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PROSPECTIVE FATHERS: PSYCHOSOCIAL ADAPTATION AND INVOLVEMENT IN THE LAST TRIMESTER OF PREGNANCY

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SUMMARY

Background: Paternal involvement in pregnancy has been recognized to have an impact on new-born's outcomes and only recently got under the spot light of mental health perspective. The aim of this study was to test differences in paternal involvement in pregnancy, perceived stress and relationship quality regarding complications in pregnancy and pregnancy duration (gestational weeks) in the last trimester of pregnancy. The role of personality traits (neuroticism and extroversion), relationship quality satisfaction and perceived stress in prospective father's perception of pregnancy involvement were examined.

Subjects and method: One-hundred forty-three primiparus couples in the last trimester of their pregnancy participated in the study. Prospective fathers completed a booklet with questionnaires including The Quality of Marriage Index, The Perceived Stress Scale, Eysenck Personality Questionnaire and Partner's Involvement in Pregnancy Scale. Prospective mothers completed only Eysenck Personality Questionnaire and questions on pregnancy complications and demographics.

Results: The prospective fathers showed high involvement in their partner's pregnancies, elevated levels of perceived stress and high relationship quality. There were found no differences in the above named variables regarding complications in pregnancy and pregnancy duration. Higher involvement of prospective fathers was related with older age, lower male neuroticism and higher female extroversion, better relationship quality and lower perceived stress.

Conclusion: The findings demonstrate that prospective father's involvement in pregnancy is supported with psychological factors, namely personality traits, quality of relationship and perceived stress. These results should lead to target interventions that can modify and improve fathers' involvement perspective and promoting a couples mental health during pregnancy: thus clinically important for promotion of healthy prenatal behaviour and decrease in mothers' emotional distress.

Key words: pregnancy – mental health - fathers – pregnancy involvement - neuroticism

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INTRODUCTION

Paternal involvement has been recognized as an important factor of a mental health perspective for its long reach from pregnancy to the infant outcomes (Brote-Tinkew et al. 2007, Cabrera et al. 2008, Shannon et al. 2009, Ghosh et al. 2010, Alio et al. 2011, Alio et al. 2013). Although a large body of research exists on a father's involvement in child health and development, little is known about what factors are associated with prospective fathers' prenatal involvement (Brote-Tinkew et al. 2007, Dunkel Schetter 2010, Adamson 2013).

Limited research has proved positive benefits of paternal involvement on maternal mental health during pregnancy (Tanner Stapleton et al. 2012). The mechanism to which paternal involvement affects birth outcomes have been linked to the impact that a presence of future father might influence maternal behaviours by reducing maternal stress through emotional, logistical and financial support (Padilla & Reichman 2001, Misra et al. 2010, Alio et al. 2013). Presence of fathers during pregnancy according to recent findings reduces maternal negative health behaviours such as cigarette consumption and later involvement in antenatal care (Martin et al. 2007). A lack

of social support is recognized to predispose mothers to mental health problems (Darcy et al. 2011). Other studies have suggested that support from fathers serve to alleviate burden of stress (Ghosh et al. 2010).

The transition to fatherhood can be viewed as an opportunity for personal growth but pregnancy, rather than postnatal period, would appear to be the most stressful period for men undergoing the transition to parenthood (Condon et al. 2004). The systematic review of the literature examining men's psychological transition to fatherhood demonstrated that the partner's pregnancy was the most demanding period in terms of psychological reorganization of self (Genesoni & Talladini 2009). Many future parents can experience various levels of mood changes and anxiety and when their increased levels can be missed this can lead to mental health problems if not recognised in an early stage (Dunkel Schetter & Tanner 2012). Psychiatric research on pregnancy focuses mostly on diagnosable mental disorders, primarily anxiety and depressive disorders (Ross et al. 2006, Leight et al. 2010), and some mainly regarding effects on birth outcomes such as preterm birth, low birth weight and mortality (Waller & Bitler 2008, Alio et al. 2010, Dunkel-Schetter & Tanner 2012).

Some prospective fathers may be at risk of developing a mental health problem perceiving pregnancy as a stressful event. That might evoke the fear of unknown, past life events, the transitional changes to personal and parenting relationships, and work-related problems (Steen et al. 2013). The risk might be greater if the prospective fathers had predisposition for developing various levels of emotional difficulties, mostly mild levels of depression and anxiety symptoms (Nice 2007, Furber et al. 2009). Furthermore, pregnancy itself as a demanding period of change, with the presence of the pregnancy complications might impose and affect the quality of couples' relationship as well as their functional relations and communication.

Men, who support their partners' pregnancy and see themselves as a part of a "pregnant couple", incorporate an active role to benefit both the expecting father himself and unborn child (Atkinson 2012). Involvement in partners' pregnancy may represent that prospective fathers want to become a parent, are interested in a child and view themselves as playing important role in prospective child's development (Cabrera et al. 2008).

The conceptualization and operationalization of prenatal involvement have varied from study to study. Indeed, current knowledge concerning expectant father's involvement is derived primarily retrospectively and from the reports of women (Cabrera et al. 2008, Dunkel Schetter, 2010, Adamsons, 2013). Further, different types of involvement are assessed such as discussing decision making, talking about pregnancy, going to regular check-ups, attending the antenatal classes and support, care and interest in pregnancy, birth attendance or general support given to the pregnant women (Bronte-Tinkew et al. 2007, Adamsons 2013).

A number of socio-economics characteristics, such as father's age, educational attainment, employment status, poverty status, health status and marital status were found to be related with paternal involvement in pregnancy (Bronte-Tinkew et al. 2007). Married older fathers with higher levels of education in stable and happy relationship have been found to be more involved (Eccles & Harold 1996, Hofferth & Anderson 2003, Redshaw & Henderson 2013). Pregnancy characteristics such as parity and pregnancy intentions may contribute to paternal involvement and findings suggested that paternal involvement was highest in partners of primiparous white women, and in those, whose pregnancy was planned (Sangi-Haghpeykar et al. 2005, Bronte-Tinkew et al. 2007, Martin et al. 2007, Redshaw & Henderson 2013). The present finding of the literature on prospective fathers' involvement shows that so far conducted researches has been focused more on socio-demographic variables while psychological factors as predictors of prospective father's involvement in partner's pregnancy are understudied (e.g. Adamsons 2013). Although partners' personality traits are recognized in context of marital interaction (Donnellan et al. 2004) published studies that report on the role of personality traits in prospective father's involvement in

pregnancy, especially regarding personality traits of both partners, to our knowledge, have not been found in the researched literature.

The current study focused on expectant father's perception of involvement in pregnancy during the last trimester of pregnancy that was often reported to be the most stressful time for men in their transition to parenthood. There had been two specific goals. First, to test differences in perceived stress, relationship quality and pregnancy involvement in prospective fathers in regard to some pregnancy characteristics such as complications in pregnancy and pregnancy duration. Second, while no studies to our knowledge have examined psychological factors as predictors of a first time expectant father's perception of involvement in partner's pregnancy, the objective of this research was to address the predictors of men's involvement in their partners' last trimester of pregnancy. Specifically, we have sought to understand more clearly how men's perception of involvement is related to personality traits (neuroticism and extroversion), men's relationship quality satisfaction, men's perceived stress, after accounting for more general characteristics of fathers (age, duration of relationship and education) in the last trimester of pregnancy.

It was hypothesized that men's aspects of psychosocial adaptation (perceived stress and relationship quality) would vary depending on pregnancy duration and pregnancy complications indicating sensitivity to pregnancy condition. Further, prospective father's perception of involvement would be explained through couple's personality traits, relationship quality and perceived stress.

SUBJECTS AND METHODS

Subjects

A total of 427 pregnant women and men as accompanied persons were approached during the study period of which 286 participants (N=286) completed questionnaires and met the eligibility criteria forming a total sample of 143 couples. The main reasons for the ineligibility (in order of frequency) were parity (23), medical conditions (9-involving cardiovascular or neuroendocrine or hepatic or renal functioning), multiple gestations (4), lack of time (2), non-native Croatian language speakers (2), not having an intimate partner at the time of the study (2) and the use of controlled substances (2).

The male sample consisted of 143 prospective first-time fathers over 18 years of age who accompanied their pregnant partner to a regular check-up appointment in the last trimester of singleton intrauterine pregnancy. The mean age of first time expecting fathers was 33 (5.41 standard deviation), range 18-52 years. The mean length of the present relationship was 4 (range 1-16) years. The majority of them finished high school (55.2%), and the rest of them had university degree. Ninety-two percent of subjects were working full time. The relationship status of the participants 133 (93%)

were mostly married/cohabitant, while 10 (7%) were not living with partner. For the purpose of this study, we had also contacted pregnant women (partners of prospective fathers) in order to gain data about their own personality traits, gestational age and complications in pregnancy.

The mean age of the first-time pregnant women was 30 (4.41 standard deviation), range 18-42 years. The mean gestational age at the time when the participants completed the questionnaires was 35 (range 28-41) weeks. The majority of them 51% had university degree and the rest of them had finished high school. Eighty-two percent of subjects are full time employed while seventeen percent were unemployed and one percent of women were students at the time of the study. All participants were provided with the written informed consent following the procedures, and the protocol was approved by the institutional and university ethics committees.

Methods

The study was conducted during a five months period in 2012 and 2013 at the University Hospital Center of Rijeka, Croatia, while waiting for the regular check-up in the last trimester of pregnancy. The questionnaires were administered by a psychologist in clinic settings within a private room. The aim of the study was explained to all participants, each participant of a couple signed the inform consent. After that, prospective fathers completed self-reported measures: The General Information Questionnaire, Quality of Marriage Index (QMI), Perceived Stress Scale (PSS), Eysenck Personality Questionnaire (EPQ) and Partner's involvement in Pregnancy Scale (PIPS). Pregnant women completed Eysenck Personality Questionnaire (EPQ) and the General Information Questionnaire. All participants completed questionnaires anonymously.

General Information Questionnaire

Several measures of couples' characteristics and pregnancy intentions were included in our analyses to control the confounding influences. Couples socio-demographic characteristics include age, length of relationship and categorical variables for couples' marital status (unmarried, married/live with partner, divorced), educational attainment (less than elementary school, elementary school, high school, university degree) and employment status (employed, part-time employed, not employed, retired). Pregnancy intentions measure captures whether a pregnancy was: (a) wanted and planned; (b) wanted but unplanned; (c) unplanned. Gestational age and complications in pregnancy (bleeding /haemorrhage, urinary infection, high physical temperature, high blood pressure and gestational diabetes) were obtained from pregnant women.

The Quality of Marriage Index

The Quality of Marriage Index (QMI) (Norton 1983) was used to assess quality of couple relationship. The quality was measured with 6 item statement sentences. The items were re-worded to apply to both married and unmarried relationships. Responses on items such as

"My relationship with my partner makes me happy" were made on a scale from 0 (strongly disagree) to 4 (strongly agree). Items were summed to create a scale with potential range of 0-24 points, with higher scores indicating greater relationship quality. Internal consistency of this scale was satisfactory ($\alpha=0.92$).

The Perceived Stress Scale

The Perceived Stress Scale (PSS) is a widely used measure of global perception of stress in relation to various psychological responses and health related outcomes (Cohen et al. 1983). The scale measures the extent to which respondents experience their lives as uncontrollable, unpredictable, and overburdening, which are the three main components of experiencing stress (Lazarus & Folkman 2004). It consists of 10 items on a 5 point Likert scale ranging from 0 (never) to 4 (very often). A total scores range from 0 to 40 where the higher score indicates a greater perception of stress. Internal consistency in the sample of the present study was satisfactory ($\alpha=0.79$).

Eysenck Personality Questionnaire

Eysenck Personality Questionnaire (EPQ) is three-dimensional questionnaire that measures personality traits of extroversion, neuroticism, psychoticism. The structure was biologically-based on independent dimensions of temperament measured on 90 item scales. A previously validated Croatian language version of EPQ (Eysenck & Eysenck 1993) had been used. There are 21 items on extraversion-introversion dimension, 23 items on neuroticism-emotional stability dimension, 25 items on psychoticism scale, and 21 items on Lie scale. Items are scored on a dichotomy yes/no scale. Fathers sample had Cronbach Alpha from 0.82 (extraversion) to 0.88 (neuroticism) and mothers sample had Cronbach Alpha from 0.66 (extraversion) to 0.68 (neuroticism) which was satisfactory.

Partner's Involvement in Pregnancy Scale

The Partner's Involvement in Pregnancy Scale (PIPS) is a 21 item scale that measures perception of self-involvement in partners' pregnancy. The scale was previously validated on couples waiting for amniocentesis procedure in two parallel forms for men and for women (Brajnović-Milić et al. 2010). We had used male form only in our study. An exploratory factor analysis was performed with Oblimin rotation and Catell scree test suggested extraction of one factor which explained 23.65 % of the variance in the PIPS scores. The items assessed various types of involvement as a degree of supporting partner, attention and decision making involvement in pregnancy (sample items e.g. "I want to know more about pregnancy and childbirth"; "I support my partner from the beginning of the pregnancy"; "I talk about her feelings related to pregnancy"). Items are scored on a 5 point Likert scale ranging from 1 (not at all) to 5 (very much). There are 6 reverse coded items in the scale. The scores range from 21 to 105, with higher scores indicating greater involvement in partner's pregnancy. Internal consistency in the sample of the present study was satisfactory ($\alpha=0.81$).

Statistical Analyses

Data were statistically analysed with the SPSS for Windows 20 software (IBM, Armonk, New York, USA). In order to obtain answers to the main problems of this study t-test, one-way ANOVA, correlational analysis and hierarchical regression analysis were performed.

RESULTS

All participants in the sample were the first-time couples. In respect to pregnancy duration, 30% of pregnancies were less than 32 weeks, 35% between 33 and 36 weeks and 35% more than 37 weeks. In regard to pregnancy intentions, 70 % fathers reported that their partners pregnancy was wanted and planned, 26.5 % that it was wanted but unplanned and only 3.5 % that pregnancy was unplanned. None complication in pregnancy was reported by 37% prospective mothers, one complication was reported by 35%, while two or more complications were reported by 28% participants.

Descriptive statistics for observed variables are presented in Table 1.

The current sample mean scores in observed variables indicate highly involved prospective fathers with low levels of stress and good relationship quality.

Stress level – comparison with norms

Mean stress score was 15.2±5.83 (range 2-31). Norms for healthy adults range from a 12.6±6.1 for an age group 45-54, to a mean of 13.0±6.2 for an age group 30-44 years to 14.2±6.2 for an age group 18-29 years (Cohen & Williamson 1988). Men's stress scores were significantly higher than the highest norm for the PSS ($t=2.04$; $p<0.05$).

Differences in perceived stress, marriage quality and pregnancy involvement in prospective fathers in regard to complications in pregnancy

In order to test differences in perceived stress, relationship quality and pregnancy involvement in prospective fathers in regard to complications in pregnancy a series of one-way ANOVAs were performed. Results are shown in Table 2.

The obtained results showed that number of complications in pregnancy has not significant effect on men's stress, relationship quality and pregnancy involvement in the last trimester of pregnancy.

Differences in perceived stress, relationship quality and pregnancy involvement in prospective fathers in regard to pregnancy duration

Differences in perceived stress, relationship quality and pregnancy involvement in prospective fathers in regard to pregnancy duration were tested with one-way ANOVA. The results are presented in Table 3.

Results of ANOVA showed that there were no significant differences in perceived stress, relationship quality or pregnancy involvement in regard to pregnancy duration.

Correlations between prospective fathers' socio-demographic factors, aspects of psychosocial adjustment and personality traits in the last trimester of pregnancy

Correlations between prospective fathers' socio-demographic factors and pregnancy complications, aspects of psychosocial adjustment in last trimester of pregnancy and both partners' personality traits are presented in Table 4.

Table 1. Means, standard deviations (SD), and scales reliabilities (Cronbach alpha) for Quality of Marriage Index, Perceived Stress Scale, Eysenck Personality Questionnaire (EPQ) for male and female participants and Partner's involvement in Pregnancy Scale (n=143)

Variable	Mean	Standard deviation	Alpha	Number of items
Quality of Marriage Index (0-4)	23.07	2.41	0.92	6
Perceived Stress Scale (0-4)	15.20	5.83	0.79	10
EPQ - male (0-1)				
Neuroticism	7.54	4.62	0.88	23
Extraversion	13.91	4.54	0.82	21
EPQ - female (0-1)				
Neuroticism	9.88	4.99	0.68	23
Extraversion	13.74	3.90	0.66	21
Pregnancy involvement (1-5)	90.47	8.90	0.81	21

Note: Response scales for each measure are given in parentheses

Table 2. Perceived stress, quality of marriage and pregnancy involvement in prospective fathers in regard to complications in pregnancy (results of one- way ANOVA)

	Group 1 (n=51)		Group 2 (n=50)		Group 3 (n=50)		F	p
	(No complications) M	SD	(1 complication) M	SD	(2 or more complications) M	SD		
Perceived stress	15.57	5.70	14.86	6.00	15.12	5.90	0.19	0.83
Relationship quality	23.32	1.55	23.38	1.47	22.35	3.79	2.55	0.08
Pregnancy involvement	89.96	8.64	90.00	9.82	91.73	8.08	0.55	0.58

Table 3. Perception of stress, relationship quality and pregnancy involvement in prospective fathers in regard to pregnancy duration (results of one- way ANOVA)

	Group 1 (n=42) (<32 weeks)		Group 2 (n= 50) (33-36 weeks)		Group 3 (n=51) (>37 weeks)		F	p
	M	SD	M	SD	M	SD		
	Perceived stress	15.57	5.88	14.68	5.71	15.39		
Relationship quality	22.74	2.12	23.36	1.87	23.06	3.02	0.76	0.47
Pregnancy involvement	88.64	9.10	90.86	8.76	91.59	8.79	1.34	0.26

Table 4. Correlations between socio-demographic (age, length of relationship, education, pregnancy complications) and pregnancy complications, aspects of psychosocial adjustment (relationship quality, stress perception) and personality traits (extraversion and neuroticism for male and female subjects) and pregnancy involvement in prospective fathers

	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Age (1)	0.46**	0.12	0.08	-0.07	-0.07	0.03	-0.09	-0.06	0.17*	0.16*
Length of relationship (2)	-	0.07	0.07	0.06	-0.22**	-0.03	-0.05	-0.04	-0.02	0.04
Education (3)		-	0.01	-0.17*	-0.16	-0.23**	0.01	-0.15	0.07	0.08
Relationship quality (4)			-	-0.28**	0.04	-0.17*	0.06	-0.22**	0.36**	-0.15
Perceived stress (5)				-	-0.19*	0.59**	0.01	0.26**	-0.39**	-0.03
Extraversion – male (6)					-	-0.07	-0.15	-0.12	0.11	-0.01
Neuroticism - male (7)						-	-0.10	0.25**	-0.35**	0.02
Extraversion - female (8)							-	-0.07	0.20**	0.05
Neuroticism - female (9)								-	-0.13	0.10
Pregnancy involvement (10)									-	0.07
Pregnancy complications (11)										-

*p<0.05; ** p<0.01

From the correlation matrix it is evident that age, situational anxiety, relationship quality, male neuroticism and female extroversion were significantly correlated with involvement in pregnancy. These relations will be further described through regression analysis.

Predictors of prospective fathers' involvement in pregnancy

Table 5. Summary of hierarchical regression analysis in predicting fathers' involvement in pregnancy

	β	R ²	ΔR ²
Pregnancy involvement F _(9,133) =6.59; p<0.01			
1 st step			
Length of relationship	-0.12		
Education	-0.02		
Age	0.22*	0.04	0.04
2 nd step			
Extraversion-male	0.01		
Neuroticism-male	-0.19*		
Extraversion-female	0.18*		
Neuroticism-female	0.05	0.20**	0.16**
3 rd step			
Relationship quality	0.27**	0.29**	0.09**
4 th step			
Perceived stress	-0.20*	0.31**	0.02*

*p<0.05; **p<0.01;

The β coefficients from the last step are shown

In order to examine the predictive effect of personality traits, relationship quality, and perceived stress on first time expectant fathers' perception of involve-

ment in pregnancy, hierarchical regression analysis was performed. Length of relationship, age and education were entered at the first, personality traits at the second, relationship quality at the third and perceived stress at the last step of analysis (Table 5).

All predictor variables together explain 31% variance of prospective fathers' involvement in pregnancy. Variables added at the first step didn't significantly contributed to the explanation of pregnancy involvement but age was a significant predictor in a way that older prospective fathers have reported higher pregnancy involvement. Personality variables entered at the second step significantly contributed to explanation of criterion variable (with additional 16 % of explained variance): higher involvement in pregnancy is related with low male neuroticism and high female extroversion. Relationship quality additionally explains 9 % variance of prospective fathers' involvement and perceived stress added at last step contributed significantly to explanation of the criterion variable. Relationship quality was positive and perceived stress was negative predictor of prospective fathers' pregnancy involvement.

DISCUSSION

The results of this study imply that the majority of prospective fathers are clearly actively engaged in pregnancy that is demonstrated through the high involvement in their partner's pregnancies, elevated levels of perceived stress and reported high relationship quality.

The biological component of the prospective fathers' involvement might be explained through the biopsychosocial model supported from the recent experimental evidence in neuroendocrine molecular science on brain oxytocin and testosterone change during pregnancy (Grillon et al. 2013, Edelstein et al. 2015). Oxytocin is often referred as the „love hormone“ or, “bonding hormone” and it plays an important role in the neuroanatomy of intimacy, pair bonding (Ljubičić 1992), specifically in sexual reproduction (Lee et al. 2009).

Mostly all of prospective fathers were very positive about their partners' pregnancy, since the pregnancy were wanted and planned. Pregnancy intentions are important to examine because they refer to men's feelings about the pregnancies of their partner and therefore present the ability of a father to provide a positive involvement during pregnancy and postpartum even extend to nurturing behaviours after birth and result with a positive father engagement with a child (Bronte-Tinkew et al. 2007). Timing of becoming a parent seems to have an impact on the couple's relationship too. The findings of Helms-Erikson (2001) suggest that “early” first-birth couples evaluated their quality of marriages more poorly than did the “on time” or “delayed” couples. Furthermore, current findings might give an insight of buffering issues in prevention of mental health pathology for the couples in late trimester of pregnancy.

Pregnancy as a source of stress in a transition to parenthood in men had already been documented. Condon et al. (2004) assessed men at 23 weeks of pregnancy and followed up at 3, 6, and 12 months postnatal. Their findings suggested that pregnancy is the most stressful time for men undergoing the transition to parenthood. The same authors hypothesised that men experience the impact of pregnancy as soon as the pregnancy is confirmed anticipating changes that will happen after the birth. In our sample, the mean gestational age was higher: 35 weeks, which supports the similar pattern in the last trimester of pregnancy. Also, the first time fathers need to develop a sense of acceptance of the anticipate lifestyle changes as well as the role model of what type of father they want to be. According to Condon 2006. men less likely want to emulate their own fathers in terms of their relationship with the future child and they may lack a role model upon which to build a desirable style of fathering. Developing an attachment to a fetus, adjusting to triad needs and conceptualizing oneself as a first time expectant father, men might perceive elevate levels of stress as they are going through psychological preparation for fatherhood.

Current findings suggest that we found neither prospective father's sensitivity to existing complications in pregnancy, nor in pregnancy duration. In that sense, fathers-to-be in pregnancies with no complication had the same state anxiety levels as in pregnancies with one or more complications. This may be due to sample selection criteria, which resulted with regular, healthy pregnancies with no medical comorbidity and treatment.

Some reported obstetric complications were from the first trimester of pregnancy, which is far enough to be perceived as a threat at in the last trimmester of pregnancy. This is in accordance with results of Brajenović-Milić et al. (2010) who found that there were not any differences in anxiety among men awaiting their partners' amniocentesis according to any of the observed clinical characteristics of pregnancy.

Expecting fathers in our sample reported that they are highly involved in pregnancy regardless of complications in pregnancy or pregnancy duration that is in line with some previous research. For example, Redshaw and Hendreson (2013) analysed data on 4616 women who had babies approximately 3 months of age about their partners' engagement in pregnancy. They found that over 80% of fathers were pleased or overjoyed in response to their partners' pregnancy, over half were present for the pregnancy test, for one or more antenatal checks, and almost all were present for ultrasound examinations and for labour. Although their results were based on women reports of men's engagement behaviour, it is obvious that most men in sample were highly involved in pregnancy. Still, there is a possibility that present study sample is biased and overrepresents well-functioning couples. The high relationship quality scores reported by prospective fathers support these findings. Further, most of expecting fathers reported that pregnancies have been wanted and planned. This all may indicate that these satisfied prospective fathers might have had enough time to get used to idea of becoming a parent.

Results of regression analysis suggest that age, couples' personality traits, relationship quality and perceived stress are significant predictors of prospective father's involvement in pregnancy. Older men in our sample were more prone to be involved in their partners' pregnancy. Although we have witnessed the increased variability in the age at which couples have their first child, the right time for getting a child can facilitate the acceptance of parental roles and identity. Earlier versus later timed parents may differ in education, financial security, career, marital stability, and as a consequence in the readiness for the parental role. Redshaw and Henderson (2013) in a national study of fathers' engagement in pregnancy and childbirth reported that partners of primiparous women aged less than 25 years were significantly less enthusiastic in reaction to pregnancy and less involved in accessing information and decision-making regarding pregnancy in comparison to partners aged more than 25 years.

Personality traits of couple had significant contribution to variance of pregnancy involvement. Among male personality traits, only neuroticism was a negative predictor of involvement. People high on neuroticism feel anxious, depressed and vulnerable in a number of stress and even non-stressful situations (Costa & McCrae 2005) which can lead them to less available sources for support in their partner's pregnancy. That notion is also supported by high positive correlation

between neuroticism and stress obtained in this study ($r=0.59$). Previous research had also associated high levels of neuroticism with psychological distress in expectant fathers in Australian study (Boyce et al. 2007). They can be less adaptable to new situations, less flexible in changing their own standards, values and therefore may negatively affect pregnancy involvement. Among female personality traits, only extroversion was a positive predictor of prospective father's involvement in pregnancy. Namely, pregnant women with higher extroversion seem to make easier to their partners to get involved in their pregnancy, they might be more open in communication and tend to "pool the partners in" regardless of partner's personal preferences (Adamson 2013).

Our findings suggest that relationship quality was a positive predictor of prospective fathers' involvement in pregnancy. Recent study of the role of paternal involvement plays in life-satisfaction during transition to parenthood (Agache et al. 2014) also indicates that both parents seem to profit from fathers' involvement. As a possible interpretation of this finding, authors suggest that fathers' involvement might be directly linked to relationship quality. High father involvement might buffer potential risks for marital conflicts, while low involvement might lead to or result from these conflicts. Approaching the childbirth may strengthen relationship between partners. Namely, according to worldwide researches, childbirth is perceived as a desirable and positive life event (Vanassche et al. 2013) and as such may have positive influence on relationship satisfaction. A qualitative study of Alio et al. 2013 defined male involvement during pregnancy as being accessible and engaged during pregnancy and showing responsibilities towards the coming child by helping the mother. Therefore, the relationship between the two parents is of utmost importance and determines the level of involvement. Results from a current study further contribute to this body of evidence by demonstrating the linking effects of good relationship quality and paternal involvement during pregnancy.

Perceived stress has small but still significant contribution to prospective father's involvement in pregnancy. Men experiencing higher level of perceived stress had less capacity to be involved in their partner's pregnancy. The nature of relation between stress and pregnancy involvement may be similar to the already discussed relation between neuroticism and involvement. Previous research (Brajenović-Milić et al. 2010) found that women who perceived their partners to be more involved in pregnancy reported lower level of stress which demonstrates positive links between fathers' involvement during pregnancy and maternal outcomes. Our findings are different since there are more aimed at describing the relation between resources for prospective fathers' involvement. One of the possible explanation of results may imply that future fathers feel unprepared for a new role of becoming fathers, which is supported by high levels of perceived

stress in the last trimester. Traditionally, men have not had a defined role in pregnancy and childbirth. Today, an increasing numbers of expectant fathers want to be involved during pregnancy, are open to information, advice, and support during pregnancy, and are more prone to change their health behaviours (Bonte-Tinkew et al. 2007).

The public mental health literacy is needed to promote and educate future fathers to establish secure parenting. Mental health specialist or perinatal mental services can play an important role in supporting an expecting father to become confident and competent in future role. Mild and moderate mental health problems, which can often be missed, are more likely be detected once a trusting relationship has been developed. However, there is a still an element of stigma and shame attached to mental health and future fathers even more than mothers may be reluctant at first to engage with mental health professionals due to fear of how other people will react and judge them (Steen & Jones 2013).

When interpreting the findings presented here, some limitations should be kept in mind. First, it is a correlation study as the present research does not allow for any conclusions on causal directions. Second, the possibilities of sample bias exist. Namely, our sample was recruited from couples that had come together to a regular check-up and may not adequately represent population of parents-to be. Arguably, one might assume that these men were more highly involved in their partner pregnancy and more committed to their relationship that those who had not accompanied their partners' to such appointments. This argument is supported by high relationship quality scores revealed in the findings.

In order to address these limitations and fill the existing gap in the literature examining involvement among expecting fathers, future studies should assess both behavioural and subjective aspects of involvement on larger samples preferably including couples with previous children considering specific mental health issues and obstetrics treatment. It would be useful for further research in this area to conduct longitudinal research, beginning in the period of prior pregnancy and following participants throughout pregnancy and during postpartum year respecting dynamic process of transition to parenthood. In addition, examining involvement during pregnancy within a context of the partner dyad would be beneficial for more complete understanding of the subjective experiences of both members of a pregnant couple.

Despite previously mentioned limitations, this study has some strength. There was a need for a conceptualization of involvement in pregnancy (believes, behaviours and support) (Condon et al. 2004, Plantin et al. 2012) and this study offered further insight in a way of assessment of paternal involvement in pregnancy. Men involvement in pregnancy was usually reported from women and even retrospectively during the first year of parenthood. In current study, prospective father

perception of self-involvement in pregnancy was reported during the third trimester in pregnancy. Considering previous research of paternal involvement in pregnancy some important socio-demographic factors are being controlled e.g. number of children/parity, medical conditions, gestational age, which enable better understanding for the role of the psychosocial factors in men's involvement in pregnancy. Previous researches in the area of fathers' involvement with pregnancy have been mostly qualitative in design and not focused on determining psychological factors affecting expecting fathers' involvement in their partner's pregnancy. Current research is, to our knowledge, among the first ones in determining the role of psychological factors in expecting fathers' involvement in pregnancy. The present study highlights the importance of men's paternal involvement in preventive mental health perspective.

CONCLUSIONS

Personality traits are significant determinants of pregnancy involvement since lower neuroticism in male and higher extroversion in females resulted with more involved prospective fathers. Further, having a good, satisfying relationship and experiencing less stress enhance expecting fathers' involvement during the third trimester in their first pregnancy. Creating preventive prenatal programs for the early recognition of the mental health problems may reduce the stressfulness of the major developmental milestone, such as the transition to parenthood that brings long-lasting changes for new parents and their intimate relations (Cowan & Cowan 2000). Pregnancy as a stressful life event may provoke variety of mental problems (e.g. depression and anxiety symptoms that should be considered as a target in the future studies), which early detection and psychotherapy interventions might have a positive influence on mental health of both future parents and the quality of the child-parents' relationship as early as from the prenatal period.

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All the authors have significantly contributed to the study design, data analysis and writing of the manuscript.

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