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Association of Insomnia and Mental Health Among Medical Students of a Private Medical College in Malaysia (A Cross Sectional Analytical Study)

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Abstract

The purpose of this research is to determine the association of insomnia and mental health among medical students of Melaka Manipal Medical College. The research conducted was an analytical cross-sectional study using SRQ. The data collection comprises of independent variables under the ISQ questionnaires which are insomnia, psychiatric disorder, circadian rhythm, movement disorder, parasomnia and sleep apnea with confounding factors of gender, usage of sleeping aids and duration of sleep/day. It was carried out for duration of 4 weeks starting from 11th April 2016 till 13th May 2016 on 4th year medical undergraduates. A sample size of 265 was used. Microsoft Excel and Epi Info Version 7 have been used to record and analyze data. Out of all the factors, insomnia, circadian rhythm and parasomnia has the strongest association to mental health. The research on insomnia in medical students is of particular interest as it is known that sleep disturbances has the capability to affect the mental well-being of an individual. Based on a study, the association of insomnia and mental health is significant (OR=2.97). Circadian rhythm disorder is defined as disruptions in a person's circadian rhythm. Circadian rhythm regulates the estimated 24-hour cycle of biological processes. To date, there are still no significant evidence to portray the relationship between both circadian rhythm disorder and mental health. Sleep apnea is characterized by repeated pharyngeal obstruction, during sleep causing apnea and hypopnea. Depressive disorder (21.75%), anxiety disorders (16.67%), PTSD (11.85%), psychotic disorders (5.13%), bipolar disorder (4.06%), and dementia (2.13%) were statistically significantly more prevalent in the apnea group compared with the non-apnea group. The study looked at the prevalence by gender of different types of common mental illnesses. The researchers also found that women with anxiety disorders are more likely to internalize emotions, which typically results in withdrawal, loneliness and depression. Men, on the other hand, are more likely to externalize emotions, which leads to aggressive, impulsive, coercive and noncompliant behavior, according to the study. Sleeping aids has also shown association to affect mental health. Other factors such as sleeping hours per day and parasomnia are also the variables being analyzed.

Keywords

Insomnia, Mental Health, Medical Students

1. Introduction

Mental Health is defined as state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community [1]. Tertiary studies has always been highly regarded as highly stressful [2]. This stressful environment can potentially exert negative effect on the psychological and physical aspects in undergraduates. This will eventually result in poor performance and possibly a large number of

casualties of psychological casualties. A study in Singapore reported that 57% of medical students had emotional disorders based on the General Health Questionnaire (GHQ) compared to 47.3% of law student whereas another study among medical students of the University Of Mississippi School Of Medicine in the USA, reported that 23% had depression and 57% had high levels of emotional distress [2]. Mental health plays a major role in medical school. The association of insomnia and mental health among Melaka Manipal Medical College students is important and might contribute knowledge to our current topic.

2. Methodology

2.1. Study Design and Settings

The research was conducted as analytical cross-sectional study to find out the association between insomnia and the effects on mental health among the medical undergraduates of Melaka Manipal Medical College, Muar, Johor. Due to the stress and demands of studying and exams, the students have more prevalence to have insomnia which can lead to mental disorders. The study were conducted to help in identifying the problems to ensure the students are well equipped to handle the problems that may arise and prepare them for the life in medical field later on.

2.2. Study Time and Study Population

The study was carried out for the duration of 4 weeks starting from 11th April 2016 till 13th May 2016 on 4th year medical undergraduates. These students are undergraduates from Melaka Manipal Medical College who finished their 2.5 years twinning programme in Manipal India. MMMC was established in 1997 through the vision of Dr. Ramdas Pai, Chancellor of Manipal University, and the instrumental efforts of the late Datuk K Pathmanaban, former Malaysian Deputy Minister of Health. MMMC admitted its first batch of MBBS students in 1997 with the support of experienced medical educationists from Manipal University who helped in the implementation of the medical programme [5].

2.3. Sample Size

The sample size of 265 was used with the sample calculation of overall prevalence of 22.19% of SRQ 20 [4]. The sample size was calculated using the formula mention below. The minimum requirement of sample for this study was 200. A total of 240 students answered the questionnaires with 25 students who did not complete the questionnaire with 68 positive for psychiatry disorder (SRQ+) and 172 tested negative (SRQ-)

2.4. Sampling Methods

The method of sampling used was universal sampling with unique ID numbers given to each participant. The questionnaires were distributed randomly among the medical undergraduates. The inclusion criteria were 4th year medical undergraduates of Melaka Manipal medical college who completed the questionnaires. The exclusion criterion was those students who did not complete the questionnaires.

2.5. Data Collections

The data collections comprises of independent variables under the ISQ questionnaires which are insomnia, psychiatric disorder, circadian rhythm, movement disorder, parasomnia and sleep apnea with confounding factors of gender, usage of sleeping aids and duration of sleep/day The outcome measured was the SRQ20 which indicates the presence of mental health with different cut off points for male and female [4]. Methods used for data collection was for the participants to answer the questionnaires which comprises of different sections including demographic, ISQ and SRQ20.

2.6. Instruments

The INSOMNIA SCREENING QUESTIONNAIRE is an optional tool that can be used by the clinician to assist in the diagnosis of a primary sleep disorder or secondary causes of insomnia [4]. Diagnostic Domains of ISQ are 1) Insomnia: Q1-6 2) Psychiatric Disorders: Q7-10 3) Circadian Rhythm Disorder: Q11 4) Movement Disorders: Q12-13 5) Parasomnias Q14 6) Sleep Disordered Breathing (Sleep Apnea): Q15-17. The cut off points for the following domains would be:

1 Q1-Q6: 18
2 Q7-Q10: 16
3 Q11: 4
4 Q12-Q13: 8
5 Q14: 2
6 Q15-Q17: 9

The SRQ-20 addresses four factors (somatization, depressive/anxious moods and depressive thoughts) which are known as minor psychiatric disorders. A Brazilian Portuguese version of the SRQ-20 has been validated, and the cut-off points for the presence of non-psychotic morbidity were established as >8 for women and > 6 for men.[3] The diagnostic values of SRQ were sensitivity 83% and specificity 80%.

2.7. Data Processing and Data Analysis

The data were recorded and analyzed using Microsoft Excel and Epi Info Version 7. The means between groups in the independent variables of Circadian rhythm, Sleep apnea, Parasomnia, Usage of sleeping aid, Hours of sleep per day were compared with SRQ-20 using the chi-square test. The association between insomnia, psychiatric disorder and movement disorder was compared using linear regression. Independent T-test was used to compare association gender with SRQ-20. The level of significance was set at 95% (P value <0.05)

2.8. Ethics

The involvement in the study is voluntary participation. The questionnaires were collected after obtaining the informed consent from the participants. Highest

confidentiality was guaranteed to the participants with no digression towards their identity. The study protocol was also approved by the Ethics Committee of the Melaka Manipal Medical College.

3. Results

Table 1. *Comparison of mental health via qualitative analysis amongst selected independent variables using Chi-square Test.*

Variables	Categories	Positive SRQ (n=68)	Negative SRQ (n=172)	OR (95% CI)	X2	P value
Circadian Rhythm Disorder	Yes (n=32)	18 (26.5%)	14 (8.1%)	4.1 (1.9-8.8)	14.17	P< 0.0001*
	No (n=208)	50 (73.5%)	158 (91.9%)			
Parasomnia	Yes (n=128)	45 (66.18%)	83 (48.26%)	2.1 (1.2-3.8)	6.29	0.012*
	No (n=112)	23 (33.82%)	89 (51.74%)			
Sleep Apnea	Yes (n=16)	9 (13.24%)	7 (4.07%)	3.6 (1.3-10.1)	6.58	0.010*
	No (n=224)	59 (86.76%)	165 (95.93%)			
Residence	Hostelites (n=174)	51 (75.00%)	123 (71.51%)	1.2 (0.6-2.3)	0.30	0.585
	Non-Hostelites (n=66)	17 (25.00%)	49 (28.4%)			
Hours of Sleep/ Day	<5 (n=27)	10 (14.7%)	17 (9.88%)	1.9 (0.8-4.6)	2.26	0.132
	5-6 (n=150)	35 (51.47%)	115 (66.86%)	1.0	0.63	0.427
	7-8 (n=52)	15 (22.05%)	37 (21.51%)	1.3 (0.6-2.7)	10.89	0.001*
	9-10 (n=6)	5 (7.35%)	1 (0.58%)	16.4 (1.8-145.4)	0.16	0.686
	11-12 (n=3)	1 (1.47%)	2 (1.16%)	1.6 (0.1-18.7)	6.29	0.012*
	>12 (n=2)	2 (2.94%)	0 (0%)	Undefined		
Sleeping Aids	Yes (n=10)	4 (5.88%)	6 (3.49%)	1.7 (0.5-6.3)	0.69	0.402
	No (n=230)	64 (94.12%)	166 (96.51%)			

*P value < 0.05

Table 1, using Chi Square test, suggests among all variables, circadian rhythm disorder, parasomnia and sleep apnea show significant correlation towards mental health disorders with the p-value being less than 0.05. Specific hours of sleep/day also concludes the same with hours of 9 to 10, and more than 12 hours.

Table 2. *Comparison of mental health via qualitative analysis amongst selected independent variables using Linear Regression.*

Variable	Coefficient	Std Error	F-test	P-value	Correlation Coefficient
Insomnia	0.531	0.093	32.5404	P<0.000000*	r= 0.346
Movement Disorder	0.701	0.161	18.9784	0.00002*	r= 0.265
Psychiatric Disorder	0.836	0.061	189.9288	0.000000*	r= 0.663

*P value < 0.05

Table 2, using Linear Regression, suggest variables such as insomnia, movement disorder and psychiatric disorder all show significance when related towards mental health disorders due to their p-values being less than 0.05.

Table 3. *Comparison of mental health via qualitative analysis amongst selected independent variables using paired T-Test.*

Variable	Mean	T test	P Value
Gender	1.1730 (0.0098-2.3363)	1.99	P<0.0481*

*P value < 0.05

Table 3, using paired T test, suggests that gender does play an important role in terms of either internalizing or externalizing emotions when confronted with the stresses of tertiary studies amongst students. The p-value being less than 0.05 as well.

4. Discussion

Comparison of mental health via qualitative analysis amongst selected independent variables using Chi- square test, linear regression and paired T-test was done and results were obtained as mentioned above. List of all significant findings were insomnia, circadian rhythm disorder, parasomnias, sleep apnea, hours sleep per day (9-10 hours and >12 hours), movement disorder, psychiatric disorder and gender. On the other hand, the non-significant findings were residence, hours sleep per day (<5 hours, 5-6 hours and 11-12 hours) and usage of sleeping aids.

4.1. Insomnia

Sleep disorders play a significant role in mental health. Insomnia is an inability to get the amount of sleep needed to function efficiently during the daytime. Over one-third of Americans report difficulty sleeping. Insomnia is caused by difficulty falling asleep, difficulty staying asleep or waking up too early in the morning. [6] Based on our study, using linear regression, it shows a P value of P=0.000000 and

correlation coefficient value r=0.346 which signifies low in correlation. This shows the variable involved is significant however it has low correlation. Based on a research, the association between insomnia and a positive SRQ was significant (OR=2.97). The association of the positivity in the SRQ with other sleep habits variables was also submitted to the c2 test (Mantel-Haensel with Yates correction). [3] On another research, insomnia is also associated to anxiety, which is also a form of mental health disorder.[7] Adolescents with insomnia symptoms were at a higher risk for all classes of mental disorders {odds ratio [OR] (95% confidence interval [CI]: 3.4 (2.9–4.0)} including mood, anxiety, behavioral, substance use, and eating disorders, suicidality [OR (95% CI): 2.63 (1.34–5.16)], poor perceived mental health [OR (95% CI): 2.01 (1.02–3.96)].[10] Thus it can be concluded based on various research and the significance of our data, insomnia is related to mental health.

4.2. Circadian Rhythm Disorder

Circadian rhythm disorders are disruptions in a person's circadian rhythm—a name given to the "internal body clock" that regulates the (approximately) 24-hour cycle of biological processes in animals and plants. The term circadian comes from Latin words that literally mean "around the day." The key feature of circadian rhythm disorders is a continuous or occasional disruption of sleep patterns. The disruption results from either a malfunction in the "internal body clock" or a mismatch between the "internal body clock" and the external environment regarding the timing and duration of sleep. As a result of the circadian mismatch, individuals with these disorders usually complain of insomnia at certain times and excessive sleepiness at other times of the day, resulting in work, school, or social impairment.[8] Based on our study using the Chi-square test, out of 240 participants, 32 students has circadian rhythm disorder; where 26.5% positive SRQ and 8.1% negative SRQ which gives a significant P value of P<0.0001. These findings are consistent with results of a similar study on the role of circadian clock genes in mental disorders by Department of Psychiatry of McGill University, Montreal, QC, Canada. [9]

4.3. Parasomnia

Parasomnia can be defined as abnormal, undesirable behavioral, physiological, or experiential events that accompany sleep, are common in the general population [10]. Usually this are more prevalence in children than adult with the exceptions of REM Sleep Behavior Disorder. Study has found out that parasomnias can lead dangerous behavior which can endanger the patient and the others which consequences such as self-mutilation and suicide. [11] According to the results above, parasomnias are significant in contributing towards mental health disorder among the medical undergraduates. Based on Chi-Square Test, 128 students (53.3%) responded positive towards parasomnias with 45 out of those students (66.18%) were positive for SRQ20 and 83 students (48.26%) are negative of SRQ20. The P value was calculated to be 0.012 which show significant association between parasomnias and mental health disorder. The OR value of 4.1 indicates that there is positive association between parasomnias and mental health disorder. In cohort study done in United Kingdom, parasomnias sufferer in childhood have tendency to experience psychiatric experiences when they are 12 years old. [12]

4.4. Sleep Apnea

Sleep apnea is a common disorder in which you have one or more pauses in breathing or shallow breaths while you sleep. Breathing pauses can last from a few seconds to minutes. They may occur 30 times or more an hour. Typically, normal breathing then starts again, sometimes with a loud snort or choking sound. Sleep apnea usually is a chronic (ongoing) condition that disrupts your sleep. When your breathing pauses or becomes shallow, you'll often move out of deep sleep and into light sleep. Sleep apnea is a leading cause of excessive daytime sleepiness. [13] Based on our data collected from ISQ, 16 out 240 participants recorded to have sleep apnea; where 13.24% is positive SRQ and 4.07% is negative SRQ. The P value is 0.010 thus showing significant association between sleep apnea and mental health. A similar study was conducted on association of psychiatric disorders and sleep apnea in a large cohort where the results indicate that compared with patients not diagnosed with sleep apnea, a significantly greater prevalence (P <.0001) was found for mood disorders, anxiety, posttraumatic stress disorder, psychosis, and dementia in patients with sleep apnea. This similar study also concludes that sleep apnea is associated with a higher prevalence of psychiatric co morbid conditions in Veterans Health Administration beneficiaries. This association suggests that patients with psychiatric disorders and coincident symptoms suggesting sleep-disordered breathing should be evaluated for sleep apnea. [14]

4.5. Movement Disorder

Stereotypic movement disorder is a condition in which a person engages in repetitive, often rhythmic, but purposeless movements. In some cases, the movements may result in self-injury. The repetitive movements that are common with this disorder includes rocking, banging the head, self-biting, nail biting, self-hitting, picking at the skin, handshaking or waving and mouthing of objects. [15] Using linear regression, there is a significant P value of 0.00002 and correlation coefficient value is r=0.265 which signifies little if any correlation since it is less than 0.30. Thus, there is a little correlation between movement disorders and its association with mental health of MMMC undergraduates.

4.6. Psychiatric Disorder

Psychiatric illnesses are medical illnesses affecting one or more functions of the mind. They interfere with emotion, thought processes, behavior and perception. A psychiatric illness causes variable amounts of stress and suffering to the person, their family, and friends [16]. Using linear regression,

it shows a P value=0. 000000 and correlation coefficient value of r=0.663. This signifies that the variable which is psychiatric disorder is significant and the correlation coefficient indicates moderate correlation.

4.7. Gender

Gender plays a significant role in determining one's tendency of having mental disorder. Women are more liable to depression and anxiety due to their nature of internalizing their emotion while men have more tendency to substance abuse and antisocial disorder due to their expressive and volatile emotions [17]. Another study shows that sleeping patterns between men and women do contribute in their tendency of having mental disorder with men falling asleep later can leads to a significance increase in the tendency of having mental disorder [18]. According to our study, the results found was to be significant by using the paired T-Test with the mean calculated to be 1.1730 (0.0098-2.3363) and the P< 0.0481. Thus, gender did play a significant role in determining the prevalence of having mental health among the medical undergraduates. After obtaining the sample and analyzing it, out of 240 samples, 30 (12.5%) male correspondents were found to be SRQ+ with 38 (15.8%) female correspondents were positive in the SRQ questionnaires. According to Robin and Regier (1991)[19], the prevalence of mental disorder were found to be more in men with 36% compared to women with 30% over their lifetime although both men and women are ranked the same in their current experience of mental health disorder. Although the findings were different from the references used [3], this was due to the number of female correspondences to be higher than male (139 female to 101 male students) with the cut off point for men to be more than 7 and female is more than 9.

4.8. Hours Sleep / Day

Regarding the hours of sleep most of our participants had varies according to these ranging durations: less than 5 hours, 5 to 6 hours, 7 to 8 hours, 9 to 10 hours, 11 to 12 hours or more than 12 hours. In this criteria, there are both positive and negative findings in regards of significance. As tabulation of data is concerned, sleeping within the hours of 9 to 10 and more than 12 hours came back as significant. The remaining hours are not significant. On the positive findings, out of 6 students who sleep for 9 to 10 hours a night, 5 of them (7.35%) are SRQ positive while 1 student (0.58%) are SRQ negative. Moreover, students who sleep for more than 12 hours a night, 2 of them (2.94%) are SRQ positive while none were SRQ negative. On the negative findings, 27 students who sleep for less than 5 hours a night, 10 of them (14.7%) are SRQ positive while 17 of them (9.88%) are SRQ negative. Next, from the 150 students who sleep for 5 to 6 hours a night, 35 of them (51.47%) are SRQ positive while 115 of them (66.96%) are SRQ negative. Other than that, the 52 students who sleep for 7 to 8 hours of sleep a night, 15 of them (22.06%) are SRQ positive while 37 of them (21.51%) are SRQ negative. Lastly, from the 3 students who get 11 to 12 hours of sleep a night, 1 of them (1.47%) are SRQ positive while 2 of them (1.16%) are SRQ negative.

4.9. Residence

Regarding the non-significant findings, it has been concluded via Chi-Square test that providing a different residential location would alter the student's mental health which may be associated with insomnia. The options include students residing in hostels and outside the hostel. In this particular study, out of the 174 hostelites; 51 of them are SRQ positive (75%), while 123 students were SRQ negative (71.51%). The non-hostelites however, ranging from 66 students shown that 17 of them are SRQ positive (25%) and 49 of them being SRQ negative (28.4).

4.10. Sleeping Aids

In the efforts to experience peaceful slumber at nights after exhausting hours, medical students in this study openly admitted to the consumption of sleeping aids in order to sleep. The results tabulated consists of 10 students; 4 out of them are SRQ positive (5.88%) while 6 of them are SRQ negative (3.49%). In a similar study, anticholinergics, which inhibits the release of neurotransmitter acetylcholine in the brain and body, are taken to relieve insomnia. Unfortunate side effects ranging from drowsiness to constipation and urine retention to dry mouth. Using more effective methods, a follow-up period extending beyond seven years, a more thorough assessment of pharmacy records regarding the medication use, researchers conclude the link between anticholinergic medication use and mental illness [20]

5. Recommendations

In the efforts to improve the following debate between the association of insomnia and the development of mental health, a few recommendations are suggested. A larger sample size is needed with an equal number of males and females to exclude gender bias. A cohort study design would be a better fit, simply due to the extra duration of time needed to better correlate the relationship between the insomnia and mental health.

6. Limitations

The disadvantages of our analytical cross-sectional study were as follows. Since the independent variables which is occurrence of insomnia and dependent variables which is mental health are measured at the same point in time, it is not possible to establish a temporal relationship between the exposure and the onset of the disease. Besides that, our study does not reflect upon the causal relationship due to our study design. In addition to that there is no incidence rate and which can lead to an increased bias potential. The results were biased towards the female correspondence because of higher number of female correspondences compared to

males. The percentage of total female correspondence was 57.92% while the males were only 42.08%.

7. Conclusion

Sleep problem is prevalent among the general population and approximately one-third of the adults have reported some form of insomnia throughout their lifetime [3]. More so in tertiary education worldwide and based on this study, 4th year medical students in a private college. As the study concludes, insomnia, circadian rhythm disorders and parasomnia show the most prevalent independent variables onto which these students are affected by, leading to an unfortunate and insidious pathway to mental health disorders. Many corrections and preventions can be sought after to curb this issue, many of which revolve around the importance of sleep hygiene being taught to the students. Hence, consolidating the idea of sleep being extremely important for cognitive and physical recovery of a person, much more needed for students in fields of study that requires so much of them. In conclusion, we concur the relevance between insomnia and mental health disorders to be significant.

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