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The relationship between anxiety levels in facing childbirth and sleep quality among pregnant women in third trimester (Field study at Lulu's Independent Midwifery Practice Surabaya in 2023)

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Abstract

One study found that out of 144 pregnant women, there were 26.4% experienced antenatal anxiety. During pregnancy, there are changes in anatomy and physiology that cause discomfort which can affect sleep patterns and quality. Sleep quality in pregnant women is often associated with anxiety but there are still conflicting from several studies. The aim of this study was to demonstrate the relationship between anxiety levels in facing childbirth with sleep quality among pregnant women in third trimester. This is quantitative study with a cross-sectional approach. Data collection was conducted at Lulu's Independent Midwifery Practice Surabaya in June-September 2023. Data were analyzed using The Spearman Rank Test and Cross Tab statistical test. The result obtained was 52 respondents who met the criteria and the most of the respondents were ≤30 years old (71.2%), 28-35 weeks of gestational age (28.8%), multigravida (57.7%), previous type of delivery were vaginal delivery (88%), final education level was High School/Vocational Education (67.3%), and being housewife (53.8%). A total of 16 (30.8%) pregnant women experienced mild-moderate anxiety and 2 (3.8%) pregnant women experienced moderate-severe anxiety. There were 27 (51.9%) pregnant women who had poor sleep quality. There was a strong relationship ($p < 0.01$, $r = 0.617$) between anxiety levels in facing childbirth and sleep quality among pregnant women in third trimester.

Keywords: Anxiety; Sleep Quality; Pregnant Women; Third Trimester

1. Introduction

Pregnancy-related anxiety is defined as a type of contextual anxiety that includes maternal fears and specific worries about pregnancy, childbirth, maternal and infant well-being, hospital, health professionals, changes in mother's appearance, and mother's future life and role [1]. One study found that out of 144 pregnant women, 26.4% experienced antenatal anxiety [2]. Risk factor for prenatal depression is anxiety in pregnancy and sleep disturbance during pregnancy [3]. Pregnant women who experience severe anxiety are at risk of preterm delivery, low birth weight, and increased risk of asthma [4].

Anxiety in pregnancy is caused by concerns about fetal health, childbirth process, finances, self-health and body image, newborn care, and childbirth services. Multigravida women may also develop anxiety about caring for other children, jealousy of other siblings, husband support, and social support. Anxiety in primigravida women is more likely caused by negative images of childbirth process, while multigravida women is more likely caused by bad experience of previous births, finances, and child care [5].

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Pregnant women's sleep quality is slightly disturbed during pregnancy. Almost half of pregnant women or 47.5% were experienced poor sleep quality. A longitudinal study shows that the sleep quality in pregnant women declined from the second to the third trimester [6]. Sleep disturbances in general is strongly associated with the incidence of preeclampsia, gestational hypertension, gestational diabetes mellitus, preterm birth, and stillbirth [7]. Poor sleep quality is also associated with perinatal depression and is predictive of prenatal and postnatal depression [8]. A preliminary study conducted in February-March 2023 at Lulu's Independent Midwifery Practice Surabaya found that there were 18 pregnant women in the third trimester who made an antenatal visit and all pregnant women had never been screened for anxiety in pregnancy and sleep quality. Meanwhile, preeclampsia cases are one of the most common cases of pregnancy complications there, where preeclampsia is one of the adverse effects that can occur due to anxiety in pregnancy.

There are conflicting findings on the relationship between anxiety levels and sleep quality in pregnant women. A previous study conducted in Pontianak, Indonesia on third trimester primigravida women found a significant relationship between anxiety levels and sleep quality in primigravida pregnant women in the third trimester [9]. Other studies also showed a strong and positive relationship between anxiety levels and sleep quality in third trimester pregnant women [10,11]. Meanwhile, the results of other studies showed there was no relationship between anxiety in facing childbirth and sleep quality of third trimester pregnant women [12]. There was no significant association between gestational anxiety and poor sleep quality [13]. This conflicting finding of previous studies has led researchers to conduct research to demonstrate the relationship between anxiety levels in facing childbirth and sleep quality in third trimester pregnant women.

2. Material and methods

This study is an observational quantitative study with a cross-sectional approach. The data collection was done by consecutive sampling according to the required respondent criteria. The population in this study were all third trimester pregnant women who made antenatal visit at Lulu's Independent Midwifery Practice Surabaya in June-September 2023 with a sample size of 52 pregnant women. Data collection was conducted at Lulu's Independent Midwifery Practice Surabaya in June-September 2023. Data collected included respondents' characteristics (maternal age, gestational age, gravida status, type of previous birth, educational level, and occupation), anxiety levels, and sleep quality. The questionnaires used were ZSAS (Zung Self-Rating Anxiety Scale) to measure anxiety level and PSQI (The Pittsburgh Sleep Quality Index) to measure sleep quality. The scoring results of the ZSAS questionnaire are classified into not anxious/normal, mild-moderate anxiety, moderate-severe anxiety, and severe Anxiety. Meanwhile, the scoring results from The PSQI questionnaire are classified into good sleep quality and poor sleep quality. The data were analyzed using univariate analysis and bivariate analysis using Cross Tab statistical test and Spearman Rank Test through SPSS program to determine the relationship between anxiety levels and sleep quality in pregnant women.

3. Results and discussion

This study was conducted at Lulu's Independent Midwifery Practice Surabaya. The total population of pregnant women in third trimester who made antenatal visit in June-September 2023 were 69 women. From the total population, there were 52 respondents as a sample obtained after adjusting the inclusion and exclusion criteria.

3.1. Overview of Characteristics of Pregnant Women

Tabel 1 Frequency Distribution of Pregnant Women's Characteristics and Cross Tabulation Toward Anxiety Levels

Characteristics		**Frequency (n)**	**Percentage (%)**	**Anxiety Levels**					
				Not Anxious (Normal)		**Mild-Moderate**		**Moderate-Severe**	
				n	**%**	**n**	**%**	**n**	**%**
Maternal Age	≤30 years old	37	71.2	22	64.7	14	87.5	1	50
	>30 years old	15	28.8	12	35.3	2	12.5	1	50
Gestational Age	28-35 weeks	28	53.8	22	64.7	6	37.5	0	0
	>35 weeks	24	46.2	12	35.3	10	62.5	2	100

Gravida Status	Primigravida	22	42.3	15	44.1	6	37.5	1	50
	Multigravida	30	57.7	19	55.9	10	62.5	1	50
Type of Previous Delivery	Vaginal Delivery	22	88	15	88.2	6	85.7	1	100
	Cesarean Section	3	12	2	11.8	1	14.3	0	0
Educational Levels	Primary School	3	5.8	1	2.9	1	6.25	1	50
	Secondary School	9	17.3	4	11.8	4	25	1	50
	High School/ Vocational School	35	67.3	24	70.6	11	68.75	0	0
	Higher Education	5	9.6	5	14.7	0	0	0	0
Occupation	Housewife	28	53.8	16	47	10	62.5	2	100
	Private Employment	22	42.3	16	47	6	37.5	0	0
	Others	2	3.8	2	5.9	0	0	0	0

Table 1 shows that most pregnant women were aged ≤30 years (71.2%). Almost all pregnant women who experienced mild-moderate anxiety were women aged ≤30 years old, namely 14 pregnant women (87.5%). The trend of the result in the category of women with mild-moderate anxiety shows that mild-moderate anxiety was experienced more by women aged ≤30 years than by those aged >30 years. This is in line with a study showing that among the socio-demographic variables, older age is correlated with a lower risk of depression and anxiety in pregnant women [14]. A study about well-being and worry of pregnant women during Covid-19 pandemic found that pregnant women aged <30 years had a higher level of worry than those were older age. Parity and maternal age were correlated. However, both variables remained in the model as predictors of women's worry [15]. The older the women, the lower the level of anxiety experienced. Age is one of the factors that affect individual anxiety because the older the age, the better the psychological maturity. The more mature the individual's psychology, the better adaptation to anxiety [16].

Most of the women's gestational age was 28-35 weeks (53.8%). This study found that mild-moderate anxiety was mostly experienced by pregnant women with gestational age >35 weeks and all pregnant women with moderate-severe anxiety levels had a gestational age >35 weeks. This is consistent with research showing a significant increase in depression and anxiety scores, especially in the third trimester compared with the first and second trimesters [17]. Pregnant women's distress symptoms are relatively increase at 16 weeks of gestation then again later at 32 and 36 weeks of gestation. Pregnant women feel more distress up to 16 weeks of gestation regardless of parity, this may be due to several factors such as the risk of miscarriage, morning sickness, and all adaptation to the physical, hormonal, and emotional changes in pregnancy. Increased symptoms in late pregnancy (32 weeks gestation onwards) may be due to increase physical discomfort, increased anxiety due to the upcoming birth and birth process, and adjustments to the realization that parenthood and all the stressors and life changes that correlated with it, are imminent [18].

Most of the pregnant women in this study were multigravida, namely 30 pregnant women (57.7%). Based on Table 1, most of the women who experienced mild-moderate anxiety were multigravida, namely 10 pregnant women (62.5%). Based on the trend of the data, specifically in the category of mild-moderate anxiety, it can be concluded that mild-moderate anxiety was experienced more by multigravida pregnant women than primigravida. The anxiety level of primigravida mothers is lower than that of multigravida mothers. For each increase in the number of previous pregnancies, the level of anxiety increases by 1.3 [19]. Another study found that during the Covid-19 pandemic, multigravida mothers had higher prevalence rates of anxiety and depression than primigravida [20]. Perinatal anxiety is high in multigravidas. Influencing factors can be an anticipatory anxiety resulting from previous childbirth and parenting experiences, concerns about caring for the baby along with other children, lack of social support compared to the first pregnancy experience, anxiety about sibling relationships, and concerns about possible financial problems [21].

In this study, 25 of the 30 multigravidas had previous birth. Most of the previous birth were vaginal delivery, namely 22 pregnant women (88%). A further, 3 others had a caesarean section. Almost all pregnant women who experienced mild-moderate anxiety were women with type of previous birth by vaginal delivery, namely 6 pregnant women (85.7%). These results are in line with research which found that the mean score of obvious anxiety and hidden anxiety were significantly higher in the group of pregnant women who had normal vaginal birth compared to the group of pregnant women with cesarean section [22]. However, another study stated differently, that type of previous delivery whether vaginal delivery or caesarean section did not affect anxiety about the current pregnancy and birth [23]. A negative birth experience or previous operative delivery is the strongest predictor of fear of childbirth in multiparous women [24] where pregnant women's mean anxiety score correlates with fear of childbirth [25]. Obstetric interventions and complications are strongly associated with mother's satisfaction with childbirth. The most significant risk factors for mother's dissatisfaction are emergency caesarean section, instrumental vaginal delivery, postpartum hemorrhage, Apgar score <7 at 5 minutes. In addition, induction of labor, epidural anesthesia, augmentation of oxytocin and obstetric anal sphincter injury are related significantly with mother's dissatisfaction with childbirth. Type of childbirth strongly influences mother's satisfaction with childbirth [26].

Most of the pregnant women in this study had only completed high school/vocational school education, namely 35 pregnant women (67.3%). Most of the pregnant women with mild-moderate anxiety were women with a high school/vocational school education, 11 pregnant women (68.75%). Moderate-severe anxiety was experienced by 1 mother with a primary school education and 1 mother with a secondary school education. This is in line with previous study showing that pregnant women with a low level of education had a significantly higher risk of anxiety [27]. Pregnant women with low levels of education had high levels of anxiety during pregnancy [28]. Other results showed that anxiety and depressive symptoms in pregnant women were reduced in more educated pregnant women [29]. When faced with events or emergencies, women with higher education tend to be more resilient and confident. They are more likely to seek information or knowledge about pregnancy on their own initiative, and to seek advice and help from obstetricians or family members, so that they can adapt to changes during pregnancy, both physically and psychologically [30].

In this study, most of the pregnant women were housewives, 28 pregnant women (53.8%). Most of the pregnant women with mild-moderate anxiety were housewives, 10 pregnant women (62.5%). While in the category of moderate- severe anxiety, all were housewives (100%). Based on these results, anxiety is experienced more by pregnant women who were housewives than working pregnant women. The result is in line with the conclusions of research on pregnant women in the early pregnancy, which found that being unemployed or a housewife is associated with the development of anxiety symptoms [31]. Low education, unemployment, and financial difficulties are three major predisposing factors for anxiety in pregnant women [27]. Being unemployed or being housewife during pandemic increases the amount of time spent at home and reduce socialization and interpersonal communication, which increases the risk of anxiety and depression [32]. Employed women enable women to gain information and experience about pregnancy from others, as working women are more likely to meet other people [33].

3.2. Overview of Anxiety Levels in Facing Childbirth and Sleep Quality

Tabel 2 Frequency Distribution of Anxiety Levels and Sleep Quality

Variable		Frequency (n)	Percentage (%)
Anxiety Levels	Not Anxious/Normal	34	65.4
	Mild-Moderate Anxiety	16	30.8
	Moderate-Severe Anxiety	2	3.8
	Severe Anxiety	0	0
Sleep Quality	Good Sleep Quality	25	48.1
	Poor Sleep Quality	27	51.9
Sleep Duration	> 7 hours	4	7.7
	6-7 hours	30	57.7
	5-6 hours	18	34.6
	< 5 hours	0	0

Almost half of the pregnant women in this study experienced mild-moderate anxiety (30.8%). Meanwhile, a small proportion of pregnant women experienced moderate-severe anxiety (3.8%). This result is similar to the finding of previous study on the prevalence of pregnancy-related anxiety (PRA) conducted in Ethiopia, which found that the prevalence of pregnancy-related anxiety in their study was 32.7% [34]. Another study conducted in Indonesia also showed similar results, namely that up to 37.2% of pregnant women in their third trimester experienced mild anxiety, while 39.5% of other pregnant women experienced moderate anxiety and 9.3% of pregnant women in their third trimester experienced severe anxiety [9].

Anxiety in pregnancy has a negative impact on maternal and neonatal health. One study found that comparing with pregnant women who did not experience anxiety during pregnancy, pregnant women who experienced anxiety during pregnancy had a 1.49-fold increased risk of preterm birth and a 1.55-fold increased risk of low birth weight [35]. Mothers with antenatal anxiety disorders have a higher risk of pregnancy-induced hypertension (PIH), gestational diabetes mellitus, preterm labor, prolonged labor, lower-segment caesarean section and low birth weight [36]. The effects of anxiety on the fetus may occur because anxiety affects fetal umbilical vein circulation. A previous study shows that fetal umbilical vein circulation patterns are correlated with maternal anxiety. Maternal anxiety is associated with reduced blood flow in the umbilical vein. These changes indicate that the supply of oxygenated blood to the fetus may be reduced under conditions of moderate or severe anxiety [37]. In addition, maternal antenatal anxiety is significantly associated with high cortisol levels. Mothers with severe anxiety showed increased serum cortisol levels and decreased DHEA-S (Dehydroepiandrosterone-sulphate) levels [38]. Whereas, high levels of cortisol serum in pregnant women increase the risk of preterm labor 10 times [39].

Most of pregnant women in this study had poor sleep quality. The prevalence of poor sleep quality among pregnant women in the third trimester in this study was 51.9%. The prevalence of poor sleep quality is also similar in several studies. Research conducted in China found that the prevalence of pregnant women with poor sleep quality was 51.8% of 2281 pregnant women. The prevalence in the third trimester was the highest (59.2%) compared to first and second trimester [40]. Another study conducted in Ethiopia showed that the prevalence of poor sleep quality in pregnant women was 42.2%, with 45.9% in the first trimester, 26.6% in the second trimester and 53.6% in the third trimester [41]. Research conducted in Indonesia found that 60.7% of pregnant women had poor sleep quality out of a total of 56 pregnant women surveyed [42].

Based on sleep duration, it was found that most pregnant women had a sleep duration of 6-7 hours at night, as many as 30 pregnant women (57.7%). Almost half of the pregnant women had a sleep duration of 5-6 hours at night, as many as 18 pregnant women (34.6%). This is consistent with research showing that sleep quality progressively deteriorates as pregnancy progresses, with high PSQI scores, longer latency, short sleep duration and poor efficiency [43]. Another study found similar results, with 256 (61.8%) pregnant women slept less than 7 hours per night [44]. Sleep is an important factor in glucose metabolism. Women who got <5 hours or ≥10 hours of sleep had significantly increased random blood glucose levels in pregnant women [45]. Pregnant women with short sleep duration are 1.81 times more likely to develop gestational diabetes mellitus [46]. Pregnant women experience sleep problems during pregnancy. One of the most common problems is frequently waking up at night. A total of 68.6% of pregnant women had difficulty falling asleep within 30 minutes and woke up to use toilet. More than a quarter (27.7%) of pregnant women also had subjective snoring problems during pregnancy [47].

3.3. Relationship Between Anxiety Levels in Facing Childbirth and Sleep Quality

Table 10 shows that most of the pregnant women in the poor sleep quality category had mild-moderate anxiety, i.e. 15 pregnant women (55.6%). There were 2 pregnant women with moderate-severe anxiety and all them had poor sleep quality. The trend of the data shows that the more anxious pregnant women in facing childbirth, the more pregnant women have poor sleep quality. One study found that mothers who experienced poor sleep quality during pregnancy had a significantly increased risk of developing depression, with a 3.72-fold increased risk of antenatal depression, a 2.71-fold increased risk of postpartum depression and a 3.46-fold increased risk of perinatal depression than mothers who did not experience poor sleep quality [48]. Poor sleep quality associated factors include maternal age (20-30 years and >30 years), gestational age (second and third trimester) and parity (multiparity) [47].

Tabel 3 Overview of Anxiety Levels and Sleep Quality in Third Trimester Pregnant Women

Variable (n)	Good Sleep Quality		Poor Sleep Quality	
	n	%	n	%

Not Anxious/Normal	24	96	10	37
Mild-Moderate Anxiety	1	4	15	55.6
Moderate-Severe Anxiety	0	0	2	7.4
Severe Anxiety	0	0	0	0

Tabel 4 Relationship Between Anxiety Levels and Sleep Quality in Third Trimester Pregnant Women

			Anxiety Levels	**Sleep Quality**
Spearman Rho	Anxiety Levels	Correlation Coefficient	1000	0.617
		Sig. (2 tailed)		0.000
		N	52	52
	Sleep Quality	Correlation Coefficient	0.617	1000
		Sig. (2 tailed)	0.000	
		N	52	52

This study found a significant relationship between anxiety levels in facing childbirth and sleep quality in pregnant women in the third trimester, with a strong and positive strength of relationship, it shows that the higher the level of anxiety, the worse the sleep quality of pregnant women in the third trimester. These findings are supported by the results of previous studies, which found that pregnant women with poor sleep quality have significantly higher average trait anxiety than pregnant women with good sleep quality. Pregnant women with high levels of anxiety are 2.3 times more likely to have sleep problems than those with low levels of anxiety [49]. Another study found that the prevalence of poor sleep quality in pregnant women with anxiety was 6.62 times higher than in pregnant women without anxiety. Anxiety was associated with poor sleep quality [44]. The most influencing factor that affects the sleep quality of pregnant women is anxiety. Pregnant women with severe anxiety are 15 times more likely to have poor sleep quality compared to pregnant women who do not experience anxiety during pregnancy [50]. Poor sleep quality and obstructive sleep apnea (OSA) are correlated with antepartum depression, generalized anxiety and PTSD symptoms in pregnant women [51]. Poor sleep quality in general, difficulty falling asleep, number of awakenings per night and early awakenings increase from mid to late pregnancy. Mild to moderate level of depressive and anxiety symptoms are associated with sleep problems in late pregnancy [52].

Sleep is an important and crucial behavior that is affected by physiological and pathological changes during pregnancy. There are several non-pharmacological interventions that are more recommended for pregnant women because they have a greater effect on sleep quality and are easy to perform, including back massage, pregnancy exercises, sleep hygiene and lavender aromatherapy. There is an effect on mother's sleep quality before and after the provision of these non-pharmacological interventions [53]. Meanwhile, some of the most effective interventions that can be used to reduce anxiety during pregnancy include behavioral activation, cognitive behavioral therapy, yoga, music therapy and relaxation. Other interventions during pregnancy and postpartum include antenatal education, partner massage, and reading self-help books with professional telephone guidance. Non-pharmacological interventions can be provided by midwives or nurses to reduce anxiety during pregnancy and postpartum [54].

4. Conclusion

This study found that there was a significant relationship between anxiety levels in facing childbirth and sleep quality among pregnant women in third trimester at Lulu's Independent Midwifery Practice Surabaya. Future research is expected to conduct more in-depth research with larger and more diverse sample on which level of anxiety that affect women's and fetuses health and the influencing factors so that prevention of anxiety in pregnancy can be made. Pregnant women are also expected to be more aware of anxiety in pregnancy and the importance of good sleep quality for healthy pregnancy. In addition, collaborative management and holistic assistance are needed for pregnant women who experience anxiety and have poor sleep quality.

Compliance with ethical standards

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Disclosure of Conflict of interest

There is no conflict of interest in this study.

Statement of ethical approval

This study implemented the principle of Helsinki Declaration and has received an ethical certificate from Health Research Ethics Committee of Airlangga University. Indonesian Midwives Association of Surabaya Branch has given a letter of approval to conduct the study and the letter was handed over to Lulu's Independent Midwifery Practice.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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