

# Depression and sleep problems in a Nigerian family practice setting

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**Summary.** Depressive symptoms in family practice clinics are often undetected, despite the fact they are associated with sleep disorders. There is paucity of data on the association between depression and sleep disorders in a Nigerian family practice setting, hence the need for this study. This was a hospital based study. Systematic sampling method was used in recruiting the patients. The PHQ-9 was administered to the respondents to screen for depressive symptoms. The Pittsburgh Sleep Quality Index (PSQI) was used to measure the quality and patterns of sleep in the respondents. One hundred and seventy eight (44.5%) out of the four hundred respondents were found to have one form of depression or other, out of which one hundred and seventy two (96.6%) had sleep disturbance, 39 (21.9%) stayed more than 60 minutes before falling asleep, 85 (47.7%) had poor subjective sleep quality, forty eight (36.9%) had taken medication (prescribed or over the counter) to assist in sleeping. These were statistically significant ( $p$ -values = 0.001, 0.000, 0.000 and 0.000) respectively. One hundred and fifty three (85.9%) were poor sleepers. One hundred and sixty one (90.4%) had habitual sleep efficiency greater than 85%, while 60 (33.7%) had trouble staying awake while driving, eating meals or engaging in social activities. Depression is common in primary care patients and is associated with sleep disturbance, sleep latency, poor subjective quality and medication before sleep. Sleep evaluation should be part of routine assessment of the new patients presenting at a family practice setting.

**Keywords:** Depression, Sleep Problems, Nigeria, Family Practice Setting

## 1. Introduction

Sleep is one of the most important processes of life and serves many vital functions such as: preservation, restoration, and memory processing (Institute of Medicine Committee on Sleep Medicine Deprivation 2006). According to the National Sleep foundation, adults should get between seven and nine hours of sleep each night. Repeated disruption of the natural sleep cycle or failure to initiate sleep can lead to a sleep deficit, which in turn causes physical, mental, and emotional fatigue.

Somniphathy is a medical disorder of the sleep patterns of a person, serious enough to interfere with normal physical, mental and emotional functioning. Low sleep duration, slow wave sleep deficiency, awakenings during the night and early morning awakenings, redistribution of REM sleep with its concentration in the first half of the night, increased eye movement (EM) density in the first cycle, absence of the

first night effect are features of sleep of depressed patients (Kupfer et al 1980). There are more than 100 different sleeping and waking disorders which can be grouped into four main categories viz: Insomnia, Excessive daytime sleepiness, Sleep rhythm problem, Sleep-disruptive behaviours (Medline Plus 2012).

Sleep disorders is a cardinal symptom of depression (Micheal 2009). There is a very strong association between sleep disturbance and depression, so strong and fundamental that some researchers have propounded that a diagnosis of depression in the absence of sleep complaints should be made with caution (Adrien 2002). The relationship between sleep and depressive illness is complex – depression may cause sleep problems and sleep problems may cause or contribute to depressive disorders. Symptoms of depression may occur before the onset of sleep problems or may be the first to appear. Poor sleep quality has adverse effects on mood, motivation, and cognitive functioning (American Psychiatric Association 1994).

In its 2006 consensus report, the Institute of Medicine (IOM) identified the effects of sleep disorders and sleep deprivation as “an under recognized public health problem” (Jindal and Thase 2004). Many depressed individuals report that sleep problems are the single most debilitating feature of their disorder and more than 65% of individuals diagnosed with depression report at least one complaint related to difficulty falling asleep, frequent awakenings, and/or early

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morning awakenings (Benca et al 1997). Sleep disturbance can potentially explain many of the cognitive impairments associated with depression including a negative or threatening interpretive bias towards ambiguous stimuli (Sbarra & Allen 2009) and an overabundance of negatively encoded declarative memories (Ree & Harvey 2006). Chronic sleep deprivation has also been shown to enhance dysregulation of the stress response system (Walker & Van der Helm 2009), which is one of the most robust and reliable findings in depression. These evidences suggest that sleep impairments should be considered a risk factor in the development of depression.

Clinically, difficulty in initiating or maintaining sleep or both have been reported in about three quarters of all depressed patients (Spiegel, Leproult, Van Cauter 1999; & Hamilton 1989). Epidemiologically, sleep symptoms occurred in 50% to 60% in a sample of young adults aged 21 to 30 (Yates, Mitchell & John 2007).

Sleep disorders have a clear impact on productivity and public health. Many of the complications associated with sleep disorders are preventable, making early diagnosis and appropriate treatment vital. Unfortunately, research indicates that sleep disorders continue to be under diagnosed and undertreated (Breslau, Roth, Rosenthal, Andreski 2010; & Meltzer, Johnson, Crosette, Ramos, Mindel 2010).

A study found that annual workplace losses (including workplace accidents) due to insomnia and associated comorbidities totaled \$91.7 billion per year (Ohayon & Schenk 2010).

Alapin and co-workers (2000) examined the daytime functioning of good and poor sleepers. The study found that poor sleepers experienced more problems with daytime functioning than good sleepers, highly stressed poor sleepers reported greater impairment in functioning during the day than either good sleepers or minimally distressed poor sleepers. Daytime symptoms were more closely related to psychological adjustment and to psychologically laden sleep variables than to quantitative sleep parameters. Daytime symptoms occurred more often in subjects with longer nocturnal wake times than those with shorter sleep times. Bonnet and colleagues found that insomniacs displayed increased tension and confusion, decreased vigor, personality disturbance, subjective over-estimation of poor sleep, increased body temperature, increased 24-hour whole body metabolic rate, and increased multiple sleep latency test (MSLT) values.

Consistent with previous studies (Moo-Estrella et al 2005), poor sleep quality was associated with depression (Eller, Aluoja, Vasar, Veldi 2006 & Breslau, Roth, Rosenthal, Andreski 1996). Depression was significantly associated with sleep complaints, a finding that was consistent with previous reports (Sahraian, Javadopur & Shiraz 2010). The relationship between depression and sleep disturbances is so strong that it is one of the diagnostic criteria of major depression (Ford & Kamerow 1989). High degree of depression and anxiety were found to be the influencing factors of poor sleep among Chinese mainland adolescents (Xu Z et al 2012).

More than half of the out-patients in primary care had sleep problems, especially insomnia, and excessive daytime sleepiness, but few of them consulted their doctors. This problem should not be overlooked Psychological problems and anxieties with their illness were associated with insomnia. Therefore, exploring and understanding their problems

are important issues to manage and render advice for their quality sleep.

The aim of this study, therefore, was to find out sleep problems among depressed patients in a Nigerian family practice setting.

## 2. Method

This study was conducted at the General Outpatients Clinic of Kwara State Specialist Hospital, Ilorin, North-Central Nigeria. The target populations were the newly registered patients attending the clinic.

The sample size will be estimated using the Fisher's Formula (Araoye 2003),

$$n = \frac{Z^2 p(1-p)}{e^2} = \frac{(1.96)^2 0.325(1-0.325)}{(0.05)^2} = 337.1$$

using 32.5% from a previous study (Bawo, Joyce & Osayi 2011), as the best estimate of depressive disorders among patients in a Nigeria Family practice population. A minimum sample size of will be 337.1 calculated, but 400 will be used to increase the reliability of the study.

A systematic random sampling method was used in recruiting respondents for this study, from the period of study from October 30 to November 30, 2013. Already identified depressed subjects who were on treatment and those who refused to give consent were excluded from the study. Pre-testing was carried out at the Kwara State Civil Service Hospital, using 40 respondents (10% of the sample size). Ethical approval was obtained from the Ethical Review Committee of the Kwara State Ministry of Health before commencement of the study.

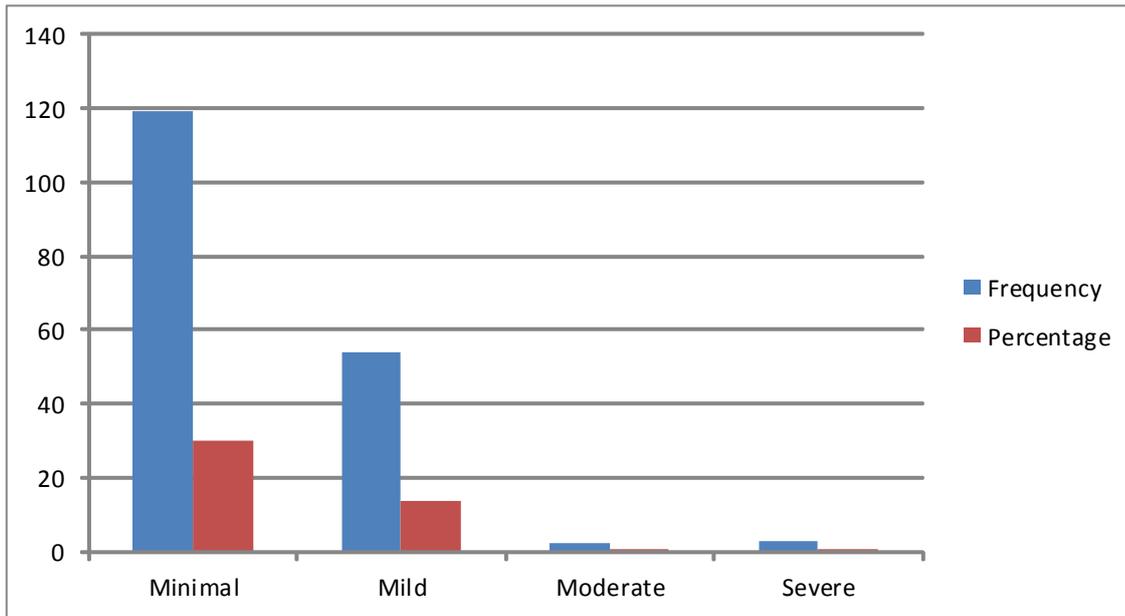
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The Patients Health Questionnaire (PHQ-9) (Kroenke, Spitzer & Williams 2003) is a brief, 9 - item, patients self-report depression assessment tool that was derived from the interview-based PRIME-MD (Buysee, Reynolds, Monk, Berman & Kupfer 1989). It was specifically developed for use, in primary care. It is the only tool that was specifically developed for use as a patient self-administered depression diagnostic tool, rather than as a severity or screening tool. It is the only short self-report tool that can reasonably be used both for diagnosis of DSM-4 major depression as well as for tracking of severity of major depression over time (Shochat, Tzischinsky, Oksenberg & Peled). Psychometric evaluation of the PHQ-9 revealed a sensitivity ranging from 62%-92% and a specificity between 74%-88% (Kroenke 2003; Buysee 1989; and Shochat 2007). All subjects screened positively for depression using Patients Health Questionnaire – 2 (PHQ-2), which was the first two questions of PHQ-9, triggered full diagnostic interviews by the behavioural scientists. Respondents who scored one and more were assessed clinically for depression. Scoring and level of depression was assessed viz: (1-4) Minimal depression, (5-9) Mild depression, (10-14) Moderate depression, (15-19) Moderately severe depression, and (20-27) Severe depression. Some direct depression care, such as care sup-

Table 1. Association between socio-demographic variables and depression

Variables	Depression				Total	P-value
	Minimal Depression	Mild Depression	Moderate Depression	Severe Depression		
<b>Age</b>						
21-30	15	6	2	1	24	0.008
31-40	13	8	0	2	23	
41-50	36	11	0	0	47	
51-60	31	20	0	0	51	
>=61	24	9	0	0	33	
Total	119	54	2	3	178	
<b>Sex</b>						
Male	33	3	0	3	39	<0.001
Female	86	51	2	0	139	
Total	119	54	2	3	178	
<b>Ethnicity</b>						
Hausa	116	51	2	3	172	0.567
Yoruba	3	1	0	0	4	
Igbo	0	2	0	0	2	
Others	0	2	0	0	2	
Total	119	54	2	3	178	
<b>Religion</b>						
Christianity	21	6	0	0	27	0.541
Islam	98	48	2	3	151	
Total	119	54	2	3	178	
<b>Marital Status</b>						
Married	73	27	2	0	102	<0.001
Single	7	2	0	3	12	
Divorced	5	1	0	0	6	
Separated	6	6	0	0	12	
Widow	28	18	0	0	46	
Total	119	54	2	3	178	
<b>Level of Education</b>						
Non-formal	71	37	0	0	108	0.003
Primary	16	6	0	0	22	
Secondary	16	7	0	2	25	
Tertiary	16	4	2	1	23	
Total	119	54	2	3	178	
<b>Occupation</b>						
Trader	38	18	0	0	56	<0.001
Civil servant	19	4	2	2	27	
Self employed	45	28	0	0	73	
Unemployed	15	4	0	0	19	
Student	2	0	0	1	3	
Total	119	54	2	3	178	

Figure 1. Level of depression among the respondents



port, coordination, case management, and treatment was embarked on.

The Pittsburgh Sleep Quality Index (PSQI) (Buysee, Reynolds, Monk, Berman & Kupfer 1989) was used to measure the quality and patterns of sleep in the respondents. It differentiates “poor” from “good” sleep quality by measuring seven areas (components): subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medications, and daytime dysfunction over the last month.

The PSQI (Schochat, Tzischinsky, Oksenberg and Peled 2007) has internal consistency and a reliability coefficient (Cronbach’s alpha) of 0.83 for its seven components. The scoring is as follows: Component 1 Subjective Sleep Quality #9 score, Component 2 Sleep Latency #2 score (<15min (0), 16-30min (1), 31-60min (2), >60min (3)), Component 3 Sleep Duration #4 score (>7(0), 6-7 (1), 5-6 (2), <5 (3)), Component 4 Habitual Sleep Efficiency (total # of hours asleep) / (total # of hours in bed) x 100 >85% = 0, 75% - 84% = 1, 65% - 74% = 2, <65% = 3, Component 5 Sleep Disturbances #sum of scores 5b to 5j (0=0; 1-9=1; 10-18=2; 19-27=3), Component 6 Use of Sleep Medications #6 score, Component 7 Daytime Dysfunction #7 score #8 score (0=0; 1-2=1; 3-4=2; 5-6=3).

### 3. Results

Table 1 shows the association between socio-demographic variables and depression. Majority were females, depression was prominent in the age group 51-60years, more among the married than the single as well as those with low socio economic status. There was strong statistical association between age, sex, marital status, level of education, occupation and monthly income.

Figure 1 shows the spectrum of depression among the respondents. Majority, 119 (29.8%) had minimal level of depression, while only 3 (0.8%) had severe depression.

Table 2 shows the association between depression and sleep disturbance. One hundred and seventy two (96.6%) had sleep disturbance.

Table 3 shows the association between depression and sleep latency. Thirty nine (21.9%) stayed more than 60 minutes before falling asleep.

Table 4 shows the association between depression and subjective sleep quality among the respondents. Eighty five (47.7%) had poor subjective sleep quality. This is statistically significant.

Table 5 shows the association between depression and use of sleep medication. Forty eighty (26.9%) of the respon-

Table 2. Association between depression and sleep disturbance

Variables	Sleep Disturbance				Total	P-value
	Not during the past month	Less than once a week	Once or twice a week	Three or more times a week		
Minimal Depression	6	61	50	2	119	<0.001
Mild Depression	0	18	26	10	54	
Moderate Depression	0	2	0	0	2	
Severe Depression	0	0	3	0	3	
Total	6	81	79	12	178	

Table 3. Association between depression and sleep latency

Variables	Sleep Latency				Total	P-value
	<15 min	16-30 min	31-60 min	>60 min		
Minimal Depression	43	41	21	14	119	<0.001
Mild Depression	7	10	12	25	54	
Moderate Depression	0	0	0	2	2	
Severe Depression	3	0	0	0	3	
Total	53	51	33	39	178	

dents had taking medication (prescribed or over the counter) to assist in sleeping.

Table 6 shows the association between depression and short sleep duration. One hundred and fifty three (85.9%) were poor sleepers.

Table 7 shows the association between depression and sleep efficiency. One hundred and sixty one (90.4%) had habitual sleep efficiency greater than 85%.

Table 8 shows the association between depression and daytime dysfunction. Sixty (33.7%) had trouble staying awake while driving, eating meals or engaging in social activities.

#### 4. Discussion

In this study, there was a strong statistical association between age, sex, marital status, level of education, occupation and monthly income. Contrary to previous studies, where no significant correlation was found between age, weight, height, BMI & sex of students with BDI, PSQI & ESS scores 4-7.

Majority were females, this is comparable to Italian study who reported higher frequency of depressive symptoms in female Estonian (Eller, Aluoja, Vasar & Veldi 2006).

Moreover, 153 (85.9%) were poor sleepers, which was higher than the findings of Jeong and colleagues (2010) who reported 37.1% Korean medical students and 30.6% Estonian medical student. Also much higher than a study in Chinese medical student that reported 19.7%. Manni and co-workers (1997) found a significant association between chronic poor sleep and depression in. The higher incidence of poor sleep quality and depression seen in our study is probably because of the poor socio-economic status of the respondents. Social ties was also related to better health

and life satisfaction (Parkerson, Broadhead, Tse 1990). Another reason may be due to cultural difference, as our study has been done on Nigerians with diverse cultural inclinations. Subjective sleep quality was strongly negative correlated with depression (Augner 2011). First-year Duke University medical students who were very satisfied with life had fewer symptoms of depression and anxiety and more sleep (Parkerson, Broadhead, Tse 1990).

In this study, there was association between depression and sleep disturbance. One hundred and seventy two (96.6%) had sleep disturbance. This is similar to the reports of The National Institute of Mental Health Epidemiologic Catchment Area study that highlighted the strong association between sleep disturbance and subsequent depression. In their study, 14% of those who had insomnia at the first interview had developed new major depression a year later (Ford & Kamerow 1989). This study also collaborate that of Breslau and co-workers (1996), adults in Michigan, who found that the odds ratio of new depression was 4 times in increased in those subjects who had insomnia 3 years earlier. Similarly, in a questionnaire survey of adults over 18 in the UK, there was a 3-fold increased risk of new depression in those who reported sleep problem (Morphy et al 2007). In a prospective study, it was reported that Doctors who had complained of insomnia during medical school in the 1950s and 1960s were twice as likely to have developed depression at follow-up in 1990s (Chang et al 1997). Johnson and colleagues (2006) explored the direction of association between sleep impairments and major depression in a community-based sample. Prior depression was not associated with later sleep impairments; however, prior sleep impairments were associated with onset of depression in 69% of co-morbidity cases. Similarly, a Meta analysis conducted by Perlis et al. (1997) found that patients who

Table 4. Association between depression and subjective sleep quality

Subjective sleep quality	Depression				Total	P-value
	Minimal Depression	Mild Depression	Moderate Depression	Severe Depression		
Very Good	33 (94.3)	2 (5.7)	0 (0.0)	0 (0.0)	35 (100)	<0.001
Fairly Good	46 (79.3)	17 (3.4)	2 (3.4)	0 (0.0)	58 (100)	
Fairly Bad	24 (60.0)	13 (32.5)	0 (0.0)	3 (7.5)	40 (100)	
Very Bad	16 (35.6)	29 (64.4)	0 (0.0)	0 (0.0)	45 (100)	
Total	119 (66.9)	54 (30.3)	2 (1.1)	3 (1.7)	178 (100)	

Table 5. Association between depression and use of sleep medication

Variables	Sleep medication				Total	P-value
	Not during past month	Less than a once a week	Once or twice a week	Three or more times a week		
Minimal Depression	94	18	7	0	119	0.001
Mild Depression	33	6	7	8	54	
Moderate Depression	2	0	0	0	2	
Severe Depression	1	0	2	0	3	
Total	130	24	16	8	178	

suffered from recurrence of depressive episodes exhibit increased levels of sleep disturbance several weeks prior to the recurrence.

The current study has important implications for the role of sleep in the development and maintenance of depression. Sleep impairments should be considered a “red-flag” for the development of depression. Individuals with a past history or family history of depression should be especially conscientious to get restorative sleep, since sleep disruptions represent a salient risk factor for dysregulation of the HPA axis, a hallmark biological marker observed in depression. Additionally, treatment of sleep disturbance could prevent the development of depression, and reduce the likelihood for relapse among vulnerable populations. Lastly, because co-morbid conditions are more difficult to treat and indicate a poorer prognosis than a primary disorder alone (Johnson and colleagues 2006), health practitioners should pay particular attention to alterations in patients’ sleep quality to avoid development of a co-morbid condition that could have been avoided with treatment of the sleep impairment. In line with evidence that sleep impairments represent a biological stressor evidenced by increased activation of the HPA axis (Van Reeth et al 2000) that may be involved in the pathophysiology of depression, the current study found decrements in sleep quality correlated with increased symptoms of depression.

Additionally, sleep continuity, a measure of time awake between initial sleep onset and final awakening correlated with symptoms of depression. Decreases in sleep continuity were associated with increases in depression. Nocturnal awakenings have been observed to cause a pulsatile release of the cortisol (Buckley TM & Schatzberg 2005). An increase in sleep fragmentation may thereby increase nocturnal lev-

els of cortisol, the wakefulness promoting hormone, when cortisol is supposed to be at a diurnal minimum.

Decreases in sleep continuity have been observed in depressed individuals with elevated levels of CRH. Levels of CRH are at their lowest during slow wave sleep (SWS), and elevated levels have been shown to be associated with decreased SWS and increased light sleep (stages 1 and 2), possibly by activation of epinephrine. Considering that light sleep, compared to SWS, is characterized by a decreased arousal threshold, elevated levels of nocturnal CRH could be a mechanism through which depressed individuals experience increased sleep fragmentation (Buckley & Schatzberg 2005).

Eighty five (47.7%) had poor subjective sleep quality. This is similar to Kristen (Kristen 2010) who reported that Perceived Stress and Sleep Quality had moderately strong predictive validity for Depression.

### Strengths and Limitations

The PSQI is a subjective measure of sleep. Self reporting by clients though empowering, may be able to reflect inaccurate information if the client has difficulty understanding what is written, or cannot see or physically write out responses.

### 5. Conclusion

Taking into account that poor sleep quality has major negative long term impact on health; preventive programmes should focus on the association between depressive symptoms and subjective sleep quality. Efforts should be made to encourage social support in order to promote mental health. An educational intervention involving written feedback and

Table 6. Association between depression and use of sleep duration

Variables	Sleep duration				Total	P-value
	≥7 hours	6-7 hours	5-6 hours	≤ 5 hours		
Minimal Depression	19	12	32	56	119	0.307
Mild Depression	6	5	16	27	54	
Moderate Depression	0	0	0	2	2	
Severe Depression	0	0	3	0	3	
Total	25	17	51	85	178	

Table 7. Association between depression and sleep efficiency

Variables	Habitual Sleep Efficiency		Total	P-value
	>85%	75-84%		
Minimal Depression	106	13	119	0.783
Mild Depression	50	4	54	
Moderate Depression	2	0	2	
Severe Depression	3	0	3	
Total	161	17	178	

participation in an educational discussion group demonstrated promising effects in changing patterns of positive health habits, particularly socialization, and sleep and exercise behaviors.

Numerous studies provide findings indicating the remarkable relationship between sleep alterations and depression. Although the existing hypotheses are not likely to explain all aspects of the sleep alterations in depression, each may be worth being maintained for refinements of pathophysiologic models of depression as new data accumulate. Further research taking into account the heterogeneity of depressive disorder and linking the different areas of research is needed to develop more comprehensive theoretical models and new therapies for depression.

### Recommendation

Education on sleep medicine should be incorporated into continuing education programs. Early detection of depression can be enhanced by screening person for the disorder when they attend a hospital for other reasons. The family practice clinic provides an excellent opportunity for this, as most patients present first at the clinic for all types of illnesses.

Future research in this area should investigate the role of sleep in longitudinal investigations which will elucidate the relationships among stress, sleep, and depression and allow for causal relationships to be inferred. While retrospective measures allow for analysis of large amounts of data often

with little investment, prospective studies are important for research into the etiology of disease and would be helpful in this field of research.

Sleep hygiene refers to behaviors that are believed to promote improved quantity and quality of sleep. Recommendations for improving sleep hygiene include maintaining consistent sleep and wake times, avoiding caffeine and other stimulants 4-6 hours before bedtime, avoiding naps, avoiding exercise before bed, along with creating a sleep environment that is quiet, dark, comfortable and absent of distractions. Additionally, following an established pre-sleep ritual coupled with activities that promote relaxation have been shown to improve sleep quality. Considering that one cannot influence a genetic or developmental predisposition to depression, attention to daily behavioral patterns that can decrease vulnerability should be perceived as vital for maintaining homeostasis.

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Table 8. Association between depression and daytime dysfunction

Variables	Daytime dysfunction			Total	P-value
	Never	Once or twice	Once or twice each week		
Minimal Depression	83	30	6	119	0.207
Mild Depression	32	19	3	54	
Moderate Depression	0	2	0	2	
Severe Depression	3	0	0	3	
Total	118	51	9	178	

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