

The Factors Influencing Sleep Quality of Pregnant Women in Yogyakarta, Indonesia

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Abstract— *Most of the pregnant women had sleep disorders during pregnancy. The factors that can cause sleep disorder are physical and physiological adaptation. This study aimed to identify sleep quality experienced by pregnant women and factors associated with it. A cross-sectional study was designed to collect the data from 161 pregnant women who are not having a complication during pregnancy and complete the questionnaire. The data were taken by purposive sampling in primary health care Kasihan 1 Tamantirto Bantul Yogyakarta. The data were collected through Pittsburgh Sleep Quality Index (PSQI), Zung-Self Rating Anxiety Scale (ZSAS), and Numerical Rating Scale (NRS), then analyzed using Chi-square and multiple logistic regressions. The majority of the respondent had poor sleep quality (78,9%), and factors that related to sleep quality are anxiety and low back pain. Health care should pay attention to anxiety and low back pain in pregnant women and provide some educations to prevent and treat anxiety and low back pain during pregnancy*

Keywords—*anxiety, sleep quality, low back pain, pregnancy*

I. INTRODUCTION

Sleep is one of the basic human needs that must be fulfilled. Sleep can reduce fatigue, stabilize feelings, facilitate blood circulation in the brain, increase protein synthesis, maintain the mechanism of the immune system, and improve memory and concentration in learning [1]. So that sleep disorders can cause a decrease in concentration and daily activities [2].

Seeing the benefits of sleeping above, Islam has a view importance of sleep. Sleep is one of the blessings of Allah SWT, as stated in Al-Qasas (28:73) which means: "And because of His mercy, He made for you night and day, so that you may rest that night and that we may search for some of His gifts (in the day) and that you will be grateful" (Al Qashahs (28:73)). On the other hand, from being a blessing from Allah SWT sleep is also one of the activities to rest the body, as stated in An-Naba (78:9) which means: "And we make your sleep to rest" (QS An Naba' 9th). Both of them said about the importance of sleep as a break to restore the body after activity.

Sleep needs of each individual differ according to the stage of development. Newborn needs 16 hours of average sleep, the teenager is reduced up to 8 hours, and 7 to 8 hours in adult. However in certain conditions, women experience changes in sleep duration. Research of Lee et al. [3] states that female has 412 minutes sleep duration in reproductive age, during 11-12 weeks of pregnancy is 446 minutes and decreases to 415 minutes in 35-36 weeks of pregnancy.

Pregnant women have poor sleep quality. According to the research of Owusu et al. [4], most pregnant women have poor sleep quality 86.4%. It can cause insomnia. According to Kizilirmak[5], 52.2% of pregnant women got insomnia, thus condition increased in the early of the third trimester.

Sleep disorders in pregnant women are caused by physical and psychological changes during the pregnancy, such as nausea and vomiting, increased frequency of urination, enlargement of the uterus, and back pain [6]. Anxiety and worry about the condition of pregnancy and childbirth often be the emotional changes that occur. Pregnant women who experience low back pain (LBP) will have poor sleep quality [7]. Based on the background, the researchers were interested in researching: "factors that most affect the quality of sleep in pregnant women." □

II. METHODOLOGY

The research used a cross-sectional design. Measurement is carrying out at the same time. This study was conducted in the work area of Public Health Center 1 Kasihan, Bantul, Yogyakarta. All pregnant women who lived in the area of study during the data collection period were eligible to participate in this study. The sample in this study were 161 pregnant women who did not have a history of high blood pressure, were willing to be respondent and did not have a problem during pregnancy. Sampling was done by purposive sampling technique.

The instrument of this study uses the Zung – Self Rating Scale (ZSAS) with 20 question items, consisting of attitude assessment and somatic symptoms. The assessment used a Likert scale from 1-4, which illustrates negative things with assessment: very rare (1), sometimes (2), often (3), and always (4). The anxiety level is categorized into four: Normal, if the results of the questionnaire scores are 25-44, mild anxiety for 45-59 scores, moderate for 60-74, and severe anxiety for 75-80. The validity and reliability of ZSAS used Indonesian version (Cronbach's $\alpha = 0,829$). Low back pain (LBP) was measured using a numeric rating scale (NRS) consisting of 4 measurement results: no pain (score 0), mild pain (score 1-3), moderate pain (score 4-6), and severe pain (score 7-10), while the quality of sleep is measured using Pittsburgh sleep quality index (PSQI) which was developed by Bussye et al. [8] and had been modified in Indonesia. It consists of seven components subjective sleep quality, sleep latency, habitual efficiency, sleep duration, sleep disturbance, medicine, and daytime dysfunction. The score of PSQI is 0 – 21, pregnant women with score < 5 is considered to have good sleep quality, and ≥ 5 is considered to have poor sleep

quality. The validity and reliability of the Indonesian version of the PSQI[9] is shown with the value of Cronbach's $\alpha = 0,741$.

The data were taken by interview and self-administered. Research has passed the ethical test of the Ethics Committee of FKIK UMY Indonesia with the number 331/EP-FKIK-UMY/VII/2018. The participant received information about the research and written consent in the informed consent before filling a questionnaire. Data analysis used chi-square and multiple logistic regression to determine the factors that most influence sleep quality.

III. RESULT AND ANALYSIS

A. Characteristics of Pregnant Women

Table 1. Characteristics of pregnant women (n = 161)

| Variable | Frequency | Percentage |
|----------------------|-----------|------------|
| Age | | |
| < 20 years | 5 | 3.1% |
| 20 – 34 years | 144 | 89.4% |
| ≥ 35 years | 12 | 7.5% |
| Pregnancy age | | |
| First Trimester | 30 | 18.63% |
| Second Trimester | 68 | 42.24% |
| Third Trimester | 63 | 39.13% |
| Parity | | |
| Primigravida | 70 | 43.5% |
| Multigravida | 91 | 56.5% |

It shows that most of pregnant women age is 20-34 years (89.4%). Also, almost half of pregnant women in this study were in the second trimester (42.2%), and more than half of pregnant women were in the multiparous mothers (56.5%).

The characteristics of respondents in this study included age, gestational age, and several pregnancies. The age of the respondents in this study was at most in the range of 20 to 35 years. According to the Health Ministry of Indonesia, the age above 20 years is a condition that is considered physically ready for the female reproductive organs to become pregnant; besides that, women are considered psychologically prepared. The ideal age for women to get pregnant should be more than 20 years and less than 35 years[6].

The age that is too young during pregnancy will increase the health risk of the mother and fetus. Women who are younger having 10% higher risk of stunting [10]. While pregnant women with more than 35 years are having a higher risk of complications during pregnancy. Possible complications include gestational diabetes, placenta previa, baby buttock presentation, preeclampsia, getting induction during labor, and cesarean delivery [11].

The results of this study indicate that the majority of respondents were in the second trimester of pregnancy. This is in line with the research of Shariat et al. [12] that the majority of respondents were in the second trimester.

The characteristics of the next respondent are parity. Most of the respondents in this study had a previous pregnancy experience. This is not in line with the research of Xianglong et al. [13], which shows that most of the respondents were mothers who were pregnant for the first time. Multiparous pregnant women have experience and knowledge about the risks of pregnancy so that they are better prepared to undergo their pregnancy [14].

B. Anxiety, Low Back Pain (LBP), and Sleep Quality of Pregnant Women

Table II. Anxiety level, LBP, and sleep quality of pregnant women (n = 161)

| Variable | Frequency | Percentage |
|----------------------|-----------|------------|
| Anxiety level | | |
| Normal | 112 | 69.6% |
| Mild | 43 | 26.7% |
| Moderate | 6 | 3.7% |
| Severe | 0 | 0% |
| LBP | | |
| No pain | 17 | 10.6% |
| Mild | 79 | 49.1% |
| Moderate | 56 | 34.8% |
| Severe | 9 | 5.6% |
| Sleep Quality | | |
| Good | 34 | 21.1% |
| Poor | 127 | 78.9% |

It shows that almost pregnant women in this study did not experience anxiety during pregnancy (69.6%), while almost half of pregnant women in this study experienced mild levels of LBP (49.1%) and more than a quarter of respondents had moderate levels of LBP pain (34.8%), and most respondents also have poor sleep quality (78.9%).

The results of this study indicate that most pregnant women do not experience anxiety during pregnancy. This is in line with research conducted by Silva et al. [15], which shows that most pregnant women do not experience anxiety. Mothers who have multiple pregnancy experience tend to get less anxiety during the pregnancy process. Pregnant women in the work area of Public Health Center 1 Kasihan, Bantul, Yogyakarta get education about pregnancy every month.

The results showed that almost half of the respondents experienced LBP with a mild scale while more than a quarter experienced moderate-scale. Usman et al. [16] said that pregnant women who experienced LBP were 106 (34, 3%). Another study by Carvalho et al. [17] shows that 68% of pregnant women experience LBP, whereas according to Gharaibeh et al. [18] shows that 76% of their study respondents experienced LBP during pregnancy.

LBP that occurs in pregnant women is caused by an increase in maternal weight during pregnancy, an increase in sagittal abdominal diameter, and shift in the body's center of gravity anteriorly due to the enlarged uterus and increased pressure on the lower back [19]. Khanna et al. [20] added that LBP occurs due to the size of the abdomen that has increased. Lower back pain increases with increasing gestational age [21], while changes in the uterus causes the center of gravity of change [22]. The improper posture of the mother can cause additional fatigue and stretch in the body of pregnant women, especially in the area of the spine so that it can cause lower back pain [23].

This study shows that most pregnant women have poor sleep quality. This is in line with the research of Sedov et al. [24]. Ko et al. stated that 60% of the research respondents had poor sleep quality [13, 25]. Pregnant women will often experience sleep disorders, sleep deprivation, and symptoms of high sleep disturbances during pregnancy [26].

Sleep disturbances in pregnant women are caused by an increase in the frequency of urinary at night, difficulties in finding a comfortable sleeping position, and restless leg [27].

In addition, The increase of oxytocin at the end of pregnancy also increases sleep disturbances in pregnant women [28].

C. Relationship between Characteristic, anxiety, and LBP with Sleep Quality of Pregnant Women

Relationship Between Characteristic, Anxiety, and LBP with Sleep Quality of pregnant women

Table III. Relationship between Characteristics of Pregnant Women, Anxiety, and LBP with Sleep Quality for Pregnant Women

| Variable | Sleep of quality | | | | p-value |
|------------------|------------------|------|------|------|---------|
| | Good | | Poor | | |
| | f | % | F | % | |
| Age | | | | | |
| < 20 years | 2 | 40 | 3 | 60 | 0.532 |
| 20 – 34 years | 29 | 20.1 | 115 | 79.9 | |
| ≥ 35 years | 3 | 25 | 9 | 75 | |
| Age of pregnancy | | | | | |
| First Trimester | 6 | 20 | 24 | 80 | 0.564 |
| Second Trimester | 17 | 25 | 51 | 75 | |
| Third Trimester | 11 | 17.5 | 52 | 82.5 | |
| Parity | | | | | |
| Nullipara | 18 | 25.7 | 52 | 74.3 | 0.290 |
| Multigravida | 16 | 17.6 | 75 | 82.4 | |
| Anxiety | | | | | |
| Normal | 33 | 29.5 | 79 | 70.5 | 0.000 |
| Mild | 1 | 2.3 | 42 | 97.7 | |
| Moderate | 0 | 0 | 6 | 100 | |
| LBP | | | | | |
| No pain | 5 | 29.5 | 12 | 70.6 | 0.008 |
| Mild | 24 | 30.4 | 55 | 69.6 | |
| Moderate | 4 | 7.1 | 52 | 92.9 | |
| Severe | 1 | 11.1 | 8 | 88.9 | |

The result of this study showed that pregnant women who are almost 35 years of age have poor sleep quality (75%) and 20-34 years old mother also have poor sleep quality (79.9%). While the statistic test results show that $p_{value} > 0.05$. It means that there is no relationship between the age of pregnant women and sleeps quality. This is different from a study by Yang et al. [29] which showed tht the sleep quality was declined as age growths among pregnant women.

Most pregnant women with the third trimester of pregnancy have poor quality (82.5%). This also occurs in first-trimester pregnant women who mostly experienced poor sleep quality (80%). The sleep quality was decline with increased gestational age [24]. The results of the statistical test show $p_{value} > 0.05$, which means that there is no relationship between gestational age and sleep quality in pregnant women.

Sleep quality in primiparous mothers showed that most of the mothers had poor sleep quality (74.3%). This also happened to multiparous mothers, which most of whom had poor sleep quality (82.4%). The results of statistical tests show that $p_{value} > 0.05$, which means there is no relationship between parity and sleep quality in pregnant women.

The results showed that there was no relationship between maternal age, gestational age, and pregnancy experience. This study is in line with the research of

Xianglong et al. [13], which states that there is no significant relationship between parity, maternal age, and gestational age with maternal sleep quality.

Poor sleep quality is experienced by all pregnant women who have moderate anxiety levels (100%), besides that pregnant woman who does not experience anxiety also have much worse sleep quality (70.5%). The statistical test results $p_{value} < 0.05$. This indicates that there is a relationship between the level of anxiety and the quality of sleep for pregnant women. The result of study supported by Polo-Kantola et al. [30] anxiety had a correlation with sleep quality of pregnant women.

Sleep quality of pregnant women who have moderate LBP levels has poor sleep quality (92.9%), and pregnant women who do not have LBP also have poor sleep quality (70.6%). The statistical test results $p_{value} < 0.05$. This means that there is a significant relationship between LBP and the sleep quality for pregnant women. This is in line with the study of de Sousa et al. [7] which showed that there is a relationship between low back pain and the quality of sleep in pregnant women. Marin et al. [31] and Axen [32] added that the incidence of low back pain could lead to sleep disorders.

Individuals who have low back pain have more alpha EEG waves in NREM sleep, which can interfere with deep sleep. The presence of painful stimuli from injured muscles due to lower back pain causes abnormalities in alpha EEG waves so that sleep becomes disrupted, and sleep quality becomes worse [33].

D. Factors Related to Sleep Quality of Pregnant Women

Factors Related to Sleep Quality of Pregnant Women

Table IV. Factors Related to Sleep Quality of pregnant women

| Variable | p-value | OR (CI 95%) |
|----------|---------|------------------------|
| Anxiety | 0.008 | 15.019 (2.019 – 111.7) |
| LBP | 0.026 | 1.988 (1.086 – 3.641) |

The result of multivariate analysis showed that the variables that most affected the sleep quality of pregnant women is anxiety (OR=15,019). Pregnant women with severe anxiety have a 15 times greater chance of having poor sleep quality compared to pregnant women who do not have anxiety during pregnancy. The result of this study is supported by Shariat et al. [12] that there is a relationship between anxiety experienced by pregnant women and sleep quality. Stress is one of several variables that affect sleep quality, especially regarding subjective evaluations [34]. The stress can increase the cortisol awakening response and hyperactive hypothalamus-pituitary-adrenal (HPA) that influence sleep [35].

IV. CONCLUSION AND SUGGESTIONS

In this present study, 78.9% of pregnant women have poor sleep quality. Factors affecting the quality of sleep in pregnant women are anxiety and low back pain. Future studies need to intervene in the LBP and anxiety that often occurred in pregnant women. Professional health care

services should provide education about adaptation in pregnancy for pregnant women.

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