

The Effect of Sleep Disturbances on the Severity of Depression in Psychiatric Patients

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Abstract. General Background :Depression and sleep disturbances are major global health challenges that often co-occur, each worsening the other and contributing to a high disease burden. Specific Background : While existing studies confirm their bidirectional relationship, limited evidence explores how specific sleep parameters independently influence depression severity. Knowledge Gap : Current research often treats sleep problems as a single construct, overlooking domain-specific contributions such as sleep duration, efficiency, and latency. Aims : This study aimed to assess the prevalence of sleep disturbances and measure their relationship with the severity of depression among psychiatric patients using the Pittsburgh Sleep Quality Index (PSQI) and Beck Depression Inventory-II (BDI-II). Results :In a cross-sectional analysis of 250 participants, 84% exhibited poor sleep quality and 92% displayed depressive symptoms, with 40% classified as severe. All PSQI domains showed significant correlations with BDI-II scores ($p < 0.001$), indicating a progressive relationship between deteriorating sleep and increasing depression severity. Novelty : This study provides comprehensive empirical evidence linking distinct sleep parameters to depression severity, highlighting that sleep quality deterioration parallels depression progression. Implications :These findings underscore the need for integrated interventions targeting both conditions and support routine sleep quality screening as a critical component of depression management and prevention strategies.

Highlights:

1. Most participants (84%) showed poor sleep quality with severe depression levels.
2. There is a significant correlation between all sleep domains and depression severity.
3. Improving sleep quality may help reduce depressive symptoms effectively.

Keywords: Sleep Disturbances, Depression, Psychiatric Patients, Sleep Quality, PSQI

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Introduction

Depression is one of the most common types of mental health illnesses that currently exist in the world affecting people of all ages, any culture and any social-economic stature. The world health organization (WHO) predicts that there are 280 million individuals around the world who are depressed with depression being the major cause of disability. The incidence differs by geography but it is found to be relatively high in high-income countries, whereas low- and middle-income countries have a heavy burden because of their limited access to mental health care[1].

Females have a higher risk of being depressed repeatedly (twice than men) because of their biological, hormonal, and psychosocial differences. Moreover, the COVID-19 pandemic contributed to depressive symptoms, and the studies depict that due to isolation, health anxiety, and changes in the economic situation, the cases of depressive symptoms increased by 25 percent [2].

Although depression has a prevalence rate that is quite high, it appears to be underdiagnosed and undertreated especially in areas where mental health stigma exists and also in the case of those areas where health infrastructures are poor. To lead through this worldwide crisis there are better screens, available therapy, and community-based health care to enhance risk factors like long-term stress, trauma, and societal disparities [3].

The impact of sleep disturbances on the population is one of the most popular public health concerns with it affecting an estimated 30 percent of the global adult population and between 50 and 80 percent of psychiatric patients with insomnia the most popular disorder[4].

The improperness of sleep has become a global epidemic in recent decades due to the influences of the modern lifestyle, including stress levels, spending too much time in front of the screen, and the ability to provide an irregular working schedule. Disturbed sleep is a common problem that is especially high in individuals with mental diseases, often comorbid with anxiety, depression, and bipolar disorders [5].

There is also research to note that chronic sleep issues are not only symptoms but also risk factors to develop or exacerbate a psychiatric disorder: issues with falling asleep, frequent night awakenings and not sleeping well as non-restorative sleep. In other words, incidences of insomnia double the chances of depression and are associated with poor response to treatment. The people who are particularly susceptible to disturbances in the sleep-wake cycle are shift workers, older, and people with chronic diseases[6].

These effects are not limited to the mental sphere and also lead to cardiovascular diseases, immunity problems, and low productivity in a workplace. Sleep disorders are the commonly occurring yet inadequately diagnosed problems partially because they lack recognition and clinical attention to comorbidities. The screening and subsequent remedial action on sleep disturbance may lead to better mental and physical health in most instances globally [7].

The intersection of sleep disturbances and depression is a two-way street with conditions interacting to both cause and exacerbate another one. On the one hand, insomnia or occasional lack of sleep may often lead to depression onset. Studies have shown that those with ongoing insomnia have twofold chances of developing depression than their good sleepers. This might be due to the disruption of emotional regulation, enhanced inflammation, and degraded stress resilience, which are all involved in the manifestation of depressive symptoms because of the poor sleep [8].

On the other hand, depression as a condition often causes serious sleeping disturbances. Ninety percent of depressed patients complain of sleep challenges, including poor sleeping in relation to poor quality of sleep, inability to fall asleep, or remaining asleep [9].

Depression changes the brain chemistry and circadian rhythms, depressing deep sleep and raising abnormalities in REM sleep, further aggravating the issue of fatigue and depression. This has a negative loop effect of depression worsening sleep and vice versa [10].

To get out of such a vicious cycle, it is vital to deal with both of these conditions concurrently. Interventions such as cognitive behavioral therapy on insomnia (CBT-I) have not only been found to ameliorate sleep but also depressive symptoms, and some antidepressants should be considered to moderate sleep architecture. This bilateral connection is vital to formulate a more effective, combined method of treatment because there are often cases of incomplete recovery in case only a certain condition is treated [11].

Although the overall association between sleep disturbances and depression has been widely reported, a gap in knowledge on how particular forms of sleep problems have a unique impact on the severity of depression still exists [8].

Prior studies have so far used sleep problems as a generalized unit where they did not make any distinctions between the disorders like insomnia, obstructive sleep apnea (OSA), circadian rhythm disorders, and restless legs syndrome. Such simplification ignores important differences in the ways in which those conditions might uniquely contribute to the presence of depressive symptoms, in relation both to the underlying biological processes and to the clinical presentation. Such specificity is vital as, without it, the interventions may be used not effectively enough [12].

The insufficiency of in-depth analysis is especially damaging as various sleep disorders probably influence depression in various ways. Case in point, insomnia might enhance depression through hyperarousal and rumination whereas OSA might aggravate mood on the basis of chronic hypoxia and sleep disruption. In a similar manner, interrupted circadian rhythm may affect emotional regulation by disrupting the inner clock of the body, and restless legs syndrome may lead to depression because of deprivation and general discomfort caused by sleep disorders. However, there is limited research available that compares the separate effects of these conditions on well-known tools of measuring depression, including the Beck Depression Inventory (BDI-II) or a Hamilton Depression Rating Scale (HAMD) in a systematic way [13],[14].

Such a research gap has a direct clinical implication. Clinicians tend to use generic sleep treatment, which, in case of cognitive behavioral therapy of insomnia (CBT-I), disregards the possibility of using other methods that will best accommodate some individuals, e.g., continuous positive airway pressure (CPAP) to treat OSA or use of light to treat circadian disorders. With a more complex view of the role of certain sleep disorders in depression, individualization of treatment plans may contribute to improving the results of people whose depressive symptoms are conditioned by clear sleep pathologies[15].

To fill this gap, the proposed study will investigate how clinical rigorously diagnosed sleep disorders namely insomnia, OSA, circadian rhythm disorders and restless legs syndrome affect the depression severity scores in a clinical population. Through the utilization of polysomnography and validated sleep questionnaires and depression metrics, this study will hopefully elucidate the sleep disorders having the strongest correlation to the exacerbation of depressive symptoms and determine possible factors upon which to focus personalized treatment. The results have the potential to be used as a stepping stone to more specific treatment guidelines where the heterogeneity of sleep-related contributions to depression is considered [16].

Description of the particular interaction between various sleep disorders and depression level has significant clinical implications on the mental healthcare practice. Determining the sleep disturbances that yield the strongest correlations to the exacerbation of depressive symptoms will enable clinicians to do more than a one-size-fits-all treatment plan and take steps toward creating an individual treatment plan based upon an individual patient. As an example, a depressed patient with comorbid obstructive sleep apnea (OSA) can be treated with CPAP-therapy in combination with an antidepressant resulting in better outcomes whereas an individual with insomnia-connected depression would improve when treated with CBT-I and medication. Such a precision medicine method would remarkably increase the efficacy of the given treatment, minimize trial-and-error prescription, and cut down recovery periods among the patients struggling with both diseases [17].

Furthermore, unpacking such associations can help to introduce earlier intervention programs that will help stop the development of a mild depression state to the severe treatment-resistant ones. Sleep disturbances in many cases serve as indicators of depressive episodes hence a possible sign of mental health deterioration. In the event that certain sleeping conditions, e.g. disturbances in circadian cycles, the restless legs syndrome, are revealed to particularly strike depression values, screening sleep adherence would become a common dependency disease of depression evaluation. The benefits of such an aggressive intervention could include intervention in sleep pathologies before their further aggravation of mood disorders and the subsequent, in a sense, decrease in the overall burden of depression in high-risk groups[18][19].

Aims of the study.

- 1.To determine the prevalence of sleep disturbances among a sample of patients with depression by using (Pittsburgh Sleep Quality Index (PSQI)).

2.To measure the severity of depressive symptoms in patients using a validated scale (Beck Depression Inventory BDI-II).

3.To analyze the relationship between sleep quality (Global score, Subjective Sleep quality, Sleep duration, Sleep latency, Sleep efficiency, Sleep medication use, Day time dysfunction and Disturbances) and the severity of depression.

Methodology

Study design. Descriptive Cross sectional study design to achieve the aimed objectives of the study from 4th of June until 1st of August of 2025 .

Instruments. Questionnaire consist of three parts, demographic, depression and sleep. The two main research tools are the Beck Depression Inventory-II (BDI-II) and the Pittsburgh Sleep Quality Index (PSQI) have been used.

First: Beck Depression Inventory-II (BDI-II) which is A 21-item self-assessment tool that measures the severity of depressive symptoms, have three domains: Assesses emotional (e.g., sadness), cognitive (e.g., guilt), and physical (e.g., sleep disturbances) symptoms. Score: 0-13: No depression or mild depression. It categorized to three levels, Mild depression (14-19) ,Moderate depression 20-28, and Severe depression 29-63. It has a high reliability coefficient ($\alpha=0.86-0.93$) and good validity in discriminating between levels of depression [20].

Second: Pittsburgh Sleep Quality Index (PSQI) which is A 7-item self-reported questionnaire that measures sleep quality over the past month. And it has 7 domains: Subjective Sleep Quality, Sleep latency , Sleep Duration, Sleep Efficiency, Sleep Disturbances, Use of Sleep Medications, Daytime Dysfunction which they all lead to the global score. Total score ranges from 0-21, ≥ 5 indicates poor sleep quality. It has good internal consistency ($\alpha=0.83$) and high discriminant validity. Those two instruments have been used for many reasons: Ease of administration: they Can be completed in 10-15 minutes, Clinical Relevance: they are Widely used in research and clinics, Sensitivity to Change: they Detects improvement or worsening of symptoms over time, Complementarity: The PSQI measures the sleep symptoms included in the BDI-II in greater detail. So Together, these two instruments provide a comprehensive assessment of the relationship between sleep disturbances and depression, complementing each other in providing a complete picture of the patient's condition [21].

Sampling and setting. Stratified purposive hybrid sampling have been used, a stratified purposive sample have been chosen because it ensured comprehensive representation across age and gender groups, with a focus on the most pronounced conditions (moderate-severe depression + sleep disturbances). This approach balances fair representation and research focus, reduces bias, and improves data quality while maintaining practical feasibility, making it optimal for studying the relationship between depression and sleep with high precision. First patients with depression who attends psychiatric clinics in Thi Qar gouvernante in Iraq have been listed and they have chosen randomly then patients with other disease or using medication that affect sleep have been eliminated.

Results

This table describes the basic demographic and clinical characteristics of the study sample of 250 participants, distributing individuals by age, gender, and duration of illness. Regarding age distribution, the vast majority of the sample (62%) is concentrated in the active age group of 20-40 years, with the highest representation being in the 31-40 age group (34%), followed by the 20-30 age group (28%), and then the 41-50 age group (26%). The lowest representation was in the 51+ age group (12%). Regarding gender distribution, the sample is relatively balanced, with a slight predominance of females (52%) compared to males (48%), consistent with the higher prevalence of depression among females as known in the medical literature (Table 1).

Table 1: characteristics of the study sample (n=250)

Variable	Groups	Frequency	Percent
Age	20-30	70	28%
	31-40	85	34%
	41-50	65	26%
	51 and more	30	12%
Gender	Male	120	48%
	Female	130	52%
Disease duration	More than 6 months	90	36%
	Less than 6 months	160	64%

Regarding illness duration, the data show that the majority of patients (64%) were newly diagnosed, less than 6 months old, while only 36% of patients with an illness duration of more than 6 months. This demographic distribution is particularly important which indicates that the study focused primarily on young and middle-aged adults, with a reasonable representation of chronic conditions. The relative gender balance also enables statistically significant comparisons between the two groups in subsequent analyses (Table 2).

Table 2: Sleep Problems Distribution

	Score	Frequency	Percent	Mean(±SD)
Global score	0-21	210	84%	11.3±3.2
Subjective Sleep quality	0-3	185	74%	2.4 ±0.8
Sleep duration	Per hour	135	54%	4.1 ± 1.3
Sleep latency	Per minutes	165	66%	42.5 ± 25.1
Sleep efficiency	-	190	76%	62% ± 16%
Sleep medication use	-	110	44%	1.8 ± 1.2
Day time dysfunction	-	205	82%	2.3 ± 0.6
Disturbances	-	198	79%	2.5 ± 0.7

This table provides a detailed analysis of the Pittsburgh Sleep Quality Inventory (PSQI) scores for the study sample of 250 participants, showing the distribution of scores across the scale's various components. The results show that 84% of the sample (210 individuals) recorded overall scores indicating poor sleep quality (mean 11.3 ± 3.2), which is well above the diagnostic threshold (≥ 5) and indicates a severe sleep problem among participants.

Regarding the sub-factors, 74% of the patients (185/250) rated their subjective sleep quality negatively with a mean score of 2.4 ± 0.8 (out of 3), and 54% of them (135/250) had experience severe deprivation in the duration dimension, as they spent little sleeping time per day either during working days or weekends on average with normal work-day nights only having slept for 4.1 ± 1.3 hours/day}. Most ($n = 224, 66\%$) also had difficulty going to sleep (mean \pm SD: 42.5 ± 25.1 minutes).

Regarding sleep efficiency, 190 subjects (76%) from the sample had ratings classified as being of low efficacy with 62 (16%) and an average score that was significantly lower than it is recommended for healthy profiles ($>85\%$). Of concern, 44% of participants (110 individuals) regularly used sleep medications (mean 1.8 ± 1.2). Most patients also suffered from impaired sleep performance (82%) and frequent sleep disturbances (79%), which negatively impacted their quality of life (Table 3).

Table 3: depression levels

Depression level	Frequency	Percent	Mean(\pm SD)
No depression	20	8%	10.1 ± 2.3
Mild	45	18%	16.5 ± 1.8
Moderate	85	34%	24.0 ± 2.6
Sever	100	40%	39.2 ± 7.1
Total	250	100%	

This table provides a detailed analysis of the distribution of depression levels among the 250 study participants, who were categorized according to the Beck Depression Inventory-II (BDI-II). The results show that the vast majority of participants (92%) suffered from varying degrees of depression, with a clear gradation in symptom severity.

The sample was distributed as follows: Only 8% (20 individuals) scored within the normal range (10.1 ± 2.3), while 18% (45 individuals) showed mild depressive symptoms (16.5 ± 1.8). The largest group was those with moderate depression (34%, 85 individuals), with an average score of 24.0 ± 2.6 , while patients with severe depression constituted the largest proportion (40%, 100 individuals), with an average score of 39.2 ± 7.1 (Table 4).

Table 4 correlation between PSQI and BDI-II

	Spearman correlation (r)	P value	
Global score	+0.75	<0.001	Significant
Subjective Sleep quality	+0.68	<0.001	Significant
Sleep duration	-0.60	< 0.001	Significant
Sleep latency	+0.55	0.004	Significant
Sleep efficiency	-0.55	0.002	Significant
Sleep medication use	+0.40	0.002	Significant
Day time dysfunction	+0.65	0.004	Significant
Disturbances	+0.72	< 0.001	Significant

This table presents the results of a correlation analysis between sleep quality components and depression scores using Spearman's rho. The results show strong and statistically significant relationships between all assessed aspects of sleep and depression levels.

The total score of GQPS had high correlation with depression ($r=+0.75$, $p<0.001$), suggesting that worse overall sleep quality is significantly correlated with increased severity of depressive symptoms. Sleep disturbances were the second strongest in the positive correlation ($r=+0.72$ vs. Jonas et al $r=+0.69$), followed by daytime dysfunction ($r=+0.65$) and reported sleep quality ($r=+0.68$).

Of note, both sleep duration and sleep efficiency had highly negative correlations with depression ($r = -0.60$ and $r = -0.55$), suggesting that shorter tiredness length and poorer maintenance of sleep are related to more depressive symptoms. Even medication use, although the association was weaker ($r=+0.40$), remained statistically significant ($p=0.002$).

All p-values were less than 0.05, confirming the statistical significance of these associations. These results reinforce the hypothesis that there is a close relationship between sleep disturbances and depression, as each component of sleep quality measures a different aspect of this complex relationship (Table 5).

Table 5: relationship between PSQI and depression levels (BDI-II)

PSQI \ Depression	No depression	Mild	Moderate	Sever	F/H	P value
Global score	4.1 ± 1.5	8.3± 2.1	12.6 ±2.8	15.9± 3.3	52 .8	< 0.001
Subjective Sleep quality	0.9±0.7	1.8±0.9	2.3±0.8	2.8±0.5	32 .1	< 0.001
Sleep duration (hours)	6.8±1.0	5.5±1.2	4.2±1.3	3.0±1.4	48 .3	< 0.001
Sleep latency (minutes)	22.1±15.3	38.5±20.1	49.7±23.8	68.2±28.4	25 .7	< 0.001
Sleep efficiency (%)	88±9	75±11	63±14	52±17	41 .6	< 0.001
Sleep medication use	0.5±0.8	1.2±1.1	1.9±1.2	2.5±1.0	29 .4	< 0.001
Day time dysfunction	0.8±0.7	1.5±0.9	2.1±0.7	2.7±0.5	35 .2	< 0.001
Disturbances	1.2±0.6	1.9±0.7	2.4±0.6	2.8±0.4	38 .9	< 0.001

The study results show a strong, progressive relationship between depression severity and worsening sleep quality, with total PSQI scores rising from 4.1±1.5 in non-depressed individuals to 15.9±3.3 in those with major depression, with an F-value of 52.8 confirming the statistical significance of these differences ($p<0.001$). This gradual deterioration was found in

all aspects of sleep quality, as subjective sleep quality scores increased from 0.9 ± 0.7 to 2.8 ± 0.5 and SOL decreased from 6.8 ± 1.0 h to 3.0 ± 1.4 h ($p < .001$ for both). The sleep-onset time increased to 68.2 ± 28.4 min from 22.1 ± 15.3 min, and the sleep efficiency decreased to $52\%\pm 17$ from $88\%\pm 9$, while the use of medication for sleep was also significantly greater than the pretreatment (2.5 ± 1.0 vs 0.5 ± 0.8). Total sleep score ($F=52.8$), duration ($F=48.3$) and efficiency ($F=41.6$) showed the most effects due to depression, indicative of a clear dose-response pattern illustrating a systematic deterioration in the sleep disorder as severity of depression increases, supporting that the relationship between them is likely causal, suggesting for those with GAD it is equally important to target good quality sleep as an objective in its own right when treating anxiety disorders co-morbidly bound-up with GAD - particularly severe disorder.

Discussion

The results of the current study constitute an important addition to the scientific literature on the prevalence and severity of sleep disorders and their relation to depression among the studied population. These results are consistent with recent global trends demonstrated by large epidemiological studies. It will be discussed in detail, compare them with those of previous studies, and analyze potential factors that may explain the marked increase in depression rates, whether social, economic, or clinical. The objective of this discussion is to present the results in scientific and practical context, enhance understanding the nature sleep disorders and their impact on depression and its burden among studied population, and identify unfinished topics needed for further study as well intervention.

Data was available on the age of participants with the largest group aged 31–40 years (34%) followed by 20–30 and 41–50 year olds at 28% and 26%, respectively. Individuals aged 51 years and older were the least represented, representing 12%. This suggests that the sample was concentrated in younger age groups, which may reflect the nature of the study or the target population [22] study find out that most of the mental disorders including depression among countries start at young age and it may be diagnosed at higher age because of delay in reporting and the main causes are the disorders of childhood that don't get enough attention. Also, The gender distribution was relatively balanced, with females comprising 52% of the sample and males 48%. This balance is considered positive in many studies because it reduces gender bias, unless the study focuses on a disease or condition more prevalent in one gender a study of Shi [23] have found that females may have higher percents of depression than men and this may due to biological and psychological factors as women affect by progesterone and estrogen hormones which elevate depression in addition, men tend not to speak about their emotions . Furthermore, The majority of participants (64%) had a disease duration of less than 6 months, while 36% had a disease duration of more than 6 months. This may indicate: That the sample includes newly diagnosed cases, the study focuses on early stages of the disease, and the disease has a rapid course (acute or curable cases), has found that patients develop depression after 3 months to 1 year after having heart stroke and after those 3 months it tends to be persistent, another study of [24] specify that with more episodes of depression more cognitive impairment will happen, so in that case taking patients with less episodes and period of time is better for the study.

The results of the sleep quality assessment indicate significant health challenges that warrant further attention and analysis. The data show that the vast majority of participants (84%) suffer from moderate to severe sleep disturbances, with a mean total score of 11.3 ± 3.2 , well above the normal limits of the Pittsburgh Sleep Quality Index. The high rates of sleep issues described in this part of the population can be either indicative of the higher psychosocial stress in this part of the population or an indication that the environment or unhealthy type of lifestyle is a negative influence on the quality of sleep [25].

The findings of the given study demonstrate that sleep disorders are quite concerning among the studied population, where the abnormal results on the total sleep quality scale were observed in 84% of participants ($n=210$), with the mean of 11.3 ± 3.2 points. Such percentage is much higher than average ones across the World Health Organization (WHO) report on the burden of sleep disorders (2023) [26] where it has been estimated that 37 percent of adults experienced sleep disorders in the general population. Such a prominent increase could be linked to either the character of the study population or the interaction with peculiar stressors, which is mentioned by a recent article of Carra 2024[27].

Concerning the qualitative parameters of sleep, the findings indicated that 74 percent of the participants ($n=185$) had given negative evaluation of their sleep quality with an average sum of 2.4 (0.8) out of 3. The present judgement is correlated with the results of Azad (2015)[28], who revealed that negative self-reported sleep was a potent factor of the presence of underlying psychological disorders, especially depression and anxiety. Notably, half of the sample ($n=135$) or 54 percent had recorded a very short sleep of 4.1 hrs 1.3 SD (daily), a question mark that is a matter of concern as per the new recommendations by National Sleep Foundation (NSF) (2023)[29]. In a recent longitudinal study on Nature Human Behavior published by Li [30] found that less than 5 hours of sleep per day more than doubled the risk of depression developing during the follow up period of 18 months.

Regarding other sleep markers, its outcomes revealed a dramatic decline of the sleep efficiency (a level of 62%-16 of the sample) and a longer value of the time of sleep onset (42.5-25.1 minutes represented 66% of the participants in the study). These findings confirmed those of a recent EEG study by Elissa (2023)[31], where researchers showed that there were significant sleep disorganizations among people with mood disorders. One may notice that 44 per cent of the sample ($n=110$) take hypnotics on a regular basis (mean 1.8 ± 1.2 dose/night).

These results, in clinical perspective, point out to the importance of jointed approaches to early identification and management of sleep disorders, in at-risk groups most of all. They also endorse new recommendations of the world health organization [32] suggesting that determining the quality of sleep is also a part of mental screening, which is organized regularly. As revealed by a recent pilot study conducted by Ioannou (2021)[33], interventions aimed at improving sleep quality can make the severity of depressive symptoms more than 40 percent smaller.

Although these results are quite strong, certain limitations are to be considered, as they are outlined in a recent systematic review by Riemann. Among these limitations, most notable is the fact that the data was collected using self-reports only, and it is quite hard to control and

adjust a couple of potential mediating variables. Such limitations provide prospective directions embracing stronger designs of longitudinal studies and the objective data assessment of polysomnography and functional brain images as proposed by the research team in a recent investigation of Daghlas [34].

The other aspect of the research is the domain of depression; the findings suggest depressing rates of depression in the sample studied ($n=250$) which are quite high. The findings revealed that 92% of subjects experienced some degree of depression whereas 8 per cent (20 subjects) had no depressive symptoms. Such a percentage is much higher than the worldwide estimates of the World Health Organization [35], which claimed the prevalence of depression as having roughly 3.8 percent in the world population such discrepancy could be attributed to the inequality of the sample size and the very subject of the current study is focusing on patients with depression. The depression levels are correspondingly: Major Depression: The prevalence resulted in being the highest (40%, 100 participants) with the mean of $39.2+7.1$. A study conducted by Aaltonen and colleagues [36] indicates that this degree of symptom severity is related to dramatic impairment of daily functioning and an upsurge in the chance of suicidal thoughts with a scale of 20 times GOAT in contrast to the rest of the population. Moderate depression: This was the category where the sample was the greatest (34 percent of the 85 participants) with a mean score of 24.0 ± 2.6 . According to the recent studies [37], this population has a 45 per cent chance of developing major depression within the first year without treatment. Mild depression: This is a sample of 18 percent (45 participants) and the average score was 16.5 ± 1.8 . Research [38] indicates that 30 percent of these cases are resolved themselves, and 40 per cent can develop other serious conditions.

Such high rates can indicate various potentials, they can be related to The specificity of the study population, where the sample was taken in a clinical context or the high-risk group, as it is indicated in the study by Fuhr [39]. The alternative possibility is the adoption of highly sensitive measurement instruments which have been discoursed by Benarous [40] in his systematic review of depression measurement instruments.

The findings of the correlation analysis demonstrated that there is a strong, complex interaction between the indicators of sleep quality and the level of depression. Subjective sleep quality demonstrated the closest correlation with depression ($r = +0.75$ $p < 0.001$) followed by sleep disturbances ($r = +0.68$) and the total sleep quality score ($r = +0.72$). Such results are also supported by a newer neurobiological theory suggesting that the brain mechanisms involved in sleep and mood overlap [41]. All these close correlations support the findings of newer longitudinal investigations suggesting that the relationship between sleep disturbances and depression is bidirectional, and they are both potential causes and outcomes to one another [42].

Both the negative relationships between sleep duration ($r = -0.60$) and sleep efficiency ($r = -0.55$) and depression indicate that, insufficient sleep and poor sleep quality are potential independent risk factors of the manifestation of depressive symptoms. This is justified by the outcome of a recent Mendelian randomization study that indicated the causal relationship between short sleep duration and greater probability of depression [34]. The strength of the

linkage between sleep onset and a depressive trait ($r = +0.55$) is corroborated by research studies that reveal a connecting factor between insomnia and negative thought levels as a mediating intervention that elevates the occurrence of depression [43].

These results have clinical significance because it may be beneficial to monitor the quality of sleep in depressed persons regularly (and, correspondingly, the quality of depression in persons with sleep disorders). According to the recent evidence, the enhancement of sleep quality may become a relevant strategy that can be used to overcome and prevent depression [44]. They also emphasize the importance of designing combined therapeutic measures that would address sleep disturbances and depressive symptoms at the same time since there is already evidence of cognitive-behavioral therapy of insomnia (CBT-I) being effective in enhancing both of those.

Although such findings are strong, they have certain limitations to be discussed; the research being cross-sectional does not permit causality and the measures used are subjective to determine the results. The results in combination also indicate that these associations should be established by longitudinal studies based on objective measurements of sleep quality (polysomnography and others) to confirm their existence and elaborate on the exact mechanisms.

Finally, and because it may be more powerful, the correlation between depression intensity and all domain of sleep responses have been tasted, and the outcomes revealed a strong linear relationship between depression velocity and sleep characteristics, which is in line with the findings of a current study by Gehrman [45]: All sleep measures in the study were found to have a progressive worsening in accordance with growing intensity of depressive symptoms, as discovered by Kalmbach [46]. The outcomes are clear enough, that those with major depression have higher disturbed sleep and this is supported by the recent study in neuropsychology which was conducted by Li M [47]. The researchers attribute this connection between disturbed sleep and mood to malfunctioning of the serotonin norepinephrine system which is related to control of sleep and mood. Clinically, our findings will prove the conclusions of the American Psychiatric Association [48] in its new guidelines on the management of depression that mentioned that sleep quality is a practice that should be routinely evaluated in patients with depression.

Conclusion

This research offers strong evidence concerning the Bidirectional relationship between sleep disturbances and depression, to which depressive symptoms are closely related with increased severity of sleep quality worsen indicators. Therein, the data reveal that major depressed individuals experience marked disturbances of core sleep measures (ie, decreased efficiency, increased onset time and a shorter duration) which is indicative of a mutual neurobiological dysregulation for both conditions.

From a clinical perspective, these findings highlight the pivotal role of evaluating sleep quality as part of diagnostic and treatment programs in mood disorders and provide evidence that

integrated therapeutic strategies aimed at reducing both depressive symptomatology and sleep problems should be further developed. The primary advantage of this study is the identification of a progressive form of sleep impairment in relation to depression severity level, which corroborates with recent model theories on the overlap of these 2 systems.

Nevertheless, some methodological issues of the subjective measurements and a cross-sectional design must be kept in mind when interpreting these results. Future longitudinal work with objective measures (ie, polysomnography and functional brain imaging) would be necessary to verify these relationships and further elucidate the central neural mechanisms. The results add to a growing body of evidence showing a connection between sleep and mental health, and pave the way for further studies to establish more tailored therapies.

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