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Women's Anxiety and Fetal Movement in the 3rd Trimester of Pregnancy

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A B S T R A C T

Pregnancy is an important period in a woman's life, where there are physiological and psychological changes as well as changes in their status in the family and society. These changes can cause mental disorders of various types, for example, increased stress and anxiety, as well as mood disorders. Maternal anxiety will cause interaction among hormones which leads to alteration of fetal wellbeing. This study aims to determine the correlation between anxiety and the frequency of fetal movement in the 3rd trimester of pregnancy. The subjects of this study were 30 at-risk pregnant women at a TPMB in Malang City, who were selected through consecutive sampling. Measurement of anxiety levels using the PRAQ-R2 instrument, as well as the Kick Counter application to calculate fetal movements. Each subject was observed using both instruments 3 times at intervals a week. The results of the study from 3 series of Chi-Square tests showed significant results, namely there was a correlation between the level of anxiety and the frequency of fetal movement in all measurements (p-value 0.033; 0.042; 0.047). Pregnant women with mild anxiety produce a normal frequency of fetal movements. Conversely, pregnant women with severe anxiety result in abnormal fetal movement frequency. It is recommended that every pregnant woman can maintain mental health so that fetal movements remain normal.

Kehamilan adalah periode penting dalam kehidupan wanita, dimana terjadi perubahan fisiologis dan psikologis, serta perubahan status mereka dalam keluarga dan masyarakat. Perubahan ini dapat menyebabkan gangguan mental dari berbagai jenis, misalnya peningkatan stres dan kecemasan, serta gangguan suasana hati. Kecemasan ibu hamil akan mengakibatkan serangkaian interaksi hormonal yang berimplikasi pada kesejahteraan janin. Penelitian ini bertujuan untuk mengetahui korelasi kecemasan dan frekuensi pergerakan janin pada trimester ke-3 kehamilan. Subyek penelitian ini adalah 30 ibu hamil berisiko di sebuah TPMB di Kota Malang, yang dipilih melalui consecutive sampling. Pengukuran tingkat kecemasan menggunakan instrumen PRAQ-R2, serta aplikasi Kick Counter untuk menghitung gerakan janin. Setiap subjek diobservasi menggunakan kedua instrument sebanyak 3 kali dengan interval seminggu. Hasil penelitian dari 3 seri uji Chi-Square menunjukkan hasil yang signifikan, yaitu terdapat korelasi antara tingkat kecemasan dengan frekuensi pergerakan janin pada semua pengukuran (p-value 0,033; 0,042; 0,047). Ibu hamil dengan kecemasan ringan menghasilkan frekuensi gerakan janin normal. Sebaliknya, ibu hamil dengan kecemasan berat mengakibatkan frekuensi gerakan janin abnormal. Direkomendasikan supaya setiap ibu hamil dapat menjaga kesehatan mental supaya gerakan janin tetap normal.

Introduction

Anxiety and depression in pregnancy will increase maternal cortisol levels for a long time and abundantly. This will lead to increased methylation of stress-related genes by the

placenta/glucocorticoids. Cortisol will cross the placental barrier and enter the fetal circulation, causing fetal neurodevelopmental disorders. This results in decreased fetal movement and hypersensitivity of the HPA axis (Do et al., 2021). When a woman becomes pregnant, physiological and psychological changes occur. The emergence of physiological changes and important psychological changes that require adaptation to ongoing changes are also fundamental problems (Zhang & Ma, 2021). The psychological changes that occur in the first, second and third trimesters of pregnancy will be different. A form of psychological change in the third trimester is a form of irritable behaviour, easily sad, fear and anxiety (Kowalska, 2023).

The problem that exists today is that there is still a high infant mortality rate in Indonesia (20 per 1000 live births by 2020) and according to a preliminary study there were 65% of pregnant women who do not familiar with monitoring the number of their babies' movement so that if there is an emergency in the fetus it cannot be detected immediately. The level of anxiety is very influential on the welfare of pregnant women and fetuses in the womb. Low levels of anxiety in pregnant women can reduce the complications caused so that it can indirectly reduce Maternal Mortality Rate (MMR) and Infant Mortality Rate (AKB) in Indonesia, while high anxiety levels can aggravate complications that occur and increase MMR and NMR. Ongoing anxiety without proper treatment can affect the health of the mother and the fetus she is carrying. The low-risk pregnancy group almost entirely experienced mild levels of anxiety (88.9%), almost all high-risk pregnancies (86.7%) experienced anxiety levels moderate, while very high-risk pregnancies almost all (66.7%) experienced the rate of severe anxiety. (Saputri & Yudianti, 2020).

Pregnancy anxiety is an emotional reaction that occurs in pregnant women. Anxiety occurs in the form of maternal concerns about the well-being of herself and her fetus, during and after childbirth, as well as when she has played the role of a mother (Dunkel Schetter & Tanner, 2012). Anxiety experienced by pregnant women is caused by an increase in the hormone progesterone. In addition to making pregnant women feel anxious, and affecting fetal movement, the increase in hormones also causes emotional disturbances and makes pregnant women tired quickly. Pregnant women who experience anxiety will change neurotransmitters in the brain so that they affect fetal neurotransmitters through the placenta (Renny et al., 2020).

Anxiety can have a negative adverse impact on the mother and fetus from pregnancy to childbirth, such as low birth weight, uterine contraction disorders, bleeding during labour, premature birth, postpartum depression and miscarriage, and even maternal and child mortality (Novitasari et al., 2013). Anxiety can also lead to increased HPA (Hypothalamic-Pituitary-Adrenal) activity, causing alterations in steroid hormone production, changes in social behaviour and reproductive rates in adulthood, hyperactivity disorders, hierarchical and cognitive disorders in children (Do et al., 2021).

In Indonesia, the results of research on anxiety were conducted in the third-trimester primigravida as many as 33.93% experienced anxiety. Another study stated that normal pregnant women in the face of childbirth experienced 47.7% severe anxiety, 16.9% moderate anxiety, and 35.4% experienced mild anxiety (Puty L, Arief W, 2012). The survey results from the Ministry of Health of the Republic of

Indonesia, 2019 that have been carried out in 2018 there were 5,291,143 pregnant women. Pregnant women who experience prolonged feelings of anxiety can reduce the level of attachment between the mother and her fetus. The attachment between mother and fetus should be strengthened since pregnancy because it affects the health of the mother and fetus and the smooth delivery process (Hassan & Hassan, 2017). Studies show that pregnancy-related anxiety can affect pregnancy outcomes, namely shorter gestational age and neurodevelopmental problems in the fetus (Rusmini et al., 2023).

Intrauterine movement of the fetus begins at the end of the eighth week but is visible by the time the fetus is 20 weeks old (Mangesi et al., 2015). Fetal movements become more pronounced, stronger and more stable with increasing gestational age (Tveit et al., 2009). Therefore, the calculation of fetal movement is the mother's activity to understand and calculate the fetal movement/shock she feels with a certain duration and technique. Counting fetal movements is the only independent research method that can be carried out by pregnant women without the help of health professionals or special tools to monitor the condition of the fetus during pregnancy. Mothers who regularly count fetal movements and are informed by health providers if fetal movements are abnormal have the potential to reduce pregnancy mortality and reduce maternal anxiety (Bellussi et al., 2020). Previous studies have shown that counting fetal movement can detect and explain reduced fetal movement, while also assuming that it can alert the mother if she feels a decrease in fetal movement.

The results of a preliminary study conducted at an independent midwife practice in Malang in December 2021, obtained data on the number of pregnant women in the third trimester for the period from November to December 2021 as many as 34 pregnant women. Secondary data obtained from filling out the PRAQ-R2 anxiety questionnaire by 15 third-trimester pregnant women related to psychological conditions in pregnant women, it was found that 56% of pregnant women experienced mild anxiety and 44% experienced moderate anxiety. The cause of the problem is that pregnant women have feelings of worry when approaching labor and concerns about the condition and health of their babies after birth which may affect the activity and welfare of the fetus. Based on the background above, this research aims to find out the relationship between maternal level of anxiety and frequency of fetal movement in third-trimester pregnant women.

Method

This study included correlational analytical research with an observational approach and 60 pregnant women who visited an independent midwife practice in Malang from March to May 2022 and obtained a sample of 30 respondents summed by Slovin's and selected by consecutive sampling. The inclusion criteria of this study are pregnant women with a gestational age of ≥ 28 weeks, have felt fetal movement, have an Android mobile phone, and have internet access. Subjects will be excluded from the study if they experience obstetric pathology. The research instrument used the PRAQ-R2 anxiety questionnaire (Huizink et al., 2016)as well as the Kick Counter App (Yudianti et al., 2022). The data was analyzed with the Chi-Square test. The categorization of PRAQ-R2 would be severe anxiety (≥ score of 37), moderate anxiety (23 ≤ a score of < 37), and mild anxiety (score < 23). Meanwhile, fetal

movement will be defined as normal when there are 3 or more body movements within 2 hours, or abnormal if there are less than 3 body movements within 2 hours. This research has passed ethical review.

Results

The following is the frequency distribution of several demographic characteristics of the respondents.

Table 1. Respondents' Demographic Situation

Characteristic	Category	n	%
Age	<20	1	3.3
	21-35	26	86.7
	>35	3	10.0
	Total	**30**	**100**
Education	Elementary	1	19
	Junior High	3	38.1
	Senior High	23	33.3
	Higher Education	3	9.5
	Total	**30**	**100**
Occupation	Unemployed	21	70.0
	Employed	9	30.0
	Total	**30**	**100**

Of 30 third-trimester pregnant women who joined this research, almost all of them (86.7%) the aged 20-35 years old. Based on education from 30 third-trimester pregnant women, it shows that almost all (76.7%) respondents have high school education. Based on the employment of 30 third-trimester pregnant women showed that most (70.0%) respondents were not working. Based on the number of samples used as respondents, the following is the result of the frequency distribution of research variables, namely the relationship between anxiety levels and fetal movement frequency in third-trimester pregnant women.

Table 2. Anxiety Level in 1st, 2nd, and 3rd Assessment

Characteristic	Category	n	%
1st Assessment	Mild	22	73.3
	Moderate	5	16.7
	Severe	3	10.0
	Total	**30**	**100**
2nd Assessment	Mild	11	36.7
	Moderate	16	53.3
	Severe	3	10.0
	Total	**30**	**100**
3rd Assessment	Mild	14	46.7
	Moderate	13	43.3
	Severe	3	10.0
	Total	**30**	**100**

Based on anxiety levels, measurement 1 showed that most (73.3%) III-trimester pregnant women experienced mild anxiety. Based on the level of anxiety, measurement 2 showed that most (53.3%) pregnant women in the third trimester experienced moderate anxiety. Based on the level of anxiety, measurement 3 showed that almost half (46.7%) of pregnant women in the third trimester experienced mild anxiety.

Table 3. Fetal Movement Frequency in 1st, 2nd, and 3rd Assessment

Characteristic	Category	n	%
1st Assessment	Normal	25	83.3
	Abnormal	5	16.7
	Total	**30**	**100**
2nd Assessment	Normal	23	76.7
	Abnormal	7	23.3
	Total	**30**	**100**
3rd Assessment	Normal	22	73.3
	Abnormal	8	26.7
	Total	**30**	**100**

Table 3 describes that based on the frequency of fetal movement, 1st assessment shows that almost all (83.3%) of fetal movement frequency in measurement 1 is normal. Based on the frequency of fetal movement, 2nd assessment shows that almost all (76.7%) of fetal movement frequency in measurement 2 is normal. Based on fetal movement frequency, the 3rd assessment shows that almost all (73.3%) fetal movement frequency is normal.

Table 4. Level of Anxiety and Fetal Movement Frequency in 1st Assessment

Level of Anxiety	Fetal Movement Frequency				Total		p-value
	Normal		Abnormal				
	n	(%)	n	(%)	n	(%)	
Mild	20	66.7	2	6.7	22	73.3	
Moderate	4	13.3	1	3.3	5	23.3	0.042
Severe	1	3.3	2	6.7	3	3.3	
Total	25	8.3	5	16.7	30	100.0	

Table 4 shows that at the 1st assessment, most (73.3%) respondents experienced mild anxiety with fetal movement frequency more than half (66.7%) were normal, and only a few pregnant women (6.7%) experienced abnormal fetal movement frequency.

Table 5. Level of Anxiety and Fetal Movement Frequency in 2nd Assessment

Level of Anxiety	Fetal Movement Frequency				Total		p-value
	Normal		Abnormal				
	n	(%)	n	(%)	n	(%)	
Mild	7	23.3	4	13.3	11	36.7	
Moderate	15	50.0	1	3.3	16	53.3	0.033
Severe	1	3.3	2	6.7	3	10.0	
Total	23	86.7	7	13.3	30	100.0	

Table 5 shows that in the 2nd assessment, most of the respondents (53.3%) experienced moderate anxiety, since half of them (50%) had normal fetal movement frequency, and only a small group of the respondents (3.3%) had abnormal fetal movement frequency.

Table 6. Level of Anxiety and Fetal Movement Frequency in 3rd Assessment

Level of Anxiety	Fetal Movement Frequency				Total		p-value
	Normal		Abnormal				
	n	(%)	n	(%)	n	(%)	
Mild	13	43.3	1	3.3	14	46.7	
Moderate	8	26.7	5	16.7	13	43.3	0.047
Severe	1	3.3	2	6.7	3	10.0	
Total	22	7.3	8	16.7	30	100.0	

Table 6 shows that in measurement 3, almost half of the respondents (46.7%) experienced moderate anxiety, since their fetal movement frequency almost half of them (43.3%) are normal, and

only a small part of the respondents (3.3%) have abnormal fetal movement frequency. According to the three chi-square tests above, it is known that there was a correlation between the level of anxiety and fetal movement frequency since each statistical test has a p-value of Pearson Chi-Square less than 0.05 (0.033, 0.042, 0.047).

Discussion

The results showed that the anxiety levels of the 30 respondents studied at 3x measurements were mostly experiencing mild anxiety. The results of this study are in accordance with those stated by Saputri & Yudianti (2020), that primigravida mothers in the third trimester often feel anxiety because they are getting closer to the labor process. Mothers will tend to feel anxious about their pregnancy, feel anxious and afraid to face childbirth, considering ignorance is a supporting factor for anxiety. Internal factors that affect the anxiety of pregnant women in the third trimester one of them is age. Based on Table 1 of age data, almost all respondents experiencing mild anxiety levels are of healthy reproductive age with an age range of 20-35 years. The results of this study are in accordance with those stated by (Hassan & Hassan, 2017), a person's age can affect the state of his pregnancy. The age of women during pregnancy affects the level of anxiety in the face of childbirth. Productive age is the age a woman has planned for her pregnancy. Pregnant women of productive age will be more ready to accept their pregnancy and prepare for the presence of their baby so that the mother's feelings will be happier in welcoming the birth of her baby.

One of the external factors that affect the anxiety of third-trimester pregnant women is education. Based on Table 4 of education data, almost all respondents experiencing mild anxiety levels were the last to have a high school education. The results of this study are in accordance with what was stated by (Larasati, 2019), a person's level of education will affect his knowledge. The higher the education, the wider the knowledge. High knowledge will increase a person's awareness to get information about his situation to reduce the anxiety experienced. According to (Argaheni, 2021), the higher a person's education, the more qualified his knowledge will be and the more mature his intellect. The higher a person's education, the greater the opportunity to seek treatment from health workers. Conversely, a lower education will cause a person to experience stress and anxiety that occurs due to a lack of information obtained.

Based on Table 4 of employment status data, most respondents who experience severe anxiety are respondents who are not working. The results of this study are in accordance with those stated by (Larasati, 2019), employment status can affect maternal knowledge. Working mothers have a better level of knowledge than non-working mothers because working mothers will have more opportunities to interact with others, so they have many opportunities to get information about their situation to reduce anxiety approaching labour.

The results of research on the frequency of fetal movements in 30 respondents showed that almost all fetal movement frequencies with normal categories. Fetal movement is a spontaneous movement carried out by the fetus in the womb. Decreased fetal movement can pose a risk of complications such

as fetal growth retardation and stillbirth. If the fetus is silent there is no response at all to physical stimuli and sounds are given, the mother must be vigilant, because there may be hypoxia (lack of oxygen) due to the fetus wrapped around the umbilical cord. The results of this study are in accordance with those stated by (Sroufe, 2005), The attachment between a pregnant woman and her fetus is particularly important because of the potential link between prenatal attachment and good parental behaviour during pregnancy and after birth.

Based on Table 4 age data. According to (Hassan & Hassan, 2017), a healthy reproductive age is the ideal age for a woman who has psychosocial readiness greater than the age under 20 years old who still lacks the knowledge and experience to become a mother. Pregnant women of productive age will be more ready to accept the pregnancy and prepare for the presence of their baby more enthusiastically so that the mother's thoughts and feelings will be happier in welcoming her baby and do not interfere with the welfare of the fetus in the womb.

Based on Table 4 data on employment status data, a small percentage of pregnant women with abnormal fetal movement frequency have working status. The results of this study are in accordance with those stated by (Hassan & Hassan, 2017), employment status can affect maternal knowledge about the importance of maternal and fetal attachment to the welfare of the fetus. Working mothers have a better level of knowledge than non-working mothers because working mothers will have more opportunities to interact with others, so they have many opportunities to get information about their situation. Non-working mothers tend to be more introverted stay indoors and have limited information with their peers so mothers have limited knowledge about developing relationships about well-being or movement in their fetuses (Yani et al., 2021).

The results of the statistical test have revealed the aim of this research, which is a strong relationship between the level of maternal anxiety and the frequency of fetal movements. The results of this study show that the adaptation of third-trimester pregnant women to anxiety before childbirth is very important, as evidenced by several study respondents who experienced abnormal fetal movement frequency caused by several kinds of factors from mothers, namely, mothers who work hard (catering, factory employees), mothers who are at home and feel limited information, mothers who lack exercise, and mothers who rarely make antenatal visits. These results show that the variable level of anxiety can be associated with the variable frequency of fetal movement in third-trimester pregnant women. Anxiety in pregnancy is an emotional reaction that occurs in pregnant women. Anxiety occurs in the form of maternal concern for the welfare of the fetus and herself and the continuity of pregnancy (Dunkel et al., 2012).

Some pregnant women experience feelings of anxiety due to physical and psychological changes experienced (Abasi et al., 2012). Anxiety is considered less important by pregnant women so it is considered normal that can happen to every mother who experiences the process of pregnancy. Anxiety that occurs in pregnant women has a negative effect on the fetus. Pregnant women who experience anxiety will change neurotransmitters in the brain that affect fetal neotransmitters through the placenta which can affect fetal movement. High levels of anxiety increase the chances of premature birth, low

birth weight, miscarriage and infantile disorders (Akbarzadeh et al., 2016). The incidence of anxiety in pregnant women can affect the birth process which can be fatal. Prolonged feelings of anxiety can decrease the level of attachment between the mother and her fetus (Abasi et al., 2012).

Fetal movement monitoring is a simple, inexpensive and low-tech method. The method used is to calculate the baby's movements every day. The number of normal baby movements is about three to five times in an hour, if the results are not satisfactory then it should be checked with ultrasound (Yani et al., 2021). The mother's perception of reduced fetal movement is the most important marker of decreased fetal activity. The mother can control fetal movements carefully and report if there is a decrease in fetal movement to her doctor or health care provider. However, this method can prevent perinatal morbidity and mortality (Samutri & Endriyani, 2021).

The attachment relationship between a pregnant woman and the well-being of her developing fetus has proven important due to the potential link between prenatal attachment and parental behaviour both during pregnancy and after birth (Hassan & Hassan, 2017). The relationship between mother and child begins during pregnancy when the mother fantasizes and dreams of herself as a mother. Mothers want to be closer, and warmer, tell stories to their babies and try to imagine baby crying and parenting. According to (Sroufe, 2005), the quality of the relationship between the fetus and its mother is an important factor affecting the well-being of the fetus. When fetuses develop and move actively and have a comfortable relationship with their mothers, they generally have better growth.

Table 4, 5, and 6 shows that the majority of anxiety is mild with normal fetal movement frequency. This is because anxiety levels can control and control the well-being or movement of the fetus. If the individual cannot control stress by increasing attachment to the fetus, it will experience high anxiety that causes disruption of fetal movement. If pregnant women have a low attachment to the fetus will experience stress, give up easily and do not believe in their abilities. Conversely, if pregnant women have a high attachment to the fetus, they will be able to withstand the stress and anxiety reactions that the mother experiences during the process before delivery which can interfere with the welfare of the fetus. Thus, pregnant women can carry out their pregnancy and childbirth properly.

From these statements, it can be concluded that pregnant women with mild anxiety result in normal frequency of fetal movements. Conversely, pregnant women with severe anxiety result in abnormal fetal movement frequency. Measurements on the variables of anxiety level and frequency of fetal movements were carried out with 3x measurements or data collection with the aim that researchers get constant results, which are seen from anxiety variables with maternal routine factors or maternal psychological changes that may affect anxiety levels. Meanwhile, the frequency of fetal movement from fetal activity factors when approaching labour is the main indicator to monitor fetal wellbeing.

Conclusions

Most of the study respondents experienced mild levels of anxiety. Almost all study respondents with normal fetal movement frequency. The results of the analysis showed a significant relationship between the level of anxiety and the frequency of fetal movement in third-trimester pregnant women.

Third-trimester pregnant women may adapt to anxiety before labour begins since it is proven that the anxiety of third-trimester pregnant women can cause abnormalities in fetal movement. Third-trimester pregnant women can find any information on how to count fetal motion or movement so that they can independently assess fetal well-being through it. On the other hand, midwives should conduct an assessment of 3rd trimester pregnant women's anxiety, along with their fetal movement. Teaching pregnant women in the third trimester how to count fetal movement would be one of the best practices.

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