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Research Article,

The Impact of Unspecified Anxiety during Pregnancy on the Fetus Development and Childbirth Complications

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Abstract:

Introduction: The high levels of chronic psychosocial stress and traumatic experiences faced by the general population of Kosovo in recent decades resulted in a high prevalence of unspecified anxiety (45.17%) among women at the reproductive age. On this psychological ground there are objective hypotheses that fetal growth and childbirth process may be affected.
Objective: The purpose of the study is to research the correlation of unspecified anxiety during pregnancy with the intrauterine development of the fetus and complications during childbirth.
Method: The research is prospective randomized and after fulfilling the selective criteria included three hundred (300) pregnant women in the second trimester and at the beginning of the third trimester of pregnancy in the general population of women on Kosovo. Scale of unspecified anxiety was determined with the Hopkins Symptom Check List (HSCL-25). Statistical package for results analysis included software SPSS 12, ANOVA analyses, frequencies, Chi square test, and linear regression analysis.
Results: Findings proved that there is no significant correlation between the emotional state of pregnant women and the slowing down of the intrauterine fetal development. However, the study proved the significant correlation between the degree of unspecified anxiety during early and mid-term pregnancy with the degree of cervix effacement at the beginning of the birth act, and with tachycardia in the newborn baby.
Discussion: Based on the study results and the data from the literature, these clinical correlations occur based on the interference of unspecified anxiety during pregnancy with neuroendocrine trajectories of pregnancy, fetus and placental functions.
Conclusion: Unspecified anxiety during early and mid-term pregnancy may initiate cervix effacement and may cause fetal tachycardia at birth. The obtained results suggest the need for greater care for the emotional state of the woman during pregnancy.

Keywords: unspecified anxiety, women, pregnancy, fetus development, childbirth complications.

Introduction:

Pregnancy and childbirth, in particular, can challenge a woman's health. In recent years, the sciences of psychology, psychiatry and reproductive medicine have begun to investigate more intensively the mechanisms through which the body and mind interact, thus conditioning the psychosocial and reproductive functioning of women. Psychosocial factors such as socioeconomic status, employment, marital status, educational level, access to prenatal care, substance abuse, nationality, cultural background, and the quality of relationships with partners and parents have been identified as determinants of stress and psychological problems during pregnancy (1). At the same time, the physiological processes associated with pregnancy always occur in the context of the individual psychological and interpersonal life of the pregnant woman and interact with her psychosocial environment (2, 3). Unfortunately, official medicine still separates the treatment of reproductive processes from those of psychological functioning. Imposing this dichotomy between mind and body leads to the underestimation of the correlation between psychological and reproductive functioning in women.

Anxiety is an unpleasant emotional condition that appears in a state of stress as a result of a disturbance in the balance between the psychic capacities of the personality and the pressures coming from the inner psychological world and/or from the external environment. Anxiety, signals the presence of this disorder through pathophysiological changes, which are the result of the simultaneous strain of the autonomic nervous system and the psychic one: rapid heartbeat, sweating, tremors, difficulty in breathing, difficulty in the chest, tightness in the abdomen, dizziness, restlessness, fear of losing control (madness) or fear of death. Thus, anxiety simultaneously affects entire systems of visceral organs as well as thinking, perception, and the ability to focus attention. For the purposes of this study, the division of anxiety into specified anxiety and unspecified anxiety was used. Specified anxiety is an essential symptom of various psychiatric diseases and disorders, be they neurotic, psychotic, and others, while unspecified anxiety is related to subjective bodily complaints that are not directly related to the cause of bodily pain (4). Anxiety attacks during pregnancy that are not well managed and controlled can have undesirable consequences for the mother and the baby. Recent data from a large number of studies suggest that anxiety during pregnancy directly affects the timing of delivery, and further determines the risk of spontaneous preterm birth to a comparable or even greater extent than other well-known factors such as smoking and medical risks. The consistency of these data paves the way for research into the causes and associated factors of anxiety during pregnancy, mechanisms of impact, and possible treatment. It is essential to diagnose as soon as possible the main causes that influence the appearance of anxiety symptoms during pregnancy in order to identify effective strategies for coping with it before birth for the benefit of the mother and the baby (5).

Considering the fact that some studies have shown a high prevalence rate of anxiety (45.17%) in the general population of women on Kosovo (6, 7) research on the impact of this emotional disorder during pregnancy on intrauterine development of the fetus and complications during and after delivery in the general population of women on Kosovo has special scientific and professional rationale. Although substantial and rigorous studies today demonstrate the detrimental impact of negative affective states and stress during pregnancy on birth outcomes, fetal and infant development, as well as family health, there is still no complete clarity regarding the specific implications of these trials.

AIM

The aim of this study is to investigate the impact of unspecified anxiety during the second trimester and the beginning of the third trimester of pregnancy, on the intrauterine development of the fetus and the delivery complications (childbirth), including the relevant clinical parameters of the woman and the newborn baby.

Hypothesis

The hypotheses of this study are as follows:

1. Unspecified anxiety during the early and middle period of pregnancy is associated with delayed gestation and premature birth.
2. Unspecified anxiety during early and middle pregnancy is associated with complications during childbirth.
3. Unspecified anxiety during the early and middle period of pregnancy is associated with pathological clinical parameters of the newborn baby and with prolonged stay in the neonatal intensive care unit.
4. Unspecified anxiety during the early and middle period of pregnancy is associated with a prolonged stay of the mother in the clinic before and after delivery, as well as with a delayed start of breastfeeding.

Method and Material:

The study is prospective, randomized. The study has included 366 pregnant women who visited the Gynecology – Obstetric Department of the University Clinical Center of Kosovo (UCCK) for routine morphological examination in the second or the beginning of the third trimester of pregnancy. The period of inclusion was February 1, 2009 to December 31, 2013. The selection of pregnant woman's was done randomly as they presented in the departments specialist ambulance for examination, on different working days during the week. All pregnant women present on the relevant day were offered the opportunity to participate in the study.

The criteria for excluding pregnant women from the study were:

1) Inability to read and understand the questionnaire for any reason, and,

2) Failure to give written consent after prior information.

The research involved 366 pregnant women examined and treated at the Gynecological and Obstetrical Department of the UCCK including those that have finalized their pregnancy and childbirth in other public and private healthcare institutions in the country. All participants in the study had fully met the above-mentioned criteria and had complete official medical documentation on their pregnancy and the childbirth act. The study lasted until the moment when 300 selected women out of 366 who had completed the relevant Questionnaire in the second or third trimester of their pregnancy gave birth in the UCCK or in other healthcare institutions in the country. The clinical history of pregnancy, delivery and post-natal care was analyzed for each of these women. For the women who gave birth outside the UCCK (43 cases), telephone communication was previously established in order to obtain the appropriate data regarding the institution where access to the woman's clinical history was to be provided.

Psychometric instrument

Among the many instruments for identifying the presence and measuring the degree of anxiety, the Hopkins Symptom Measurement Questionnaire (HSCL–25) was used. This questionnaire was selected as a reliable psychometric instrument on international scale for measuring the level of anxiety (8). HSCL–25 was also used in three large studies of the mental health status of Kosovo population in the post-war period (6, 7) showing high degrees of validity and reliability.

The questionnaire has 25 questions, of which ten questions measure the degree of anxiety and fifteen questions measure the degree of depression. Each answer is evaluated with the number found next to the question: "0" not at all; "1" = little; "2" = enough; "3" = a lot.

The score for the unspecified anxiety scale was obtained by adding the values of the answers 1-25 and dividing the obtained amount by 25. For the purposes of this study the obtained results were divided into three groups determined by the lowest level of points necessary to rank the pregnant woman in the specific group according to the intensity of the present anxiety (cut-off score):

1) 0 – 0.4 low degree of anxiety;
2) 0.5 – 1.75 average degree of anxiety;
3) > 1.75 high degree of anxiety.

Data collection and processing

Before the beginning of the ultrasound examination, the Hopkins questionnaire was offered to the pregnant women for completion after appropriate explanations regarding the study and the content of the questionnaire were given. The pregnant women who agreed to be interviewed signed the Informed Consent, and then they were asked to record their first and last name, date of birth, phone number, as well as to give their consent for the eventual phone call in the later period. The questionnaire was completed in the presence of the author of the study. Part of the interview was taking notes on: marital status, socio-economic status, smoking, alcohol consumption, the presence of psychiatric disorders and diseases (personal, family), and other non-communicable diseases. In this case, the notes on the previous abortions as well as the eventual treatment of sterility, which led to the current pregnancy, were also taken. In case any woman requested specific help or had suicidal thoughts, she was immediately referred for specialized psychiatric help.

The questionnaires were collected and saved by the author of the study. In the next phase of the study, the clinical histories of each of the women who completed the Questionnaire were examined. From the clinical histories are extracted data's related to relevant clinical parameters before, during and after the childbirth act: uterine contractions, dilatation of the cervix, premature birth, arterial hypertension including preeclampsia, oligohydramnion, vaginal hemorrhages of the third trimester (including placenta previa and placental dystocia), post-term pregnancy, episiotomy, use of vacuum or forceps, cesarean delivery (emergency or planned), postpartum hemorrhage. Also, the specific clinical parameters of the baby such as: fetal hypoxia, length, weight, heart rate, and hospitalization in the neonatal intensive care unit have been identified.

When completing the questionnaire, I keep in mind the possibility of random error during the self-reporting of pregnant women due to their educational level or specific emotional state, which may affect the analysis of the results. However, the possibility of error is minimized by

conducting the interviews by the author of the study with necessary explanations.

Statistical analyses

Data processing and statistical analysis was carried out using the computer program Microsoft Office Excel 2003 as well as the software of the statistical package SPSS 12. The values "p" were calculated using the ANOVA analysis, while the value $p < 0.05$ was considered statistically significant.

Frequencies and Chi square test were used for descriptive analysis; when there was a need to compare the percentages of the categories of one variable with the other variable, cross tables were used; however, in cases where the dependent variable was continuous and the average and standard deviation had to be determined, comparative averages were used.

For the final statistics of the evaluation of the significance ("p" values), and to prove the influence of one (dependent) variable on the other (independent) variable, the logistic correlation analysis was used; however, in cases where it was necessary to control the influence of any variable in addition to determining significance, linear regression analysis was used.

Results:

The results of this study are divided into three groups: 1) the results of socio-demographic parameters of pregnant women; 2) the results of the clinical parameters of the pregnant woman and the baby; and 3) the results of the correlation analysis of anxiety with the results of the clinical parameters of the mother and the baby.

Summary results of socio-demographic parameters

- Three hundred pregnant women are included in this study, of which 21.6% were aged up to 24 years; 61.6% between 25 - 34 years old; and 16.6% aged 35-46.
- 36.6% were from villages, while 63.3% from cities, which is not a representative sample because according to the official population census of Kosovo, 61% of the population lives in rural areas, while 31% lives in urban areas. This difference can be explained by the fact that the majority of pregnant women from all over the country visit the University Gynaecological and Obstetrical Department in the capital city of Pristina, which does not have a general hospital.
- According to the educational structure, only 3.3% had no education at all, 33.3% had primary education, 36.6% had secondary education, and 27.6% had university education.
- Regarding marital status, only 1% of pregnant women were unmarried.
- According to the self-assessment of pregnant women, 3% were in a poor economic condition, 50% had average economic conditions, while 47% lived in good economic conditions, which can be explained by the reasoning given for attending the clinic by pregnant women living all over the country.
- For 50.6% of pregnant women, it was their first pregnancy.
- As for the gestational age of the fetus at the time of the interview, 87.9% were pregnant within the second trimester (14-24 weeks), while 12.1% (36 women) were pregnant at 25-28 weeks of pregnancy.
- 16.3% of pregnant women in the sample consumed tobacco, while only 0.6% consumed alcohol.
- 9.6% of pregnant women presented that they had chronic non-communicable diseases in the past.
- Regarding psychiatric disorders and illnesses, personal or in the family, only 2% of pregnant women declared that they had a psychiatric illness in the past and only 7.6% that they had a psychiatric illness in the extended family, which is important when discussing results because it is a sample with a very low degree of prior contamination with psychiatric pathology.
- **Summary results of clinical parameters of pregnant women**

Table 1 – Descriptive data for the unspecified anxiety scale

Degree of anxiety	Frequency	Percentage
Low (0 - 0.4)	32	10.6%
Average (0.5 – 1.75)	186	62%
High (>1.75)	82	27.3%

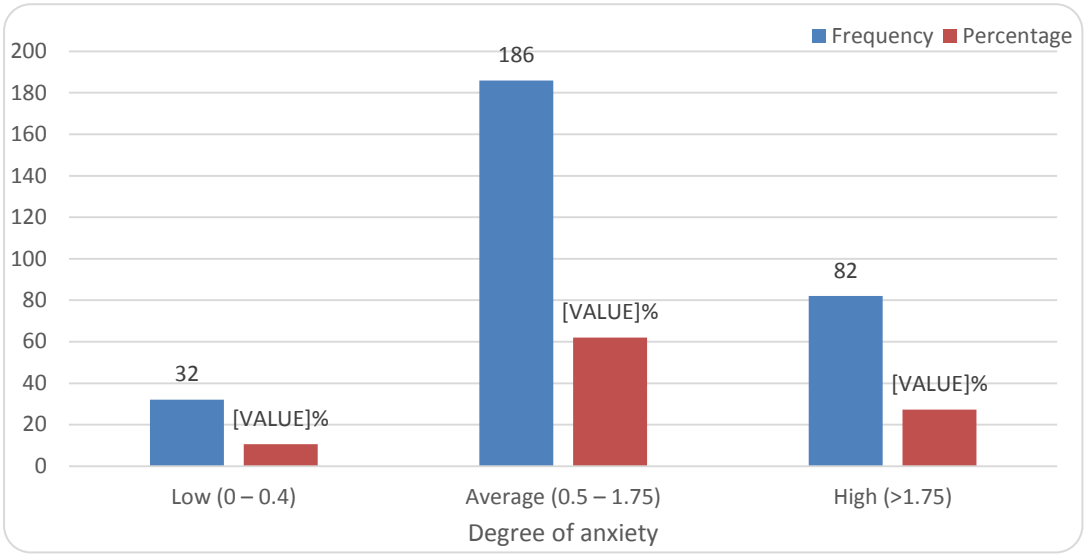

Figure 1. Pregnant women according to degree of the unspecified anxiety

10.6% of pregnant women had a low degree of unspecified anxiety in the second trimester and at the beginning of the third trimester of pregnancy; 62% with an average degree, and 27.3% with a high degree of this type of anxiety.

- According to the Guidelines of the Task Force of the European Association of Cardiologists and the European Association of Hypertension (9), pregnant women were divided into three groups in terms of blood pressure values at the beginning of the act of labor (at the time of admission to the clinic): 55.6% had optimal blood pressure (up to 120/80 mmHg); 39.3% with normal high blood pressure (up to 139/89 mmHg): and 5% were in the third group with high blood pressure (equal to or above 140/90 mmHg).
- In 41.6% of pregnant women, the cervix had begun to disappear (efface) and was present at the beginning of the childbirth act 60-0% (at the time of admission to the department), while in 58.4% it was present 100-60%.
- According to the degree of cervical dilation at the beginning of the childbirth act (upon admission to the department), the pregnant women were divided into three groups: 76.6%, with dilation of 1-4 cm; 16.3%, with 4-7 cm dilation 16.3%; and 6.6% with 7-10 cm dilation.
- At the beginning of the childbirth act (upon admission to the department), 26.3% of pregnant women had strong uterine contractions, 65.3% normotonic contractions and 6.6% weak (hypotonic) contractions.
- Regarding the time of stay in the clinic from admission to the end of delivery, 53% of pregnant women stayed less than 24 hours; 18.3% of 24 – 72 hours; whereas 28.6% of them stayed more than 72 hours. As for the mode of delivery, 35% of pregnant women were delivered by caesarean section, while 65% were delivered vaginally.

- In the group of women born vaginally, forceps was used in only 1% of cases.
- Delayed birth (post-term pregnancy) was found in 4.3% of cases.
- In 8.6% of pregnant women, oligohydramnios was detected before the membranes ruptured.
- Third trimester hemorrhages, including placenta previa and placental dystocia, were present in 4.7% of pregnant women.
- Slowed intrauterine development of the fetus was found in 7.1% of cases.
- Perineal lacerations including rupture of the anal sphincter (in one case) were found in 12.6% of pregnant women.
- Episiotomy was performed in 31% of cases.
- Premature birth according to WHO criteria (49) – from 28th week to the 37th week, was evidenced in 14.6% of pregnant women included in the study.
- According to the hospital days of the pregnant woman in the department, 62.3% stayed for 0-2 days; 26% stayed for 3-6 days; while 6.6% stayed for 7-10 days.
- 82.6% of pregnant women started breastfeeding 0-2 days after birth; 8.6% between days 3 – 6; meanwhile, between days 7 and 10, 3.6% of pregnant women started breastfeeding.

Summary results of infant clinical parameters

- Newborns were grouped according to weight based on WHO criteria (10): 19.3% were of low weight (under 2499 grams); of 2500 - 4000 grams were 75%; while 5.6% of babies weighed more than 4000 grams.
- According to the tachycardia at birth, the newborn babies were divided into three groups where: 31% had a heart rate below 140/min, 64.6% between 140 - 160/min, while 2.6% were above 160/min.
- According to the values of the Apgar test (11) that measures the physical condition of the newborn baby by evaluating with 2, 1, or 0: heart rate, respiratory activity, muscle tonus, response to stimulation, and skin color, babies are divided into three groups: 8% of newborn babies had very low Apgar score 0 – 2; with Apgar score up to average 3 – 6 were 12%; while with good Apgar score 7-10 were 80% of newborns.
- 85.3% of newborns stayed 0-2 days in the neonatal intensive care unit; 4.3% stayed for 3-6 days; while 5.3% stayed for 7-10 days.

Summary Results of Chi-Square Correlation Analysis between Non-Specific Anxiety Scale and Outcomes of Clinical Parameters of Pregnant Women and Infants

The Chi-Square analysis of frequencies did not result in a significant difference between most groups of results, but the investigation of interactions between some factors was accompanied by indicative results. Meaningful difference with significant power was found between the two groups of results:

The degree of unspecified anxiety and percentage of the cervix effacement at the beginning of the childbirth act (p = .029);

Table 2 – Unspecified anxiety during pregnancy and the percentage of the presence of cervix (effacement) at the beginning of the birth act

Anxiety degree	The percentage of column presence			Number		
	60 %– 0%	**100% - 60%**	**Missing data**			
0 – 0.4	20	12	0	32		
0.5 – 1.75	80	105	1	186		
>1.75	25	57	0	82		
Total	125	174	1	300		

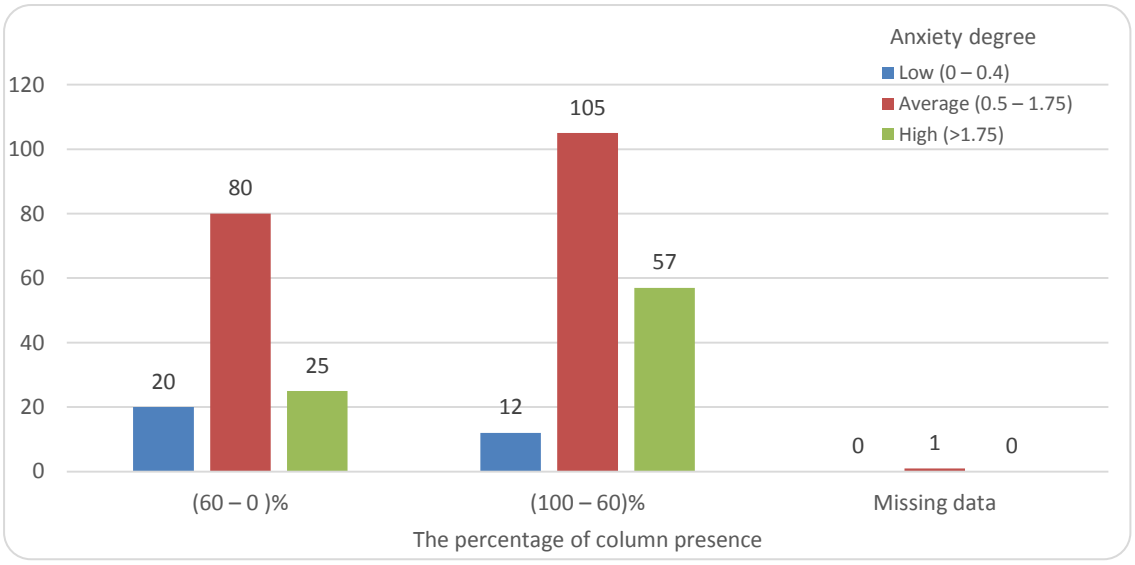

Figure 2 – Unspecified anxiety during pregnancy and the percentage of the presence of cervix (effacement) at the beginning of the birth act

The Chi-Square analysis of the significance of the frequencies **results in a significant difference between the groups χ2 (4, N = 300) = 10.755, p= .029.** Degree of unspecified anxiety and tachycardia in the newborn baby (p= .000).
The degree of unspecified anxiety during pregnancy and tachycardia in the newborn (p = .000);

Table 3 – Unspecified anxiety during pregnancy and tachycardia in the newborn

Anxiety degree	Heart rate				Number
	< 140/min	**140 – 160/min**	**> 160/min**	**Missing data**	
0 – 0.4	21	10	0	1	32
0.5 – 1.75	53	127	2	4	186
>1.75	19	57	6	0	82
Total	93	194	8	5	300

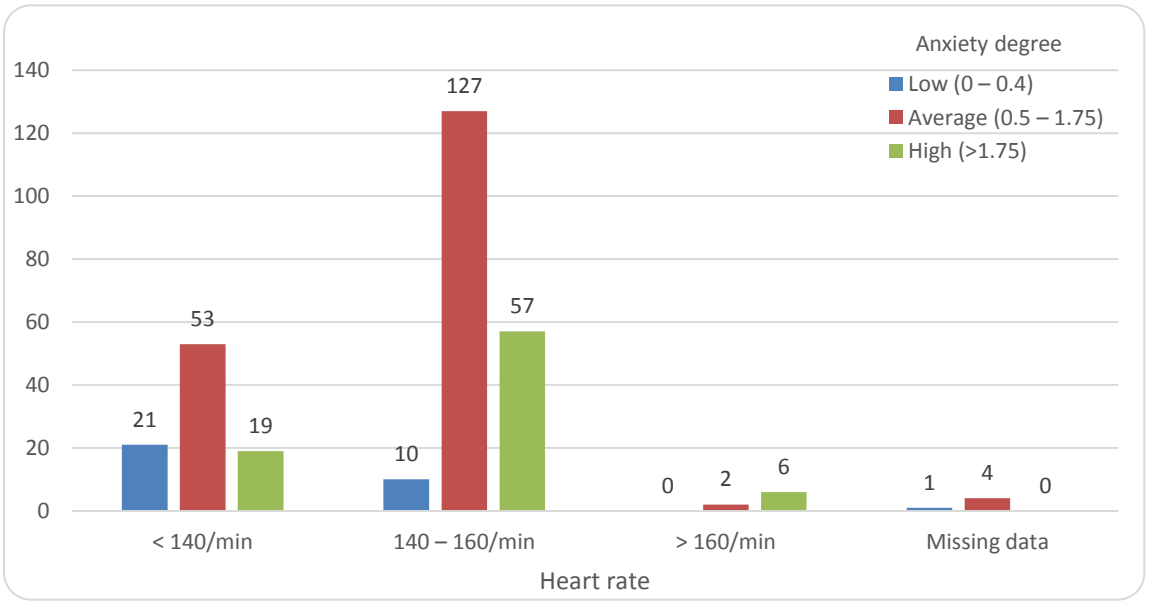

Figure 3. Unspecified anxiety during pregnancy and tachycardia in the newborn

The Chi-Square analysis of the significance of the frequencies **results in a significant difference between the groups χ2 (6, N = 300) = 31.879, p=.000.**

Based on data from the literature, these correlations occur based on the interference of unspecified anxiety during pregnancy with neuroendocrine trajectories of pregnancy, fetus and placental functions.

Results from Linear Regression Analysis

Linear regression analysis was used to see the correlation of the degree of unspecified anxiety during pregnancy and the following variables:

1. The percentage of the presence of cervix at the time of delivery (effacement of cervix) – a significant correlation was observed between these two variables with values: F (1,298) =1.473, p<0.000, and R2= .070. The presence of the cervix expressed as a percentage at the beginning of the delivery is 2.178 lower in pregnant women who have a higher degree of unspecified anxiety during pregnancy.
2. Tachycardia in the newborn baby – a significant correlation was observed between these two variables with values: F (1,298) = 61.347, p=0.000, and R2 = .070. Tachycardia in the newborn baby is for 2.178 more common in infants of mothers with high levels of unspecified anxiety during pregnancy.

Discussion:

This prospective randomized study included the socio-demographic and clinical factors of the pregnant women and newborn's included in the study, putting them in separate statistical correlations with the clinical factor of unspecified anxiety during early and mid-pregnancy (second trimester and beginning of the third quarter). The findings supported the study's hypotheses about the potential impact of unspecified anxiety during early and mid-pregnancy on specific obstetric complications during delivery and on infant clinical parameters. The results of the study did not support the hypothesis that unspecified anxiety during early and mid-pregnancy is associated with delayed fetal gestation and preterm delivery.

Unspecified anxiety and maturation of the cervix

Given the data from the literature and the specific nature of the study that aimed to illuminate the correlation between the emotional aspects of pregnancy and the outcomes of pregnancy and delivery, as distinctive factors of the study, from the Bishop Scale (12) for measuring the maturity of the cervix, I have identify the factor of dilatation of the cervix and the factor of the length of the cervix, respectively its effacement ("shortening"), represented by the percentage of the presence of the cervix at the beginning of the childbirth act, in the moment of admission in the department. Based on data from the literature, these two factors from the Bishop Scale are the most relevant parameters that, after a detailed analyses, can shed light on the objectives of the study. For the purposes of this study, the lowest level of points necessary to rank the pregnant woman in the specified group (cut-off score) suitable for statistical correlation analysis was established:

1. According to the length of the cervix - the existence of the cervix expressed as a percentage during the examination at the beginning of the childbirth act (in the moment of admission at the department):
   - 100% - 60%;
   - 60% - 0%.
2. According to the dilatation of the cervix in "cm" at the beginning of the childbirth act (in the moment of admission at the department):
   - 1-3 cm;
   - 4-6 cm;
   - 7-10 cm.

The finding of our study that unspecified anxiety is significantly correlated with the initiation of the first phase of the birth act through effacement of the cervix, prove the hypothesis of the study that psychological factors, in this case unspecified anxiety during early and mid-term pregnancy may affect the course of pregnancy and obstetric outcomes through activation of the hypothalamic-pituitary axis (HPA) from the center of emotional functions in the human brain (nucleus amygdala in the limbic system). Activation of the HPA axis in the first step occurs through the increased production of cortical releasing hormone (CRH) in the hypothalamus of the pregnant woman and in the placenta, initiating a chain of complex biochemical reactions and mechanisms in the cervix and uterine myometrium, resulting in softening of the cervix. The study proved that the highest levels of unspecified anxiety during

pregnancy are in significant correlation (p=.029) with the maturation of the cervix (effacement) in the initial stage of the childbirth act. This result is in agreement with the finding of Hobel et al. (13) for a positive association between maternal prenatal anxiety and CRH levels in the second trimester of pregnancy, suggesting that higher levels of prenatal anxiety are positively correlated with elevated levels of CRH. The study by Korebrits et al. (14) proved that CRH is directly involved in the initiation process of the first stage of labor, since elevated levels of CRH concentration were found in the plasma of pregnant women in whom labor had begun, which is very important because it is well known that CRH stimulates the production of prostaglandins which then carry out the initial phase of uterine activation by initiating the effacement of cervix. Hobel's study (13) also showed that experienced stress and state of anxiety at 18 to 20 weeks of gestation were significant predictors of CRH level at 28 to 30 weeks of gestation, which as a whole may apply to our study because the average gestational age of the fetuses included in the study was 19 weeks. Similarly, the study by Henrichs et al. (15) suggests that, beginning in mid-pregnancy, fetal growth may be affected by various aspects of antenatal anxiety. These results support previous studies showing that the neuroendocrine system is a key component in determining the timing of birth. The study by Dayan et al. (16) showed that when anxiety during pregnancy is combined with specific biomedical factors, they can cause the spontaneous and premature onset of labor. The authors have assumed the synergistic action of psychological and biomedical factors on placental CRH secretion. It is interesting to note that, while the significant correlation between the degree of unspecified anxiety and the maturation of the cervix (decrease in the percentage of presence – its effacement) has been proven, the effacement of the cervix has not resulted in a significant correlation with the dilatation of the cervix and in premature birth, which could be expected considering the data from the literature, which suggests the possibility of the existence of other pathophysiological mechanisms related to premature birth.

The biological model on which this study was developed is partly based on the well-known fact that depression, stress, and anxiety are associated with increased production of CRF in the hypothalamus and increased concentrations of cortisol in the plasma (17), as well as partly in the fact that the increased production of CRF in the placenta can initiate uterine contractions and the effacement of cervix (18). The study hypothesized, as Hobel et al. (13) suggested for stress, that anxiety and depression also affect placental CRF secretion. This would occur as regulation of the CRF gene in the placenta, either directly or indirectly through the secretion of cortisol (19), which paradoxically would act as a stimulant. It has been observed that the level of placental CRF during pregnancy increases after the injection of synthetic glucocorticoids (20), while the increase of the level of placental CRF has been proven in vitro after the action of cortisol (21). The interactions we validated can be integrated into this primary model.

The study proved that pregnant women who are anxious during the second trimester and the beginning of the third trimester of pregnancy have an increased risk of spontaneous premature onset of labor in the form of effacement of the cervix, although other factors that contribute to this process need to be identified, in order to understand why the threat for premature childbirth in a form of cervix effacement don’t became realized.

The results do not support the study's hypothesis that unspecified anxiety during pregnancy is associated with delayed gestation and preterm delivery. Also, there was no statistical significance in the correlation between unspecified anxiety (p= .977) and the weight of the baby at birth; although many studies have proven this connection. Also, contrary to expectation, the level of education, which indirectly reflects the social background and which is known to have an impact on the presentation of preterm birth (22), was not found to have a significant association with the spontaneous onset of preterm labor in this study. However, this can be explained by the fact that the population of Kosovo does not have significant social heterogeneity, as well as by the fact that the pregnant women included in the study have early antenatal care, which can significantly improve pregnancy outcomes in women with social deprivation (23).

Unspecified anxiety and tachycardia in the newborn

The study found a significant association between the degree of unspecified anxiety (p= .000) and tachycardia in newborn babies. The findings are in agreement with the longitudinal study of fetal ontogeny, by DiPietro et al. (24) who evaluated fetal variables in relation to pregnant women's reports of daily stress during weeks 20 to 36-38 of gestation. Fetuses of mothers who reported higher stress showed significantly lower heart rate variability than those of the low stress group, suggesting that exposure to maternal emotional distress may contribute to impaired parasympathetic control of the fetal heart (25). A series of studies proved that fetuses of pregnant women who have experienced psychological distress (anxiety, depression) also show significantly different reactivity to maternal stress. However, in the other study, DiPietro et al. found increased heart rate variability (which was usually associated with slowed heart rates) and reduced movements during the arousal period compared to baseline. It is possible that these conflicting results between studies emphasize the role of chronic maternal mood on fetal responses to changes in the intrauterine environment.

Strengths and Limitations of the Study

The important advantage of this study is its prospective design, which enabled the detection of unspecified anxiety early in pregnancy (on average, in the 19th week of pregnancy), a few months before the act of childbirth begins. Thus, the reporting of unspecified anxiety was not influenced by the presence of complications during the childbirth act.

The limitations of the study include:

- Lack of repeated measurements of unspecified anxiety during pregnancy, since this measurement in the study was done only once in the second trimester (88%) and at the beginning of the third trimester (12%); any subsequent change of these emotional states could change the significance of the correlations found. This may happen because the anxiety detected at the beginning or in the middle of pregnancy may go away until the end of pregnancy or unspecified anxiety may be not present at the time of interview but may appear later during pregnancy.
- Potential error in determining the sample size due to the relatively low number of pregnant women participating in the study, although it is well known that the prospective design of the study reduces the impact of the low participation rate on the study results.
- Determining the degree of anxiety during pregnancy is not part of the routine clinical examination procedure in the obstetric services of Kosovo.
- Validation and comparison with the results from the literature is difficult due to the use of different measurement instruments for anxiety during pregnancy, and/or the use of different criteria for its diagnosis.

Conclusions and Recommendations

Future research should confirm the biological plausibility of the studied interactions and determine which are the additional factors that condition the impact of the evident impact of unspecified anxiety during pregnancy on the act of childbirth and the fetal health. It is essential to diagnose as soon as possible the main causes that affect the appearance of unspecified anxiety symptoms during pregnancy in order to identify effective strategies for coping with it before birth, for the benefit of the mother and the baby.

Currently, the primary goal should be to urgently improve the monitoring of the emotional status of pregnant women and their mental health through appropriate interventions aimed at early detection, and reducing anxiety in this sub-population of pregnant women in general by well-trained teams of nurses and midwives, as well as by clinical psychologists.

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