E-ISSN: 2528-410X
RESEARCH ARTICLES

Differences in Sleep Quality of Schizophrenia Patients Based on Gender at Madani Hospital Medan, North Sumatra

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Abstract: *Schizophrenia is a severe mental disorder, this disorder is characterized by delusions, hallucinations, thought disorder, restlessness, strange or hostile behaviour, feeling (affect) dull or flat, interest away from social interactions, little emotional contact (quiet, difficult to talk to), passive, apathetic or indifferent, difficult to think abstractly and lose of motivation. Sleep disturbances have been assessed in various studies in patients with schizophrenia, using subjective (ie daily interviews, sleep diaries) and objective (ie, polysomnography and actigraphy) parameters. Compared with healthy controls, patients with schizophrenia exhibit longer sleep onset latency, decreased sleep efficiency, more nighttime awakenings, increased daytime dysfunction due to sleep deprivation, poorer overall sleep quality, and a higher proportion of sleep disturbances. Previous studies have suggested that poor sleep quality is associated with female gender in schizophrenic patients. This study aims to determine the difference in sleep quality of schizophrenia patients based on gender at Madani Hospital Medan, North Sumatra. This study is an analytical descriptive with a cross-sectional study approach, sampling method using a purposive sampling technique. The data of this study were obtained from primary data using questionnaire instruments and patient medical records. Data analysis using Chi-Square test. The results showed that the sleep quality of male research respondents with disturbed sleep quality was found in 18 people (51.4%), and undisturbed sleep quality was found in 17 people (48.6%). Of female research respondents, 22 people (62.9%) had disturbed sleep quality and 13 people (37.1%). The p-value was found to be 0.334 (p>0.05), which means that there was no significant difference in the sleep quality of schizophrenic patients based on gender at Madani Hospital Medan, North Sumatra. There was no significant difference in the sleep quality of schizophrenic patients based on gender at Madani Hospital Medan, North Sumatra.*

Keywords: Gender, schizophrenia, sleep quality

E-ISSN: 2528-410X

INTRODUCTION

Mental disorders are a combination of signs and behavioural changes that occur in a person that can cause suffering and difficulties in carrying out daily life and social interactions.[1] Mental disorders, although they do not directly trigger death, can cause misery for sufferers and heavy burdens for families, so that sufferers are no longer productive.[3] Schizophrenia is a severe mental disorder that can overhaul a person's lifestyle in daily life, this disorder is characterized by delusions, hallucinations, confusion of mind, restlessness, strange or hostile behaviour, dull or flat feelings (affect), detachment from association, low emotional contact (quiet, difficult to talk to), passive, apathy or indifference, difficulty thinking abstractly and loss of motivation.[4,5]

Sleep difficulties can be measured according to various studies in people with schizophrenia, using both subjective (i.e., daily interviews, sleep diaries) and objective (i.e., polysomnography and activation) parameters.

Compared to healthy humans, patients with schizophrenia indicated the potential for longer sleep initiation, reduced sleep efficiency, frequent awakenings at night, decreased productivity levels during the day due to sleep deprivation, poorer overall sleep quality and higher rates of sleep disturbances.[10] Sleep complaints in this population are associated with poorer psychiatric outcomes, including worsening psychotic symptoms, cognitive impairment, poorer quality of life, and increased depressive symptoms.[11]

One study found that more male schizophrenia patients had better sleep quality compared to female patients, although no difference was observed between the two groups in actual sleep scores. There was no difference in sleep quality between men and women in the healthy control group. Good sleep quality is essential for optimal health, as improvements in body systems occur during sleep; and brain organs undergo self-cleansing of metabolites and memory strengthening.[5] Studies of sleep disorders in newly treated patients found that 83% of patients with acute schizophrenia experienced at least one type of sleep disorder (difficulty falling asleep, difficulty waking up, difficulty maintaining sleep, poor sleep quality, or increased time spent in bed). Sleep irregularities in people with schizophrenia lead to a deterioration of the clinical condition.[10]

Sleep-deprived patients showed lower scores across all quality-of-life domains; Patients who were more stressed and agitated experienced a more negative reaction to treatment than those who slept soundly.[14] Studies have also shown that sleep disorders are associated with increased thought disturbances and positive symptoms, and can predict the occurrence of symptom recurrence.[13] The importance of sleep quality for a better prognosis of schizophrenia makes researchers interested in researching the difference in sleep quality of schizophrenia patients based on gender at Madani Hospital Medan, North Sumatra.

METHOD

This type of research is descriptive-analytical with *a cross-sectional design.* This research was conducted at Madani Hospital Medan, North Sumatra. The sample that is the subject of this study is schizophrenia patients at Madani Hospital Medan, North Sumatra who meet the inclusion criteria from June 2021 to December 2021. The data taken in this study are primary data using questionnaire instruments and secondary data through medical records. The results of the study were analyzed using *the Chi-Square Fisher Exact test* with a statistically significant difference if the value was ($p<0.05$).

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E-ISSN: 2528-410X

RESULT

Table 1 Demographic Characteristics of Research Respondents

Demographic Characteristics	Sum (n)	Percentage (%)
Gender		
Man	35	50%
Woman	35	50%
Age		
15-24	6	8.6%
25-33	28	40%
35-44	23	32.9%
45-55	13	18.6%
Sleep Disorders		
Annoyed	40	57.1%
Uninterrupted	30	42.9%
Education Level		
Not in school	7	10%
Primary school	18	25,7%
Junior High School	17	24,3%
High School	19	27,1%
College	9	12,9%
Duration of Treatment		
<1 year	44	62.9%
>1 year	26	37.1%
Total	**70**	**100%**

Table 1. The above explains that the male research respondents are 35 people (50%), and the female research respondents are 35 people (50%). The age group of most respondents was found at the age of 25-33 years amounting to 28 people (40%), compared to the age of 35-44 years amounting to 23 people (32.9%), the age of 45-55 years amounting to 13 people (18.6%), and the age of 15-24 years amounting to 6 people (8.6%). Disturbed sleep quality in respondents was found in 40 people (57.1%), while sleep quality in 30 people (42.9%) other respondents were not disturbed. The most common level of education was high school in 19 people (27.1%), compared to elementary school education in 18 people (25.7%), junior high school in 17 people (24.3%), and college in 9 people (12.9%), and not in school in 7 people (10%). For the length of treatment, 44 people (62.9%) underwent treatment <1 year and 26 people (37.1%) underwent treatment >1 year.

Table 2 Proportion of Sleep Quality of Schizophrenia Patients by Length of Treatment

Duration of Treatment	Sleep Quality				Total	
	Annoyed		Uninterrupted			
	n	%	n	%	n	%
<1 year	28	70	16	53,3	44	62,9
>1 year	12	30	14	46,7	26	37,1
Total	**40**	**100**	**30**	**100**	**70**	**100**

Table 2. The above explains the sleep quality of schizophrenia patients based on the length of treatment, the most disturbed sleep quality was found in patients with a treatment duration of <1 year, which is 28 people (70%), compared to a treatment time of >1 year, which is in 12 people (30%). Next, undisturbed sleep quality was most common in patients with a treatment duration of <1 year, namely in 16 people (53.3%), compared to a treatment duration of >1 year in 14 people (46.7%).

Table 3 Proportion of Sleep Quality of Schizophrenia Patients by Education Level

Education Level	Sleep Quality				Total	
	Annoyed		Uninterrupted			
	n	%	n	%	N	%
Not in school	2	5	5	16,7	7	10
Primary school	10	25	8	26,7	18	25,7
Junior High School	9	22,5	8	26,7	17	24,3
High School	13	32,5	6	20	19	27,1

E-ISSN: 2528-410X

College	6	15	3	10	9	12,9
Total	**40**	**100**	**30**	**100**	**70**	**100**

Table 3. The above explains the sleep quality of schizophrenia patients based on the level of education, the most disturbed sleep quality is found at the education level of high school, elementary school, junior high school, college, and non-school in 13 people (32.5%), 10 people (25%), 9 people (22.5%), 6 people (15%), and 2 people (5%). The quality of undisturbed sleep based on education level was found in 8 people (26.7%), 8 people (26.7%), 8 people (26.7%), 5 people (16.7%), and 3 people (10%).

***Table* 4** Pittsburgh Sleep Quality Index (PSQI*) Score Distribution*

Component	Category	Gender				Total	
		Man		Woman			
		n	%	n	%	n	%
Subjective sleep quality	Excellent	5	14,3	7	20	12	17,1
	Pretty good	12	34,3	6	17,1	18	25,7
	Pretty bad	10	28,6	6	17,1	16	22,9
	Very bad	8	22,9	16	45,7	24	34,3
Sleep latency	0	11	31,4	5	14,3	16	22,9
	1	14	40	13	37,1	27	38,6
	2	5	14,3	6	17,1	11	15,7
	3	5	14,3	11	31,4	16	22,9
Length of sleep at night (hours)	>7	16	45,7	13	37,1	29	41,4
	6-7	14	40	11	31,4	25	35,7
	5-6	4	11,4	4	11,4	8	11,4
	<5	1	2,9	7	20	8	11,4
Sleep efficiency (%)	>85%	16	45,7	13	37,1	29	41,4
	75-84%	17	48,6	15	42,9	32	45,7
	65-74%	2	5,7	4	11,4	6	8,6
	<65%	0	0	3	8,6	3	4,3
Sleep disorders	0	16	45,7	17	48,6	33	47,1
	1	16	45,7	13	37,1	29	41,4
	2	2	5,7	3	8,6	5	7,1
	3	1	2,9	2	5,7	3	4,3
Use of sleeping pills	Never in the past month	35	100	35	100	70	100
	1x Week	0	0	0	0	0	0
	2x Week	0	0	0	0	0	0
	≥3x Week	0	0	0	0	0	0
Daytime dysfunction	0	4	11,4	8	22,9	12	17,1
	1	13	37,1	10	28,6	23	32,9
	2	13	37,1	8	22,9	21	30
	3	5	14,3	9	25,7	14	20
Total	**>5**	**18**	**51,4**	**22**	**62,9**	**40**	**100**
	≤5	**17**	**48,6**	**13**	**37,1**	**30**	**100**

E-ISSN: 2528-410X

Table 4. above explains the distribution of Pittsburgh Sleep Quality Index (PSQI) *scores* on each component based on gender. For subjective sleep quality in male respondents, most were found to be quite good in 12 people (34.3%), compared to subjective sleep quality was quite poor in 10 people (28.6%), very bad in 8 people (22.9%), and very good, namely in 5 people (14.3%). Meanwhile, the subjective sleep quality in most female respondents was found to be very poor in 16 people (45.7%), compared to the subjective sleep quality was very good in 7 people (20%), quite bad in 6 people (17.1%), and quite good in 6 people (17.1%). Next, the sleep latency component in male respondents was found to experience sleep latency in 24 people (68.6%), while the other 11 people (31.4%) did not experience sleep latency. Meanwhile, sleep latency in most female respondents was found to experience sleep latency in 30 people (85.7%), while the other 5 people (14.3%) did not experience sleep latency.

For the component of the length of night sleep in male respondents, the most common length of night sleep was >7 hours in 16 people (45.7%), compared to 6-7 hours of sleep in 14 people (40%), 5-6 hours in 4 people (11.4%), and the length of night sleep for <5 hours in 1 person (2.9%). In the female gender, the most night sleep duration was found for >7 hours, namely in 13 people (37.1%), compared to 6-7 hours sleep in 11 people (31.4%), <5 hours in 7 people (20%) and 5-6 hours of night sleep in 4 people (11.4%).

Next is the sleep efficiency component, where for male respondents it was found that the most had a sleep efficiency of 75-84% in 17 people (48.6%), compared to sleep efficiency >85% in 16 people (45.7%), and 65-74% in 2 people (5.7%), and no male respondents had sleep efficiency <65%. Meanwhile, female respondents were found to have the most sleep efficiency of 75-84% in 15 people (42.9%), compared to sleep efficiency >85% in 13 people (37.1%), 65-74% in 4 people (11.4%), and sleep efficiency <65% in 3 people (8.6%).

The next component of PSQI is the sleep disorder component, where male respondents were found to have sleep disorders in 19 people (54.3%), while the other 16 people (45.7%) did not experience sleep disorders. Meanwhile, sleep disorders in female respondents were found in 18 people (51.4%), and another 17 people (48.6%) did not experience sleep disorders.

For the component of sleeping pill use, all respondents had never used sleeping pills in the past month.

The last component of PSQI is daytime dysfunction, where male respondents were found to experience daytime dysfunction in 31 people (88.6%), while the other 4 people (11.4%) did not experience daytime dysfunction. Meanwhile, female respondents had daytime dysfunction in 27 people (77.1%), and another 8 people (22.9%) did not experience daytime dysfunction.

Overall, the PSQI score of ≤5 was interpreted as undisturbed sleep quality was found in 30 people (42.9%), and the >5 score was interpreted as disturbed sleep quality was found in 40 people (57.1%).

E-ISSN: 2528-410X

***Table* 5 Sleep Quality Characteristics of Schizophrenia Patients by Gender**

Gender	Kualitas Tidur		*P* value
	Annoyed n (%)	Uninterrupted n (%)	
Laki-laki	18 (51.4%)	17 (48.6%)	0.334
Perempuan	22 (62.9%)	13 (37.1%)	
Total	**40 (57.1%)**	**30 (42.9%)**	

Table 5. above explains that the sleep quality of male research respondents with disturbed sleep quality was found in 18 people (51.4%), and undisturbed sleep quality was found in 17 people (48.6%). In female study respondents, impaired sleep quality was found in 22 people (62.9%) and undisturbed sleep quality was found in 13 people (37.1%). A *P*-value of 0.334 was found which means that there was no significant difference in the sleep quality of schizophrenia patients based on gender at Madani Hospital Medan, North Sumatra.

DISCUSSION

The results of this study show that schizophrenia patients based on the age group of 25-33 years are the most numerous, amounting to 28 people (40%), and 35-44 years old totalling 23 people (32.9%). The results of this study are slightly different from the 2020 study which stated that the age group of schizophrenia patients with the most is 35-44 years old amounting to 12,807 (30.5%) people, 45-54 years old amounting to 11,277 (26.9%) people, and the age group of 25-34 years amounting to 3,090 (20.3%) people.[25] The high prevalence of schizophrenia in the age group of 35-44 years is thought to occur due to *the onset* of schizophrenia generally occurring in the second or third decade of life, with *the onset* of the disease in men 1.5 years earlier than in women. The study also states that the peak of schizophrenia occurs slightly differently between men and women.[11,26]

The results of this study showed that the quality of sleep was disturbed in 40 people (57.1%), while the quality of sleep in 30 people (42.9%) of the other respondents was not disturbed. This is in line with previous research that stated that the optimal sleep duration of the schizophrenic group was less and the sleep quality of the schizophrenic group was worse compared to the group without psychiatric diseases.[19] The results of this study are also in line with a 2020 study which stated that sleep disorders were found in 57.4% of schizophrenia patients, while another 42.6% did not experience sleep disorders.[20] About 30-80% of schizophrenia patients experience some form of sleep disorder.[14] Sleep quality is a complex element associated with a person's quality of life. Poor sleep quality is a common symptom and is a consequence of psychiatric illnesses.[27] Sleep disturbances in schizophrenia patients are related to the hyperactivity of the dopaminergic system which is the main pathophysiology that causes schizophrenia and will give rise to clinical symptoms, both positive and negative symptoms in schizophrenia patients.[28,29]

The results of this study show that the education level of respondents who are schizophrenia patients at Madani Hospital Medan, North Sumatra, is found in Senior High School, which is 19 people (27.1%), Elementary School, 18 people (25.7%), and Junior High School, which is 17 people (24.3%). The results of this study are slightly different from the study in China in 2021 which stated that the education level of schizophrenia patients was junior high school (147 people (33.9%), high school or equivalent as many as 115 people (26.6%), then a bachelor's degree or higher which was 92 people (21.2%), and the least common education level of schizophrenia patients was elementary school or no school at all as many as 79 people (18.2%).[30] The results of this study are also slightly different from the research at the Jimma University Health Center, Ethiopia in 2020

E-ISSN: 2528-410X

which stated that the most common level of education for schizophrenia patients was elementary school in 137 people (33.3%), followed by junior high school in 110 people (26.8%), non-formal school in 94 people (22.9%), and junior high school and above in 70 people (17%).[31] The higher a person's education level, the higher the level of cognitive health. In addition, high levels of education are associated with a reduced risk of schizophrenia. The level of education has also been shown to increase a person's creativity and self-control. The effect of education level on the incidence of schizophrenia by sex is more common in women than men, in addition to the slightly slower onset of schizophrenia, women also tend to experience fewer socioeconomic problems such as income and power than men which can contribute to mental health.[32]

The results of this study showed that the proportion of sleep quality of schizophrenia patients based on the length of treatment, the most disturbed sleep quality was found in patients with a treatment duration of <1 year, which was 28 people (70%), and undisturbed sleep quality was found most in patients with a treatment duration of >1 year, namely in 16 people (53.3%). The duration of treatment for schizophrenia patients is not related to sleep quality. A study in Qatar in 2020 showed that schizophrenia patients who did not receive treatment experienced shorter sleep durations compared to those who received treatment.[21] The use of antipsychotic drugs as therapy in schizophrenia patients is related to a more consistent quality of sleep in patients due to the sedative effect caused by these drugs. Often schizophrenia patients are given antipsychotic drugs with a strong sedative effect so that they can improve the quality of the patient's sleep. Patient adherence to adequate and regular antipsychotic medication has been proven to have a positive effect on the sleep quality of schizophrenia patients, namely increasing sleep efficiency and sleep duration, decreasing sleep latency, and normalizing slower wake-up cycles. Meanwhile, if the consumption of antipsychotic drugs is stopped suddenly, it will result in changes in the sleep cycle that cause a decrease in the sleep quality of schizophrenia patients.[29]

The results of this study showed that the proportion of sleep quality of schizophrenia patients based on education level, the most disturbed sleep quality was found at the education level of high school, elementary school, and junior high school respectively in 13 people (32.5%). Meanwhile, the quality of sleep not disturbed based on the level of education was found at the level of junior high school and elementary school education, which was in 8 people each (47.1%). Sleep quality is related to the level of education. The cognitive performance of the brain for lower levels of education among women can be described by lower social pressure for higher educational attainment, mainly due to the different cultural pressures exerted on men and women. A study in 2020 stated that lower levels of education are predictors of worse outcomes. In this study, sleep disorders were found in older women who had lower levels of education.[21]

The PSQI score of each component in this study was classified based on the gender of the research respondents, where the subjective sleep quality component in the male respondents was found to be quite good, namely in 12 people (34.3%), and in the female respondents, the subjective sleep quality was found to be very poor in 16 people (45.7%). The results of this study are not in line with a 2019 study that reported that male schizophrenia patients had poor subjective sleep quality compared to a healthy control group.[34] The results of this study are also not in line with a study in 2020 which stated that overall the subjective sleep quality of schizophrenia patients who underwent the most treatment was quite good, namely in 147 people

E-ISSN: 2528-410X

(35.8%), very good in 109 people (26.5%), quite bad in 95 people (23.1%), and very bad in 60 people (14.6%).[20]

Next, the sleep latency component in male respondents was found to experience sleep latency in 24 people (68.6%), while sleep latency in female respondents was found in 30 people (85.7%). The results of this study are in line with one study that reported that male and female schizophrenia patients experienced longer sleep latency compared to a healthy control group.[34] Meanwhile, the results of this study are quite different from the results of other studies that reported that overall sleep latency in schizophrenia patients undergoing treatment was quite good in 122 people (29.7%), very bad in 107 people (26%), very good in 100 people (24.3%), and quite bad in 82 people (20%).[20]

For the component of the length of night sleep in male respondents, most were found to sleep at night for >7 hours, namely in 16 people (55.2%), and in female respondents, the most night sleep was also found for >7 hours, namely in 13 people (44.8%). The results of this study are in line with a study conducted in the United States in 2020 which reported that male schizophrenia patients had a longer sleep duration compared to a healthy control group, and there was no difference in the length of sleep at night in female schizophrenia patients with a healthy control group.[34] This study is also in line with a study in Ethiopia in 2020 which reported that overall the most treated schizophrenic patients slept >7 hours in 154 people (37.5%), 6-7 hours in 142 people (34.5%), 5-6 hours in 66 people (16.1%), and <5 hours in 49 people (11.9%).[20]

The next component of PSQI is the sleep disorder component, where male respondents were found to have sleep disturbances in 19 people (54.3%), while female respondents were found to have sleep disturbances in 18 people (51.5%). The results of this study are in line with a study in the United States in 2020 that reported that a group of schizophrenia patients experienced an increase in sleep disturbances in both sexes compared to a healthy control group. Still, in the same study, female schizophrenia patients experienced more sleep disturbances compared to a healthy control group.[34] The results of this study are also in line with another study conducted in 2020 which reported that overall as many as 295 people (71.8%) of schizophrenia patients undergoing treatment experienced sleep disorders.[20]

Furthermore, the PSQI component is in the form of the use of sleeping pills, where for both genders of male and female respondents, it was found that they had never used sleeping pills in the past month. The results of this study are not much different from a study conducted by the Jimma University Health Center, Ethiopia in 2020 which stated that as many as 210 (51.1%) schizophrenic patients used sleeping pills in the past month and 201 (48.9%) schizophrenic patients did not use sleeping pills in the past month.[31] The results of this study are different from other studies conducted in 2020 which reported that as many as 222 (54%) schizophrenia patients who received treatment used sleeping pills, and another 189 (46%) did not use sleeping pills.[20]

The last component of PSQI is daytime dysfunction, where male and female respondents were found to experience the most daytime dysfunction in 31 people (88.5%), and in 27 people (77.2%). The results of this study are in line with a study in the United States in 2020 which reported that schizophrenia patients experienced more daytime dysfunction compared to a healthy control group, and male schizophrenia patients experienced more daytime dysfunction compared to female schizophrenia patients.[34]

The total PSQI score of respondents ≤5 interpreted as undisturbed sleep quality was

E-ISSN: 2528-410X

found in 30 people (42.9%), and the >5 score interpreted as disturbed sleep quality was found in 40 people (57.1%). The total PSQI score based on gender found that the most disturbed sleep quality was found in the female gender, namely 22 people (62.9%). The results of this study are in line with a study in the United States in 2020 that reported that schizophrenia patients were 2,762 times more likely to have impaired sleep quality compared to a healthy control group. The study also reported that female schizophrenia patients were 7,364 times more likely to have impaired sleep quality compared to a healthy control group.[34]

The results of this study are also in line with a 2020 study which reported that overall 236 people (57.4%) of schizophrenia patients undergoing treatment had impaired sleep quality, and another 175 people (42.6%) had undisturbed sleep quality.[20] A study conducted in the United States in 2020 stated that the sleep quality of schizophrenia patients based on male sex with the score of each PSQI component with longer sleep duration, poorer sleep quality, and more dominant daytime dysfunction. Meanwhile, the sleep quality of schizophrenia patients based on female sex with the scores of each component of the PSQI was longer sleep latency, more sleep disturbances, and reduced sleep efficiency.[34]

The results of this study showed that the most disturbed sleep quality was found in female respondents, namely in 22 people (62.9%), and the most undisturbed sleep quality was found in male respondents, namely 17 people (48.6%). The p-value was found to be 0.334, which means that there was no significant difference in the sleep quality of schizophrenia patients based on gender at Madani Hospital Medan, North Sumatra. Sleep disorders and decreased sleep quality levels are the most common complaints experienced in people with mental disorders, where 30-80% of schizophrenia patients experience sleep disturbances and sleep latency, which will then cause physical, mental, and emotional fatigue in patients. Sleep disturbances in schizophrenic patients appear earlier than psychosis symptoms in newly diagnosed patients and are associated with medication, chronic illness, poor mental health, and mortality. In addition, the many clinical symptoms of schizophrenia also contribute to poor sleep quality in schizophrenia patients. Positive symptoms such as hallucinations and delusions in schizophrenia patients cause patients to feel scared and have difficulty starting to sleep, so they will stay awake longer and experience a decrease in sleep quality. At the same time, negative symptoms such as anxiety and depression in schizophrenic patients can cause persistent nightmares, thus affecting the patient's sleep quality. In addition, positive symptoms are related to sleep disturbances, low daytime productivity, and the quality of the patient's sleep. Hallucinations and paranoia in patients are related to sleep disorders and also poor sleep quality.[20] Sex differences and their relationship to sleep quality are mainly associated with a higher incidence of affective disorders in women when compared to men, as well as socioeconomic differences.[23] In addition, the higher incidence of depression in the female sex contributes to gender differences with poor sleep quality.[20] The high prevalence of poor sleep quality in female schizophrenia patients is also related to the influence of sex steroid hormones on both sexes. The main gonadal sex steroids are estrogen and progesterone in females and testosterone in males. Low or consistently fluctuating estrogen levels are associated with increased sleep disorders including insomnia in women.[24] The sleep quality of schizophrenia patients can also be an important indicator for the improvement or worsening of the disease in both the male and female sexes, so further research is needed on this matter.

E-ISSN: 2528-410X

CONCLUSION

There was no significant difference in the sleep quality of schizophrenia patients based on gender at Madani Hospital Medan, North Sumatra.

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