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Research Article

Social Support and a Consolidated Partnership as Protective Factors against Stress during Pregnancy and Further Consequences for Mother and Child

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Abstract

Several studies have convicingly demonstrated a deleterious effect of prenatal stress on the pregnancy outcome. In line with the "Fetal Programming Hypothesis" studies detected that prenatal stress isprogramming fetal brain functions associated with permanent changes in neuroendocrine regulation and behaviour in the child and adolescent (Literatur, Jahr) . Long-term consequences like ADHS or schizophrenia are associated with those changes Satz unklar! While the consequences and risks of prenatal stress are meanwhile well approved, there is only very rare literature about the character of the relevant pregnancy specific stress-factors. The objectiveaim of this study was to find preventiv or predisposing factors in stress coping. It investigated subjective, objective and hormonal aspects of stress, trying to find the criteria with the highest impact on pregnant women. In each trimester of pregnancy self-report questionnaires and anamnestic data were examined The self-report data included pregnancxy- related anxiety (PRAQ: so wird der international abgekürzt, perceived stress, life events, perceived stress (PSQ), pregnancy-specific stress (PESI), depression (EPDS), partnership (FPD) and social support (F-sozU). 111 women were included into the analysis.The findings show that a good partnerschip and social support seem to be the most important factors preventing pregnant women from emotional and psychological stress, independet from their objective situation. These results highlight the importance of a firm social enviroment and a good partnership as highly underestimated factors to minimize stress-related risks for mother and child.

Keywords

Pregnancy; Stress; Partnership; Social support; Prenatal stress

Introduction

In the last decades, an increasing literature on prenatal influences on the unborn child has emerged. As it is shown in serveral prospective studies, a mother which is stressed during her pregnancy has a higher risk for behavioural, emotional or cognitive problems in their children, including an increased risk of attentional deficit/ hyperactivity, anxiety, and language delay [1,2]. Moreover there is eleborate evidence about lower birth-weight [3,4] and smaller head circumferences [5,6]. Due to alterations in immunofunction also the risk of pregnancy complications such as preeclampsia and premature labor is increased [7-9]. The idea that pregnancy could influence the long-term health of the offspring was first formulated by Barker, who stated that "Coronary heart disease, Type 2 diabetes, stroke and hypertension originate in developmental plasticity, in response to undernutrition during fetal life". Indeed, lower birth weight, which seems to be assoziated with stress and daily hassles in maternal reports has turned out to be an individual risk for cardiovascular disease and metabolic disorder, such as diabetes [1]. The concept of pregnancy impact on the offspring is nowadays known as "fetal programming" or "prenatal programming". This conpect describes the fetus' psychological adaption to the enviroment where it is signalised to be born [1]. One of the most important and best-investigated mechanisms in fetal programming is the psychiological stress response due to the activation of the hypothalamic-pituitary-adrenal (HPA)-axis and the autonomic nervous system (ANS) [10]. However, despite all of those findings, there still is little previous research and literature about the forms of anxiety or stress which are most detrimental. Most studys only focussed on one criteria. For example, Lobel et al. [11] investigated the difference between the contribution of pregnancy-specific and general stress to the birth outcomes, and whether prenatal health behaviours explain this association. They found pregnancy-specific stress contributing directly to an earlier deliverey and a higher risk for low birth weight, due to an association between pregnancy-specific stress and smoking [11]. Two other studies revealed that women with high stress were more susceptible to use cigarettes or marihuana during the pregnancy, what evidently is associated with higher risks for the child outcome [12,13]. Chou et al. [14] stated that women who have not planned their pregnancy have a higher risk for poor maternal psychosocial adaptation as well as for severe pregnancy-related nausea and vomiting [14]. Only two studies dealt particularly with partnership and social support as a factor in stress-copying. Paul et al. [15] tracked the partner- and partnership-related risk factors for preterm birth among low-income women in Lima, Peru. They selected 580 preterm cases (20–36 weeks gestational age at delivery) and 633 term controls (≥ 37 weeks) from women delivering at an obstetric hospital in Lima, Peru. Each subject completed a structured interview and gave biological specimens within 48 h after birth. Four factors were chosen to create a "composite partnership risk score" which showed a correlation with the risk for pre-term-birth. Those factors were: ever having had a partner with a history of drug use, ever having had anal sex, having a current partner with a history of visiting prostitutes and perceiving one's current partner as a "womanizer" [15]. Another study investigated social support and stress in the transition to parenthood. It was found deficiencies in social integration and reliable alliance as important factors predicting postpartum depression. Nevertheless, we found great gaps in literature concerning the question after the most affecting components of stress during pregnancy and in the pregancy related enviroment.Partnership has often be suggested as a crucial factor, but still scientific evidence is missing. This paper is a first approach to fill this gap of research. It will concentrate on the

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different components of influence of subjective stress-perceiving showing up the most important points, focussing on partnership and social support, as the criteria with the highest revealed influence.

Methods

Participants

This study is a three-wave prospective longitudinal study conducted during the period of November 2007 to January 2009. Participants were recruited via public and private search, referrals from obstetricians, notices posted in clinics and advertisment in the internet and newspapers. Inclusion criteria were an early pregnancy (week of gestation: 13.6 ± 1.68) and no severe mental or physical problems. Exclusion criteria were (a) inability to speak and read German language, (b) twin pregnancy and (c) advanced pregnancy (>19 week of pregnancy). Every woman gave her written, informed consent in accordance with the ethic committee of the University Clinic of Heidelberg, which approved all protocols.

Procedures

Eligible subjects received an anamnestic questionnaire regarding demographic information; social, medical and psychiatric history, information concerning partnership and pregnancy, medical complications and live events, as well as a package of structured questionnaires including the a variety of questionnaires with regard to depression, perceived stress, pregnancy-related anxiety, marital satisfaction and pregnancy-specific stressThis package had to be completed at three points in each trimenon of pregnancy. In addition, the women were asked to collect basaline salivary cortisol at home in each trimenon. The determining instruments for this article, will be presented in the following:

The Perceived Stress Questionnaire (PSQ) by Levenstein, et al. [16] translated by Fliege et al. [17] is a tool for psychomatic research with the aim to measure the subjective perceived stress. This questionnaire contains four scales (worries, strains, joy and demands), differently from the original version by Levenstein et al. [16] that includes five scales. The original number of 30 items was reduced to 20 items.The first three scales try to image the individuum's internal stress reaction, whereas the scale „demands" focusses on the apperception of external stressors. Internal consistency of the subscales is ranging from 0.80 to 0.86; reliability is at least 0.80.

The Prenatal Emotional Stress Index (PESI) by Moehler et al. [18] is an instrument developed to measure emotional stress in pregnancy. In this study it was used as prospective measurement. The questionnaire consists of 33 items, 11 for each trimenon of pregnancy. Each item images anxiety, sadness, joy, perceived stress and emotional strain of the mother on a visual analog scale from 0 to100. The arithmetic mean of all 33 single scales discloses the total burden of stress during pregnancy.

The revised Pregnancy Related Anxiety Questionnaire (/PRAQ-R) aims to record pregnancy-specific anxiety [19]. It contains 10 items accordant to the three-factor-model: 1. 'fear of giving birth', 2. 'fear of having a handicapped child' and 3. 'fear of one-self's unattractive appearance'. The PRAQ was developed by van den Bergh, et al. [18], revised by Huizink, et al. [19] and translated in German language by Moehler et al. [20]. The answer format consists of a five point Likert scale reaching from „never to "mostly". Cronbach's alpha for all three subscale is >.76.

F-SozU is a questionnaire dealing with social support by Sommer et al. [21]. Four scales are measured: emotional support, practical support, social integration and social strains. Four of these scales and the total the internal consistency is identified between 0.81 and 0.93.

The German "Fragebogen für Parnterschaftsdiagnostik" (FPD) ('Questionnaire for diagnostics of partnership') assessed marital satisfaction, using three subscales: 1. behaviour during partnership conflicts, 2. tenderness and 3. Commonness / communication. Each woman indicated on a four point Likert scale how often ("never", "seldom", "often", "very often") some attitudes from the partner or themselves occur (e.g. the statement: "He blames me of failures I did in the past"). Reliabilities for all subscales are located between .88 and .95. Internal Consistency for the whole scale constitutes r = 0.83.

One part of the anamnestic questionnaire, which the women completed once in the beginning and particular parts continously once every trimenon was a part about live events. It was asked for critical events like separation in partnership, medical complications during pregnancy, financial problems, death of a relative, loss of home or job, etc. All possible life events were summarized to one 'critical life event score' ranging from zero to eleven.

Statistical analysis

SPSS version 17.0 for Windows was used for the statistical analysis. Single missings values were replaced by the mean value of the subscale. Descriptive analysis of the anamnestic data reported was carried out. Correlation between the different questionnaires and cortisol were conducted using Pearson or Spearman's rho correlation if data were non-normally distributed. A p-value of ≤ 0.05 was regarded as significant. Multiple regression analyses were used to examine the association between partnership, social support and other stress factors. For the first multiple regression, the total FPD-score, commonness/communication and tenderness were independent variables. Analyses were repeated with changing responser-variables. Every important target value (questionnaire scores, scales) was tested. The same construction was calculated with the total score and scales of F-sozU and another time with the objective stress factors and live events as independent variables. To test for imputation bias, a sensivity analysis with exclusion of all missing data was preceded.

Results

Patient flow and characteristics

A total of 121 women were contacted in Heidelberg, Germany, and the surrounding area (Figure1), of whom 111 women submitted at least one dataset package and were included in the study. Main reasons for drop-out were spontaneus abortions and unclear reasons (probably in most cases forgetting to send back the data set in time). The questionnaire dataset collection was coducted by post. The main age of the pregnant women was 31 years (comprising a total range from 17 to 43 years). The main age of the partner was identified to be 34 years. The majority of women are German (94,6%), christian (93,7 %), have an education level of the German „Abitur" or higher (82,0) and planned or at least wished their pregnancy (71,2% planned, 97,3% wished). 97,3% are having a longterm relationship, 86,5% are living with their partners. Table 1 presents a selection of sociodemographic and anamnestic characteristics of the participants in an overview.
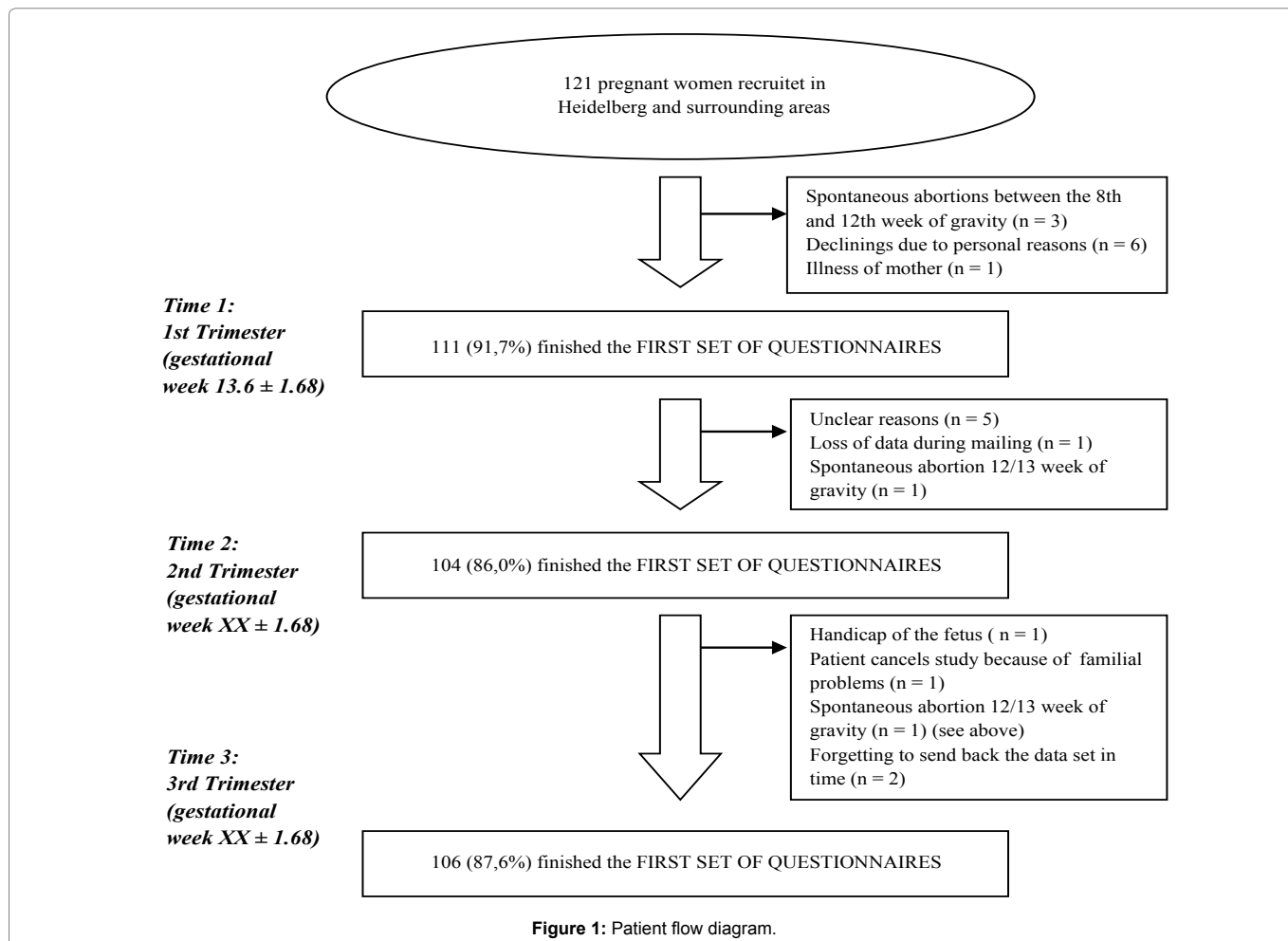
Figure 1: Patient flow diagram.

Data analysis

Correlation between different indicators of prenatal stress: A significant negative correlation could be found between the different aspects of a good partnership and depressive symtpoms, indicated by the EPDS. This correlaton even gets stronger with the pregnancy progressing (EPDS correlation with tenderness: r=-0.432; p=0.000; communication: r=-0.401; r=0.000; FPD total score: r=-0.408; p=0.000 (time 3)). Also pregnancy-specific anxiety shows a tendency to be lower in a good partnership, which gets specifically obvious for the subscale ‚fear of having a handicapped child' in the second and third trimester (correlation with tenderness: r=-0.316; p=0.001(time 2)) and worries about the one's own appearance in first and second trimester (correlation with tenderness: r=-0.332; p=0.001; communication: r=-0.348; p=0.000, FPD total score: r=0.0330; p=0,001). The perception of social support and social satisfaction is highly related topartnership (e.g. correlation between F-sozU total score and tenderness: r=0.526; p=0,000, communication: r=0.565; p=0.000, FPD total score: r=0.397; p=0.000 (time 1)). The correlation between total PSQ score and FPD indicates that the partnership has high importance for the women's perceived stress over the whole course of pregnany (r=0.391; p=0.000 (time 3)). The same tendency could be found in the correlations between the different invastigated aspects of partnership and the subscales of the PSQ worries, tension, joy and demands. Furthermore, nocommonness and communication as well as high frequeny of arguments with the partner are associated financial issues (correlation between financial issues and arguments: r=0.133; p=0.019; commonness/communication: r=-0.169; p=0.003).

The total number of objective stress factors and live events (e.g. medical complications, seperation in partnership, financial issues, other not-specified factors) has a clear impact on the subscale of the PSQ. Women with high amounts of objeicitve stress factors perceive more worries (r=0.310; p=0.000), more tension (r=0.284; p=0.000), less joy (r=-0.247; p=0.000) and more demands (r=0.213; p=0.000).In Tabelle integrieren. Splitting it up, particularly financial issues and a seperation in partnership seem to have the highest influence on these perceptions (e.g. correlation between financial issues and worries: r=0.403; p=0.000; correlation between seperation in partnership and total PSQ score: r=0.181; p=0.001). Other objective stress factors or live events like "loss of home", "loss of job" or "loss of relative" do not even indicate significant values.

Regression analysis: The role of partnership seems to gain importance when pregnancy advances. In the multiple regression analysis FPD and it subscales, particularly the measure of commonness and communication, increasingly correlate with the measure of stress, worries, tension, joy and depressive symptoms (e.g. PSQ: [t1]: r=0.298; p=0.004; [t2]: r=0.431; p=0.000; [t3]: r=0.442; p=0.000). Social and particularly emotional support does as well influece the stress perception during pregnancy. We found a preventive effect against depressions [t1]: r=0.491; p=0.000; [t2]: r=0.627; p=0.000; [t3]:

Table 1: Sociodemographic and anamnestic characteristics of the patient collective and partners.

		Pregnant women n (%)	Partner n (%)
Nationality	German	105 (94.6)	102 (91.9)
	European (other)	3 (2.7)	3 (2.7)
	Others	3 (2.7)	6 (5.4)
Confession	Christian	75 (93.7)	68 (87.2)
	Muslim	2 (2.5)	4 (5.1)
	Other	3 (3.8)	6 (7.7)
Marital staus	Married	66 (59.5)	66 (63.4)
	Single	39 (35.1)	32 (30.8)
	Divorced/Seperated	6 (5.4)	6 (5.8)
Education	"Abitur" or higher educational level	91 (82.0)	84 (83.1)
	Lower education level	20 (18.0)	17 (16.9)
Occupation	Fulltime	57 (51.8)	87 (87.0)
	Partime	26 (23.6)	3 (3.0)
	Student	7 (6.4)	6 (6.0)
	Housewife/marginally occupied	20 (18.2)	4 (4.0)
Living situation	With parnter	96 (86.5)	n/a
	Without partner	12 (10.8)	n/a
	With parents	3 (2.7)	n/a
Living with children	Own child/children	38 (34.2)	n/a
	Other child/children	3 (2.7)	n/a
	No child	70 (63.1)	n/a
Depressive Symptoms	Yes	14 (12.6)	n/a
	No	97 (87.4)	n/a
Planned pregnancy	Yes	79 (71.2)	79 (73.1)
	No	32 (28.8)	29 (26.9)
Wished pregnancy	Yes	107 (97.3)	3 (2.7)
	No	102 (96.2)	4 (3.8)

R=0.492; p=0.000) as well as an impact on subjective stress perception (e.g. PSQ [t1]: r=0.549; p=0.000), worries (e.g. [t1]: r=0.616; p=0.000), strain (e.g. [t1]: r=0.409; p=0.002) and joy (e.g. [t1]: r=-0.540; p=0.000). The highest impact is found in the first trimester slightly abates with time. Like a good partnership, social support can reduce worries about one's own appearancewithin the first two trimesters ([t1]: r=0.697; p=0.000; [t2]: r=0.421; p=0.002). In the last trimester social support and a good partnership gain importance in order to deal with the increasing demands and the objective stress factors ([t3]: r=0.473; p=0.000).

Women without partnership or bad FPD and tenderness scores are more susceptible to smoke cigarettes and drink alcohol during pregnancy (e.g. correlation between FPD score and cigarettes: r=-0.285; p=0.004 (time 2), corelation between tenderness and alcohol: r=-0.225; p=0.023 (time 1)). Objective stress factors and live events, particularly a seperation in partnership, are additional factors, which are highly associated with smoking ([t1]: r=0.390; p=0.004; [t2]: R=0.333; p=0.040; [t3]: r=0.653; p=0.000). Smoking, in turn, indicates fear of a disabled child (r=0.175; p=0.002) and worries about one's own appearance (r=0.237; p=0.000). We also found a relation between smoking and depression (r=0.204; p=0.000) and a lack of social support (correlation with F-sozU: r=-0.246; p=0.000). However, these data has to be interpreted with reservation, referring to the small number of women without partnership as well as the small number of women smoking or drinking alcohol in our studygroup.

Discussion and Conclusion

The results of this study present significant evidence for the hyphothesis that there are preventive and predisposing factors for stress-managment in pregnant women. This is the first known population-based study to specifically evaluate this question. Several epidemiological studies have shown that stress during pregnancy bears high long- and short-term risk factors for the developing child [1-4,11,20]. Our findings affirm the conclusion by Cutrona, who stated that "specific components of social support are most strongly predictive of postpartum depression" (1984). It also matches with previous presumptions that partnership (due to it's important role in stress perception) is very probable to play a crucial role for the early programming and child development [1]. One aspect of this can even be proofed: obviously a bad partnership and lacks of social support are predisposing factors for smoking and eventually drinking during the pregnancy, which is known as a risk factor for the child's health. This also stands in accordance to previous findings by Nelson, et al. [12] and Crittenden et al. [13] who also found the use of cigarettes and marihuana related with a the mother's stress-perception.

In the perception of stress during pregnancy, it can be distinguished between 1. objective stress factors like live events (seperation in partnership, medical complications, financial issues, etc.), 2. subjective perception (presented here by PSQ, PESI), 3. pregnancy-specific anxiety (R-PRAQ) and 4. internal and external factors which influence the final perception (character, partnership, social support, natural ressources). All those factors are complexly related. Objective, internal and external factors are together constructing the psychological state, which decides about the final subjective perception. Neither objective nor internal background are influencable from the medical point of view, excluding the

possibility of psychological therapy (In conclusion, partnership and social support play a keyrole for the subjective stress perception. Tenderness, commonness, communication and emotional support are found as the criteria with main impact in partership and social support. Reminding of all the approved consequences for mother and child related with stress during pregnancy, this is a crucial finding concerning stress-managment and stress awareness during pregnancy. As a conclusion, the impact of the partner's behaviour should be valued much higher and it would be important to make people aware that it is not only possible, but important, to protect their baby's health through such simple measures as tenderness and communication.

Acknowledgements

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