 2000; Figueiredo, 2014), these results suggest that depression has a negative effect on the achievement of developmental tasks within the transition to parenthood, increasing paternal adjustment problems and negative paternal attitudes. This study suggested that compared to men with fewer depression symptoms, men with more depression symptoms may present more difficulties in the performance of early developmental tasks (e.g. pregnancy acceptance, father-fetal emotional involvement), increasing paternal adjustment problems and negative paternal attitudes at the second trimester of pregnancy: fewer positive attitudes towards sex, lower satisfaction with the marital relationship, fewer positive attitudes towards pregnancy and the baby, and lower paternal adjustment and fewer positive paternal attitudes (PAPA total score). Additionally, men with more depression symptoms may present difficulties in the achievement of several developmental tasks within the transition to parenthood, leading to an increase in paternal adjustment problems and negative paternal attitudes from the second trimester of pregnancy to six months postpartum: a decrease in positive attitudes towards sex, a steeper decrease in marital relationship satisfaction, a decrease in positive attitudes towards pregnancy and the baby, and a decrease in paternal adjustment and positive paternal attitudes (PAPA total score). In contrast, men with fewer depression symptoms revealed an increase in positive attitudes towards sex, a lower decrease in marital relationship satisfaction, an increase in positive attitudes towards pregnancy and the baby, and an increase in paternal adjustment and positive paternal attitudes.

Limitations

Some methodological limitations can be noted. The voluntary nature of the participation may have led to a selection bias because those who agreed to participate and those who completed all assessments may have felt more involved and satisfied with the pregnancy and the postpartum experience. However, no differences were found between the participants who did and did not complete both assessment waves. The generalisation of the findings should be performed with caution. This study was conducted with a Caucasian Portuguese sample of men and may not be generalisable to men from other countries and ethnic/cultural backgrounds. Significant associations were found between depression and parity or mode of conception. However, these variables were controlled for in the study analysis. A larger sample size could increase the power of the analysis and would allow to examine the effects of the interaction between depression symptoms and parity or mode of conception. Different models were performed for each outcome variable, which could increase the probability of type 1 error in the study results. However, all results revealed a high effect size. Depression symptoms were assessed using the EPDS, a self-report measure. Nevertheless, the EPDS is one of the measures most commonly used to assess depression symptoms in men and women during pregnancy and the postpartum period. Moreover, the mean scores of depression symptoms were similar to those found in previous studies with Portuguese men during pregnancy and the postpartum period (e.g. Figueiredo & Conde, 2011a). Although all measures have exhibited good internal

consistency, additional observational measures could have contributed to higher accuracy and reduced possible shared method variance of the study variables.

Implications for clinical practice and research

Recent studies have reported the negative effect of men's adjustment problems during the transition to parenthood on women's adjustment and parenting and mainly on infant development, highlighting the importance of considering both women and men's adjustment to the transition to parenthood to conceptualise the health of the family (e.g. Cattaneo et al., 2015; Gutierrez-Galve et al., 2015; Ramchandani et al., 2011). The results of the present study may provide relevant information for practice and research in prenatal and postpartum mental health. This study highlighted two major implications for practice. First, screening for depression symptoms early in pregnancy may allow for the identification of men with paternal adjustment problems and negative paternal attitudes during the transition to parenthood. Second, the PAPA is a useful tool to assess the specific problems on dimensions of paternal adjustment and paternal attitudes, and to develop new aims in psychological counselling according to men's specific needs during both pregnancy and the postpartum period.

This study could be a contribution to the literature on men's prenatal and postpartum mental health. Previous studies have suggested that men are at risk of more depression symptoms during the transition to parenthood (e.g. Cameron et al., 2016; deMontigny et al., 2013; Figueiredo & Conde, 2011a; Matthey et al., 2003, 2000; Parfitt & Ayers, 2014). This study showed that depression symptoms could represent a risk factor for increased paternal adjustment problems and negative paternal attitudes during the transition to parenthood. The results from this study also suggested that primiparous men and IT men could be at a higher risk of depression during pregnancy. Specifically, depressed IT men were found to reveal lower marital relationship satisfaction during pregnancy than were IT non-depressed men and depressed or non-depressed men whose partners conceived spontaneously (Pinto et al., 2018). Future studies could explore parity and mode of conception as possible moderators of the effect of depression symptoms on paternal adjustment and paternal attitudes trajectories during the transition to parenthood.

Guided by the developmental psychopathology framework (e.g. Cowan, 1991; Cowan & Cowan, 2000; Figueiredo, 2014), the present study hypothesised depression symptoms during the transition to parenthood as a risk factor for the emergence of paternal adjustment problems and negative paternal attitudes (via no achievement of the transition to parenthood developmental tasks). However, effects of early paternal adjustment problems and negative paternal attitudes on men's depression symptoms may occur during the transition to parenthood. Previous studies suggested low parenting self-efficacy and low marital relationship quality during pregnancy and the postpartum period as major predictors of men's postpartum depression (e.g. deMontigny et al., 2013; Wee et al., 2011). Future studies could explore possible bidirectional effects between depression symptoms and paternal adjustment and attitudes during the transition to parenthood.

Disclosure statement

No potential conflict of interest was reported by the authors.

Ethical approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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