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COMPARATIVE STUDY OF SLEEP-WAKE DISORDERS AMONG PATIENTS OF DEPRESSION, GENERALIZED ANXIETY, AND BIPOLAR DISORDERS

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generalized anxiety, depression, bipolar disorder, insomnia, restless legs syndrome/periodic limb movements in sleep, obstructive sleep apnea, parasomnias, age, marital status, gender, physical activity, GSAQ-11, purposive sampling, co-occurrence

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Abstract

In the current study, a comparison of sleep-wake disorders among patients of generalized anxiety, depression, and bipolar disorders was made. It also explored the association of correlates including marital status, gender, and physical activity on study variables. A quantitative cross-sectional survey research design was used for the collection of the data from Peshawar, Abbottabad, Mansehra, and Haripur through a purposive sampling technique. The sample of the study comprised 385 psychiatric patients with ages ranging from 21 to 60 years. The sample data was collected from outpatients seeking treatment from different hospitals, and psychiatric and rehabilitation centers using two sets of questionnaires one demographic information sheet and a global sleep assessment questionnaire (GSAQ-11) developed by Roth et al., (2002). The outcomes of the study revealed high co-occurrence and significant association of specific sleep-wake disorders among patients of depression, generalized anxiety, and bipolar disorders. Insomnia was the most co-occurring disorder followed by restless legs syndrome/periodic limb movements in sleep, obstructive sleep apnea, and parasomnias respectively. Findings indicated a higher co-occurrence of sleep-wake disorders in females as compared to male counterparts, in married individuals as compared to unmarried, and in individuals with lower physical activity as compared to individuals with higher physical activity. These findings will provide clinicians insights into the early detection and use of interventions for sleep problems among psychiatric patients, which would improve their quality of life.

INTRODUCTION

Daytime distress and impairment in functioning resulting from sleep quality, timing, or quantity are referred to as sleep-wake disorders. They frequently co-occur with physical conditions or other mental health issues, like anxiety, depression, or cognitive difficulties. (American Psychiatric Association [APA], 2013). In general, all sleep disorders share common symptoms of unusual movements, behaviors, or sensations, excessive sleepiness during daytime, and inability to fall asleep or stay asleep (International Classification of Sleep Disorders [ICSD], 2005).

Sleep disorders are common, easily treatable but often ignored health problems. According to estimates a chronic sleep problem occurs in 50 to 70 % of Americans and affects their physical and

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mental health and day-to-day functioning (National Academies of Sciences, Engineering, and Medicine, 2006).

Demographic differences are also found in study variables as revealed by the previous studies. According to a comprehensive population-based study, males are less likely to experience insomnia than females (Ford & Kamerow, 1989). The type of insomnia symptoms varies with age, with difficulties falling asleep happening more commonly in young adults and difficulties staying asleep more frequently in middle-aged and elderly individuals (American Psychiatric Association [APA], 2013).

The findings of a study conducted by Guo et al. (2023), showed that compared to the unmarried participants, married participants were more likely to report poor sleep quality, daytime drowsiness, and dysfunctional sleep beliefs Those who were separated, divorced, or widowed had lower sleep, which in turn raised the risk of depression, according to another follow-up research of middle-aged and older rural communities (Guo et al., 2023).

Evidence also suggests that sleep problem symptoms were linked to reduced levels of physical activity. According to a recent meta-analysis by Vancampfort et al. (2017), patients with severe mental illness were more sedentary than healthy controls, and having a higher body mass index was linked to lower levels of physical activity and sleep disturbances (Hombali et al., 2019).

Relationship between Sleep-Wake Disorders and Mental Health Disorders

There is compelling evidence that all these sleep problems are also common among those suffering from psychiatric disorders, and many of us are also aware that we feel better after a good night's sleep and worse when we are sleep-deprived. Therefore, sleep is crucial to not just our physical but also our mental well-being. Inadequate or poor-quality sleep might raise the risk of mental health issues (Colombia University Department of Psychiatry, 2022).

Research has revealed that there is a complex relationship between sleep and mental health (Scott et al., 2017). In addition to increasing the symptoms of many mental disorders, such as depression, anxiety, and bipolar disorder, sleep irregularities can also be caused by several psychiatric conditions (Cherry, 2023). The evidence so far suggests a reciprocal relationship between sleep-wake disorders and psychiatric problems, even though more study is needed to fully understand the links (Suni, 2023). This point of view is backed by the fact that sleep problems are recognizable symptoms of several psychiatric disorders and are a component of their diagnostic criteria (American Psychiatric Association, 2000).

According to DSM-5 sleep disturbances frequently co-occur in patients with psychiatric illnesses and must be taken into consideration when developing a treatment plan. Chronic sleep problems (both insomnia and excessive sleepiness) are known to increase the risk of developing mental illnesses in the future. They might also be the prodromal stage of a mental illness episode, allowing for early intervention to prevent or lessen a full-blown episode (American Psychiatric Association [APA], 2013).

Although sleep-wake disturbances are widespread and morbid in Asia and Pakistan's clinical population, the data available is limited. Moreover, in Pakistani population studies have been conducted in Karachi and Lahore on the general population but not in the specific area of Khyber Pakhtunkhwa and the clinical population. Therefore, there is a dire need to conduct further studies in Pakistani and, by extension, the Asian population. So, the present study conducted on sleep-wake disorders among psychiatric patients can practically and theoretically contribute to filling this gap. It has the potential to bridge gaps in our understanding of these complex conditions, leading to practical benefits in patient care and theoretical advancements in the fields of psychiatry and sleep medicine.

The study may shed light on the development of specifically designed screening and assessment tools on sleep-wake disorders for psychiatric patients. These tools can facilitate early and independent detection and intervention of sleep disorders. Identifying and addressing these

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disorders in psychiatric patients can lead to improved patient care and quality of life and can guide clinicians in developing more effective treatment plans and preventative measures. For example, addressing specific psychiatric symptoms or providing sleep hygiene education could help prevent the onset of these disorders. These findings can inform future research directions and clinical practices, ultimately improving the lives of individuals with psychiatric disorders who also experience sleep-wake disturbances.

Materials and Methods

Research Design

This study was conducted with the help of a cross-sectional survey research design which is the optimum option to compare different variables at a single point in time. The comparison of co-occurring sleep-wake disorders and the association of demographics was investigated to draw conclusions. Therefore, the cross-sectional survey research design was used in the current study.

Sample

A purposive sampling technique was used to collect data from 385 diagnosed patients of depression, generalized anxiety, and bipolar disorders with an age range of 21-60 years. The sample data was collected from different psychiatric centers, hospitals, and rehabilitation centers from different major cities of Khyber Pakhtunkhwa (Peshawar, Abbottabad, Mansehra, and Haripur). The sample was categorized based on gender (males = 150, females = 235), marital status (married = 231, unmarried = 94, Divorced=60), and physical activity (high= 165, low= 220).

Inclusion Criteria

Only diagnosed patients with depression, generalized anxiety, and bipolar disorders were included in the study with an age range of 21-60 years. Psychiatric outpatients seeking treatment from hospitals, psychiatric centers, and rehabilitation centers were included in the study. Demographics of gender, age, marital status, and physical activity were also included in the study.

Exclusion Criteria

Psychiatric inpatients and the general population were excluded from the study. Participants previously diagnosed with any of the sleep disorders were also excluded from the study.

Instruments

Global Sleep Assessment Questionnaire, a demographics sheet, and an informed consent form were used for the collection of data. The detail of the data collection tools is as follows:

Demographic Sheet

Participants were asked to fill demographics sheet providing information about their gender, age, marital status, physical activity, and psychiatric diagnosis.

Global Sleep Assessment Questionnaire

GSAQ a brief 11-item, self-reported questionnaire with four response options (never, sometimes, usually, and always) was used in the present study. It was developed by Roth et al., in 2002. Four subscales were used to screen for four major sleep-wake disorders. Items 1, 2, and 3 measured insomnia, items 2, 3, 5, and 6 measured obstructive sleep apnea, items 1, 2, 7, and 8 measured periodic limb movements in sleep and restless legs syndrome, and, items 2, 3, 9, and 10 (b) measured parasomnias.

Scores on the scale range from 15 to 45, the higher the score higher the likelihood of the disorder being present. The scale's original alpha reliability was .70 (Roth et al., 2002). The reliability obtained in this study was α= .816.

Procedure

Before collecting any data from participants for the current study, participant consent and relevant institution consent were requested. The participants were approached in various hospitals, rehabilitation centers, and psychiatric centers in Khyber Pakhtunkhwa. Participants were made sure of the confidentiality of the data collected from them. After receiving informed consent, the demographic sheet and questionnaire were given out. Participants had the right to withdraw from the study at any time they wanted. According to

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the given instructions, the questionnaires were filled out completely by each respondent.

The data collection started on February 17, 2023, and ended on May 16, 2023. The results obtained from the gathered data were shared with the administration upon request. In the end, participants were thanked for participating in the study and were given a chance to ask any question regarding the nature and goal of the study.

Data Analyses

The SPSS-26 (statistical package for social sciences), was used to meticulously enter, analyze, and arrange all the data. For calculating the reliability of the scale Cronbach Alpha was employed. Validity of the scale was also computed. Based on hypotheses and objectives comparison was made by calculating the percentage of co-occurring sleep disorders. A correlation analysis was conducted to identify the nature and direction of the relationship between GSAQ and sub-scales. For demographic differences in the study variables independent sample t-test and ANOVA were conducted. Descriptive statistics of mean, standard deviation, frequency, and percentage were used to present continuous and categorical variables.

Ethical Considerations

Ethical Research Committee of Hazara University, Mansehra approved this research. After ethical approval from the Graduate Research Committee (GRC) Psychology Department and the Advanced Studies and Research Board (ASRB) at Hazara University the study was conducted.

Results

Table 1 Demographic Characteristics of Participants (N=385)

Variables	*N*	%
Gender		
Female	235	61%
Male	150	39%
Marital Status		
Unmarried	94	24.4%
Married	231	60%
Divorced	60	15.6%
Physical Activity		
High	165	42.9%
Low	220	57.1%

Note. Demographic Characteristics of Gender, Marital Status, Physical Activity

Table 2 Frequencies of Co-occurring Sleep-Wake Disorders among Patients of Generalized Anxiety, Depression, and Bipolar Disorders (N=385)

	Psychiatric Disorders			
Sleep-Wake Disorders	Depression (n=138)	Generalized Anxiety (n=114)	Bipolar (n=133)	Total (n=385)
ID	129	101	131	361
OSA	118	98	106	322
RLS/PLMS	111	105	110	326
PS	113	74	100	287

Note. N=385; n=138 Depression; *n= 114* Generalized Anxiety; *n= 133* Bipolar; ID= Insomnia Disorder; OSA= Obstructive Sleep Apnea; PLMS/RLS = Restless Legs Syndrome/ Periodic Limb Movements in Sleep; PS= Parasomnias

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Table 2 revealed the comparing frequencies of co-occurring sleep-wake disorders among psychiatric patients. The most co-occurring disorder was insomnia (93%) followed by the co-occurrence of restless legs syndrome/periodic limb movements in sleep (84%), obstructive sleep apnea (83%), and parasomnias (74%) respectively. The most prevalent psychiatric disorder was depression followed by bipolar disorder and generalized anxiety disorder respectively among these patients.

Table 3 Mean, Standard Deviation, and t values of Gender Differences on Sub-scales of the Global Sleep Assessment Questionnaire for patients of Depression, Generalized Anxiety, and Bipolar Disorders (N=385)

Measures	Patients						
	Females (n=235)		Males (n= 150)				Cohen's d
	M	*SD*	M	*SD*	*t* (383)	*P*	
ID	7.51	1.36	6.44	1.48	7.26	.000	0.75
OSA	8.44	2.10	6.93	1.48	7.61	.000	0.83
RLS/PLMS	4.78	1.36	3.73	1.39	7.30	.000	0.76
PS	2.36	0.84	1.89	0.84	5.31	.000	0.55

Note. Total *N*= 385; *n*= 235 Females; *n*= 150 Males; OSA= Obstructive Sleep Apnea, ID= Insomnia Disorder, PLMS/RLS= Periodic Limb Movements in Sleep/Restless Legs Syndrome, PS= Parasomnias; *M*= Mean; *SD*= Standard Deviation

Table 3 indicates statistically significant differences between the male and female groups on the sleep-wake disorder sub-scales of the Global Sleep Assessment Questionnaire. The results reveal the high percentages of insomnia, restless legs syndrome, and parasomnias in females as compared to males, whereas the percentage of obstructive sleep apnea was higher in males than their female counterparts.

Table 4 Mean, Standard Deviation, and t values of Physical Activity Level Differences on Sub-scales of the Global Sleep Assessment Questionnaire for patients (N=385)

Measures	Patients						
	Physically Active (n= 165)		Physically Inactive (n= 220)				Cohen's d
	M	*SD*	M	*SD*	*t* (383)	*P*	
ID	6.84	1.65	7.29	1.35	2.95	.003	.53
OSA	7.58	2.02	8.06	2.00	2.33	.020	.23
RLS/PLMS	3.98	1.51	4.66	1.37	4.66	.000	.47
PS	1.72	.84	2.53	.72	10.16	.000	1.03

Note. Total *N*= 385; *n*= 165 Physically Active; *n*= 220 Physically Inactive RLS/PLMS= Restless Legs Syndrome/ Periodic Limb Movements in Sleep, PS= Parasomnias, ID= Insomnia Disorder, OSA= Obstructive Sleep Apnea; *M*= Mean; *SD*= Standard Deviation

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Table 4 shows significant differences between both groups of physically active and inactive patients on the sub-scales of insomnia disorder (ID), obstructive sleep apnea (OSA), restless legs syndrome (RLS)/ periodic limb movements in sleep (PLMS), and parasomnias (PS). The results reveal the high percentages of all these sleep problems in patients who were less physically active as compared to patients with high physical activity.

Table 5 Means, Standard Deviations, and One-Way Analyses of Variance of Marital Status on Sleep-Wake Disorders Subscales for patients of Bipolar, Depression, and Generalized Anxiety Disorders (N=385)

Measures	Patients						*F* (2, 382)	η^2
	Unmarried (n= 94)		Married (n= 231)		Divorced (n= 60)			
	M	*SD*	*M*	*SD*	*M*	*SD*		
ID	6.57	1.69	7.36	1.41	6.90	1.29	10.10***	.23
OSA	7.03	2.02	8.30	1.98	7.40	1.68	16.08***	.29
RLS/PLMS	3.89	1.44	4.61	1.43	4.17	1.47	9.07***	.21
PS	1.13	.69	2.52	.64	2.50	.50	169.39***	.94

Note. RLS= Restless Legs Syndrome, OSA= Obstructive Sleep Apnea, ID= Insomnia Disorder, PLMS= Periodic Limb Movements in Sleep, PS= Parasomnias; *M*= Mean; *SD*= Standard Deviation; η^2= Partial Eta Squared
***p<.001

Table 5 revealed the results of one-way ANOVA which determined the significant effect of marital status on the co-occurrence of sleep-wake disorders.

The multiple comparisons table of Tykey post hoc shows that the co-occurrence of sleep-wake disorders is higher in divorced and married patients as compared to unmarried patients.

Discussion

The results of the data collected from different major cities of Khyber-Pakhtunkhwa reveal that 84% of the specific sleep-wake disorders are co-occurring among the psychiatric population. The estimated co-occurrence of ID, OSA, RLS/ PLMS, and PS is 361 (93.76%), 322 (83.63%), 326 (84.67%), and 287 (74.54%). These specific sleep-wake disorders also co-existed among participants (see Table 2).

The current study's findings are also consistent with previous studies, for example, patients with underlying sleep problems are more likely to experience psychiatric disease than the general population (Hombali et al., 2019).

The sleep-wake disorders are also independently associated with the demographic variables of the study. The co-occurrence of sleep-wake disorders is relatively high in female patients as compared to male patients. This is confirmed by the findings of the current study (see Table 3). Out of four sleep-wake disorders, the co-occurrence of three (insomnia, restless legs syndrome, and parasomnias) disorders is higher in females as compared to males, whereas the percentage of obstructive sleep apnea is higher in males than their female counterparts.

Previous well-known sleep studies also lend credence to this showing that females complain

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about their sleep more frequently than males. Women experience higher rates of sleep disturbances than men and biological or physiological variations between the sexes are frequently cited as reasons for this, along with psychological ones (Arber et al., 2009).

The results of the current study support that the co-occurrence of specific sleep-wake disorders is higher in divorced and married patients as compared to unmarried patients. Previous studies also lend support to this. Additionally, earlier research has discovered a correlation between increased sleep disturbances and romantic relationship deterioration, such as widowhood, separation, or divorce (Gordon et al., 2021).

The current study's findings reveal a high co-occurrence of sleep-wake disorders among patients not active physically than among those who are physically active. Previous research studies also suggest that sleep problems are linked to reduced levels of physical activity. They have demonstrated that consistent physical activity can lengthen and increase the quality of sleep. Other studies have demonstrated that exercise can aid in the reduction of sleep disorders like insomnia, excessive daytime drowsiness, and sleep apnea (Alnawwar et al., 2023).

Evidence from research demonstrates that treating sleep-wake disorders can significantly improve co-existing mental conditions and result in better management of these conditions. The risk that depression will develop over at least the following year can be decreased by treating insomnia. Evidence suggests that patients with depression need to be encouraged to have regular, uninterrupted sleep for a certain period. Data demonstrate that cognitive-behavioral techniques are an effective strategy to get such sleep, even in mental hospitals (Freeman et al., 2020).

Improvement in social and occupational functioning has been reported by the patients if proper education is provided to them on the signs of a manic relapse due to sleep problems and on how to seek treatment as quickly as possible (Plante & Winkelman, 2008).

Conclusion

It is concluded from the current study's findings that patients with bipolar disorder, generalized anxiety disorder, and depression frequently experience co-existing sleep-wake problems. Additionally, there is a strong correlation between demographic factors and sleep-wake problems. Symptoms of two or more sleep-wake disorders were also co-existing among patients. Insomnia was the most co-occurring disorder followed by restless legs syndrome/periodic limb movements in sleep, obstructive sleep apnea, and parasomnias respectively.

Findings indicated a higher co-occurrence of sleep-wake disorders in females as compared to male counterparts, in divorced and married individuals as compared to unmarried, and in individuals with lower physical activity as compared to individuals with higher physical activity.

Limitations and Future Research Suggestions

There are limitations in the current study that need to be addressed to avoid future complications.

1. Only four cities of Khyber Pakhtunkhwa (Peshawar, Abbottabad, Mansehra, and Haripur) were selected for the current research. Future research should be conducted in other regions of Pakistan to understand cultural diversity.
2. The study sample only consisted of patients aged 21-60, with limited demographic variables. Problems may occur in patients older than 60 and younger than 21, and future research should consider these age groups and different demographics.
3. The current study used a single self-report questionnaire to assess the co-occurrence of sleep-wake disorders. Future research should focus on a detailed clinical assessment of co-existing sleep disorders in psychiatric patients with the help of multiple screening tools.
4. The study used a cross-sectional survey research design so, causal inferences cannot be drawn from the study. Experimental or longitudinal designs and qualitative research are needed in the future to establish causality.

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5. Only outpatients seeking treatment from hospitals, rehabilitation centers, or psychiatric centers were included in the research. In the future studies should be conducted on psychiatric inpatients and the general population.

Implications of the Current Study

There are several important implications of the current study in the clinical field and the area of sleep medicine.

1. The current study explored the co-occurrence of sleep-wake disorders among psychiatric patients. The findings revealed that despite the adverse impact of sleep-wake disorders on the course of mental health conditions they are often ignored health problems. This study will emphasize the in-depth analysis of specific sleep disturbances and the importance of their co-occurrence in psychiatric illnesses.
2. It is one of the very few studies conducted on the mental health community in the area of sleep so this study will add to the existing literature and will expand the knowledge of sleep medicine experts and mental health experts about this phenomenon.
3. Additionally, the study's findings will provide clinicians and sleep experts insights into the importance of independent assessment and management of co-occurring sleep-wake disorders for the effective management of mental health disorders. It will encourage them to design and implement interventions and strategies for working on the sleep hygiene of patients and promoting healthy sleep habits.
4. This study will aid clinical practitioners in understanding the signs of various sleep disorders along with demographic factors in the clinical population. So that practitioners' greater understanding aids in the timely detection of sleep difficulties.
5. Furthermore, this study will also highlight the significance of additional investigations into sleep-related disorders in the Pakistani clinical population.

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