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SLEEP HYGIENE, SOCIAL RHYTHM AND SLEEP QUALITY AMONG UNIVERSITY STUDENTS

NICKY ANG CARLMOND



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UNIVERSITI PENDIDIKAN SULTAN IDRIS

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ABSTRACT

Sleep is vital for maintaining overall health and well-being. This study investigated the relationship between sleep hygiene and social rhythm and aimed to identify the key predictors of sleep quality among young Malaysian adults. Conducted at Universiti Pendidikan Sultan Idris in Perak, Malaysia, the research utilized a longitudinal survey design. A total of 113 university students participated, completing either a paper-based or an online survey. The survey comprised a demographic questionnaire, Insomnia Severity Index (ISI), Pittsburgh Sleep Quality Index (PSQI), Sleep Hygiene Inventory (SHI), Social Rhythm Metric (SRM II-5), Consensus Sleep Diary (CSD), and Stanford Sleepiness Scale (SSS). Participants also recorded sleep and social rhythm diaries for one week. The results showed that Malaysian young adults generally exhibited good sleep hygiene and an above-average social rhythm, with mean scores of 12.52 (SD = 6.7) for sleep hygiene and 4.78 (SD = 1.62) for social rhythm. Most participants were categorized as good sleepers, as indicated by a mean PSQI score of 4.29 (SD = 2.44), sleep quality from the diary (M = 3.52, SD = 0.38), total sleep time (M = 7 hours 7 minutes, SD = 54 minutes), and sleep efficiency (M = 86.61%, SD = 7.19%). A significant positive correlation was found between sleep hygiene and sleep quality as measured by the PSQI ($r(111) = .71, p < .01$). In contrast, social rhythm did not significantly correlate with sleep quality variables and had a moderate negative correlation with PSQI scores. Regression analysis revealed that sleep hygiene is a stronger predictor of sleep quality ($\beta = .69, t(110) = 8.38, p < .001$), whereas social rhythm better predicts sleep efficiency ($\beta = .33, t(110) = 3.17, p < .002$). Thus, improving both sleep hygiene and social rhythm may provide a more holistic approach to managing sleep quality. However, further research is needed to confirm these findings across a broader young adult population.





KESIHATAN TIDUR, RENTAK SOSIAL DAN KUALITI TIDUR DI KALANGAN PELAJAR UNIVERSITI

ABSTRAK

Kajian ini adalah untuk mengkaji korelasi dan menentukan faktor yang lebih baik sebagai petanda kualiti tidur antara kesihatan tidur dan rentak sosial di kalangan orang dewasa muda Malaysia. Reka bentuk kajian tinjauan berlongitudinal dilaksanakan di Universiti Pendidikan Sultan Idris, Perak, Malaysia. Seramai 113 pelajar universiti yang layak telah mengambil bahagian dalam kaji selidik bertulis atau dalam talian yang terdiri daripada soal selidik demografik, *Insomnia Severity Index* (ISI), *Pittsburgh Sleep Quality Index* (PSQI), *Sleep Hygiene Inventory* (SHI), *Social Rhythm Metric* (SRM II-5), *Consensus Sleep Diary* (CSD), dan *Stanford Sleepiness Scale* (SSS). Hasil kajian menunjukkan skor purata kesihatan tidur dan Rentak Sosial di kalangan orang muda Malaysia melaporkan kesihatan tidur yang baik dan rentak sosial di atas purata ($M = 12.52$, $SD = 6.7$) dan ($M = 4.78$, $SD = 1.62$) masing-masing, dan majoriti peserta adalah penidur yang baik dengan *Pittsburgh Sleep Quality Index* ($M = 4.29$, $SD = 2.44$), Kualiti Tidur Diari Tidur ($M = 3.52$, $SD = 0.38$), Masa Tidur Keseluruhan ($M = 7$ jam 7 minit, $SD = 54$ minit), dan Kecekapan Tidur ($M = 86.61\%$, $SD = 7.19\%$). Terdapat korelasi positif yang signifikan antara kesihatan tidur dan rentak tidur yang diukur oleh PSQI, $r(111) = .71$, $p < .01$ manakala rentak sosial tidak berkorelasi secara signifikan dengan sebarang pemboleh ubah kualiti tidur dan mempunyai korelasi negatif sederhana dengan pengukuran kualiti tidur oleh PSQI. Analisis regresi linear berganda menunjukkan bahawa kualiti tidur yang diukur oleh PSQI lebih baik diramalkan oleh kesihatan tidur ($\beta = .69$, $t(110) = 8.38$, $p < .001$) manakala rentak sosial merupakan petanda yang lebih baik untuk pengukuran kualiti tidur oleh kecekapan tidur diari tidur ($\beta = .33$, $t(110) = 3.17$, $p < .002$). Dari kajian ini terhadap orang dewasa muda, kesihatan tidur adalah petanda yang lebih baik untuk kualiti tidur seperti yang diukur oleh PSQI, sementara rentak sosial adalah petanda yang lebih baik untuk kualiti tidur seperti yang diukur oleh kecekapan tidur atau diari tidur. Walau bagaimanapun, penemuan ini memerlukan pengesahan lanjutan untuk mewakili populasi orang dewasa muda dengan lebih baik.





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LIST OF ABBREVIATION

ANOVA	Analysis of Variance
BD	Bipolar Disorder
BMI	Body Mass Index
CSD	Consensus Sleep Diary
CSM	Composite Scale of Morningness
DBAS	Dysfunctional Beliefs and Attitudes About Sleep Scale
DSM	Diagnostic and Statistical Manual for Mental Disorders
FPM	Faculty of Human Development
FPTV	Faculty of Technical and Vocational
FSK	Faculty of Human Sciences
FSSK	Faculty of Sport Science & Coaching
ISI	Insomnia Severity Index
KSS	Karolinska Sleepiness Scale
MAPs	Mindful Awareness Practices
MDD	Major Depressive Disorder
PSQI	Pittsburgh Sleep Quality Index





PTSD	Posttraumatic Stress Disorder
REM	Rapid Eye Movement
rMEQ	Reduced Morningness-Evening Questionnaire
SCN	Suprachiasmatic Nucleus
SE	Sleep Efficiency
SEM	Structural Equation Modelling
SHE	Sleep Hygiene Education
SHI	Sleep Hygiene Inventory
SHPS	Sleep Hygiene Practice Scale
SOL	Sleep Onset Latency
SPSS	Statistical Package for the Social Sciences
SRM	Social Rhythm Metric
SRT	Social Rhythm Therapy
SSD	Square Successive Difference
SSS	Stanford Sleepiness Scale
TIB	Time In Bed
TST	Total Sleep Time
TWASO	Terminal Wakefulness After Sleep Onset
TWT	Total Wake Time
UPSI	Universiti Pendidikan Sultan Idris



WASO

Wake After Sleep Onset



LIST OF SYMBOLS

$>$	Greater than
$<$	Less than
$\geq$	Greater than or equal to
$\leq$	Less than or equal to
σ	Standard deviation
σ^2	Variance
μ	Population mean
p	Probability
$p\text{-value}$	Significance level in hypothesis testing
N	Total population size
n	Sample size
r	Correlation coefficient
R^2	Coefficient of determination
z	z-score
F	F-statistic
df	Degrees of freedom



α	Level of significance
β	Coefficient in regression analysis
H_0	Null Hypothesis
SD	Standard Deviation of sample

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CHAPTER 1

INTRODUCTION



1.1 Introduction

This chapter of this study consist of nine sections which is meant to explain more specifics of the study on the association between social rhythm, sleep hygiene, and sleep quality in young adults. The sections include background of study, problem statement, research questions, objective of study, significant of study, variables of study, theoretical approach, framework of study and hypothesis of study.



1.2 Background of study

Sleep is a natural behaviour and a part of a daily biological rhythm that is indispensable for promoting health and optimal bodily functions (Kabrita, Hajjar-Muca, & Duffy, 2014). Sleep is influenced by light and dark and alternates with wakefulness in a cyclical circadian pattern. Through which, a good sleep comprises specific sleep stages which cycle throughout the night, initiated and modulated by neurochemical activities with resulting systematic benefits (Hoey, Fulbrook, & Douglas, 2014). Whereas abnormal sleep duration being too much or too little sleep is implicated in a wide range of physical and mental health conditions (Maslowsky, & Ozer, 2014).

The daily biological rhythm of sleep is regulated by the interactions of two systems which are the circadian rhythm which promotes wakefulness during daytime and sleep at night, and sleep homeostatic system which is dependent on the sleep-wake episode of an individual whereby the drive for sleep (sleep pressure) which builds up during wakefulness (Van Dongen & Dinges, 2005). Despite the crucial role of the biological needs, the priority is outweighed by society's obsession on their social and work schedule. This results in increased reported sleep disturbance and poor sleep quality among young adults (Maslowsky & Ozer, 2014) which states that there is declined in average sleep duration and this decline is driven by constraints of the fulfilment of biological and social needs.

This lack of emphasis on the importance of sleep due to social and work pressures leads to irregular sleep pattern which causes wide ranges of physical and mental health conditions such as daytime sleepiness, hypertension,



hypercholesterolemia, obesity and depression (Shochat, Cohen-Zion, & Tzischinsky, 2013). The trend of increase of sleep problems among university students can be seen in the increase of the overall prevalence of insomnia in a study conducted by a national health survey conducted in Norway, 34.2% of women and 22.2% of men reported experiencing insomnia. It was observed that there is an increase of sleep problems from 22.6% in 2010 to 30.5% in 2018. And this study prompts the increase of the attention as this is a public health problem (mental health) in the Norway population (Sivertsen, 2018). In another study conducted in Tripura Medical College, in which 57% of the 203 medical students reported disturbed sleep, 72.4% were sleepy during daytime an increase of 20.7% during exams. According to the study findings, students who achieved average marks in the last semester exam were the most impacted by disrupted sleep (66.3%), followed by those who received good marks (53.5%) and poor marks (50%) (Datta, Nag, Karmakar, Chakrabarty, Tripura, & Bhattacharjee, 2018).



In Malaysia, more studies and survey have been carried out to highlight sleep problem in the community, Abdul Rahman & Norbani, 2022 in their study states that approximately 36% of the university students surveyed reported experiencing symptoms of insomnia and Nearly 40% of students had irregular sleep schedules, which was linked to poorer sleep quality. In addition, Zailinawati et al., (2009) also carried out a survey among students studying medicine at the International Medical University (IMU) located in Malaysia. It was reported that out of the 799 medical students, 35.5% reported Daytime sleepiness, 41.8% psychological distress, and 16.1 % reported bad sleep quality, the study emphasises that there is a notable incidence of daytime sleepiness, low sleep quality, and psychological distress. This rise in sleep issues within the Malaysian population is evident in a study conducted among secondary school





students in the Gombak District of Selangor as well. Kesintha et al., (2018) found that of 1092 secondary school students 24.0% reported poor sleep quality. Their conclusion highlights the high prevalence of poor sleep quality among adolescents, with contributing factors including age, parental marital status, depression, anxiety, stress, and academic performance. Taken together, there is an alarming increase of the prevalence of poor sleep quality, which leads to many health problems that includes major severe illnesses and therefore more research endeavours are needed to identify the factors that predict poor sleep quality. Determining the predictors of poor sleep quality can promote ways to improve sleep quality and awareness on the importance of good sleep.



1.3 Problem Statement

As sleep is a very crucial and important behaviour for regulating the body's rest and restoration, and is a very indispensable need for all humans. However, prevalence of reported poor sleep quality has been increasing at an alarming rate especially among young adults especially students as reported by Maslowsky and Ozer (2014) when compared to other age groups.

The findings stated in the background of study (Abdul Rahman & Norbani, 2022, Kesintha et al., 2018, & Zailinawati et al., 2009) should prompt major concern of the increasing trend of the sleep deprivation among Malaysian. Therefore, sleep study which focuses on the predictors and prevention of this epidemic which are





actually one of the contributing factors of the most prevalent illnesses such as depression, increase in obesity risk and accidents which are induced by sleepiness should be carried out to reduce the avoidable consequences of sleep deprivation.

Since there is limited study on sleep and its predictors especially among the Malaysian population and there are limited studies which focuses on association of sleep quality and behaviour (Lai & Say, 2012), more sleep studies should be conducted in Malaysia although there is an increase in number of sleep studies abroad but as stated by the author of this stated study carried out in Malaysia due to differences in ethnicity, lifestyle, and culture the findings of a different population may not necessarily apply to the population of Malaysia.



Another study which was conducted in Malaysia whereby the study investigates the prevalence and factors linked to poor sleep quality among secondary school teachers in a developing country (Musa, Moy, & Wong, 2018). Just as stated previously there is a few studies of the prevalence and factors of sleep which is important to know the effects of sleep deprivation and poor sleep quality, however there is no study which has been carried out in the Malaysian population to address the predictors of sleep.

Based on the most recent study on the predictors of sleep quality, Kesintha et al., (2018) suggests that future studies to be conducted with greater emphasis should be placed on examining both adjustable and unalterable risk factors associated with low sleep quality and also to improve studies as compared to the cross-sectional design of their study. Musa, Moy, and Wong, (2018) also reported that due to the cross-sectional design of their study, no causal relationship between poor sleep quality and its





associated factors can be established and also that in the time their study was conducted there were limited studies investigating the prevalence and the associating factors of poor sleep quality among teachers.

In a subsequent study focusing on sleep quality among pre-clinical medical students in Malaysia (Universiti Putra Malaysia & Universiti Malaya) conducted by Ngu, et. al., (2017), findings indicated that students who slept longer on average tended to achieve slightly better grades. The study also revealed that 42.3% of students experienced poor sleep quality when following an early schedule, which decreased by 11.5% when following a later schedule. Therefore, the study underscores the importance of students, regardless of their program, prioritizing good quality sleep to enhance performance. Moreover, another study by Ng and Azmi (2023) states that academic stress negatively affects sleep patterns among Malaysian university students with students reported average sleep duration of 5-6 hours per night, which are less than the recommended 7-9 hours further suggesting that sleep and academic achievements have strong correlations.

Although several sleep studies have been conducted among university students of Malaysia, most of the studies only includes medical students and thus there is still lack of representation of sleep studies among other university students with non-medical programme as suggested by Ngu, Masalamany, Manan, and Adam, (2017) and therefore a study which focuses on university students of Malaysia regardless of programme and a longitudinal design is necessary to obtain a better representation of investigating the quality of sleep among university students.





1.4 Research Questions

The research questions of this study are:

- 1) Is there any correlation between sleep hygiene and sleep quality of PSQI among UPSI students?
- 2) Is there any correlation between sleep hygiene and sleep quality of Sleep Diary among UPSI students?
- 3) Is there any correlation between sleep hygiene and total sleep time among UPSI students?
- 4) Is there any correlation between sleep hygiene and sleep efficiency among UPSI students?
- 5) Is there any correlation between social rhythm and sleep quality of PSQI among UPSI students?
- 6) Is there any correlation between social rhythm and sleep quality of Sleep Diary among UPSI students?
- 7) Is there any correlation between social rhythm and total sleep time among UPSI students?
- 8) Is there any correlation between social rhythm and sleep efficiency among UPSI students?
- 9) How well can sleep hygiene and social rhythm predict sleep quality of PSQI?
- 10) How well can sleep hygiene and social rhythm predict sleep quality of Sleep Diary?
- 11) How well can sleep hygiene and social rhythm predict total sleep time?
- 12) How well can sleep hygiene and social rhythm predict sleep efficiency?



1.5 Objective of Study

The objective of this study is:

- 1) To examine the correlation between sleep hygiene and sleep quality of PSQI among UPSI students.
- 2) To examine the correlation between sleep hygiene and sleep quality of Sleep Diary among UPSI students.
- 3) To examine the correlation between sleep hygiene and total sleep time among UPSI students.
- 4) To examine the correlation between sleep hygiene and sleep efficiency among UPSI students.
- 5) To examine the correlation between social rhythm and sleep quality of PSQI among UPSI students.
- 6) To examine the correlation between social rhythm and sleep quality of Sleep Diary among UPSI students.
- 7) To examine the correlation between social rhythm and total sleep time among UPSI students.
- 8) To examine the correlation between social rhythm and sleep efficiency among UPSI students.
- 9) To determine whether sleep hygiene or social rhythm is the better predictor of sleep quality of PSQI.
- 10) To determine whether sleep hygiene or social rhythm is the better predictor of sleep quality of Sleep Diary.
- 11) To determine whether sleep hygiene or social rhythm is the better predictor of total sleep time.

- 12) To determine whether sleep hygiene or social rhythm is the better predictor of sleep efficiency.

1.6 Significance of Study

This section states the significance of this study and why this study should be carried out, the results of this study will primarily enhance the body of knowledge on sleep research in Malaysia as there is lack of sleep study in Malaysia and most evident benefit is that as of this period of time there is limited studies that focusses of the predictors of sleep, sleep prevalence, factors of sleep, and also association of sleep and behaviour.

For that reason, the significance of this sleep study which focuses on the predictive measurement of sleep can help to determine more accurate assessment of sleep quality and can also be regulated to improve sleep quality such as by changing certain sleep habits (sleep hygiene) and daily rhythmic behaviour (Social Rhythm) to obtain a better sleep quality.

In addition, this study will directly motivate the participants to be more aware of their sleeping habits and also their daytime routine which may in turn help them improve their sleep quality, sleep habits, and daily rhythmic behaviour. The self-awareness of sleeping habit benefits from this study can also then be practised by anyone of the general population to improve their sleep quality, sleep habits, and daily rhythmic behaviour. The results obtain on the better predictors for good sleep quality can also be utilised by the general population who are intent on improving their sleep quality.



This study will also promote the use of instruments such as social rhythm metrics on the normative population of Malaysian. By executing this sleep study, the predictors of sleep quality of Malaysian can be determined and consequently benefits the Malaysian population by providing a better knowledge to help in enhancing overall sleep quality through the regulation of sleep habits and daily rhythmic behaviour.

This study will also benefit the general population by increasing performance in all sectors. Improvement of sleep quality will directly improve performance regardless of age groups such as, students will have improved academic performance (Kesintha et al., 2018) while working adults will have better work performance (Ganesan et al., 2019).



1.7 Definition of Variables

1.7.1 Conceptual Definition of sleep hygiene

The conceptual definition of sleep hygiene according to the American Sleep Association (2019) is defined as the behaviours that an individual can do to help in promoting good sleep using behavioural interventions. Good sleep hygiene promotes consistent, high-quality, and restorative sleep for an adequate duration each night which are also stated in Mastin et al. (2006) whereby the conceptual definition of sleep hygiene is outlined as a set of practices and habits that are conducive to sleeping well on a regular basis. In addition, Alvaro, Roberts, and Harris (2013) also describes sleep





hygiene to be a set of behaviours and practices designed to promote good sleep quality and a regular sleep-wake cycle. Conversely, poor sleep habits result in low-quality and insufficient sleep (Irish et al., 2015).

1.7.2 Operational Definition of sleep hygiene

In this study, sleep hygiene is operationally defined by the scores derived from the 13-item of Sleep Hygiene Inventory (Mastin et al., 2006). Whereby the higher the total score of SHI the poorer the sleep hygiene.



1.7.3 Conceptual Definition of social rhythm

The conceptual definition of social rhythm according to Monk et al. (2002) is defined as the patterns of habitual and daily behaviours (“social zeitgebers”) these factors impact the timing of the circadian system, either directly or indirectly, via light exposure. They directly activate the central circadian oscillator located in the suprachiasmatic nucleus (SCN) of the hypothalamus, which governs and influences feelings of hunger or sleepiness at specific times of the day. In addition, according to Harvey and Kempenaar (2006) Social rhythm refers to the regularity and consistency of an individual's daily social activities and routines which can be measured using social rhythm metrics, such as sleep patterns, meal times, and social interactions. This concept highlights that maintaining stable and predictable routines can help regulate



biological rhythms, including circadian rhythms, and enhance overall health and well-being.

1.7.4 Operational Definition of social rhythm

Social rhythm in this study is operationally defined by the scores derived from the Social Rhythm Metric (SRM II-5) (Monk et al., 2002). Whereby the higher the total score of SRM II-5 indicates better social rhythm.

1.7.5 Conceptual Definition of Sleep Quality

According to Ramlee, Sanborn, and Tang (2017), the conceptual understanding of sleep quality remains elusive, lacking a universally agreed-upon definition. Nevertheless, it holds significance as an indicator of health and well-being in both healthy and clinical populations. Sleep quality is subjective and can differ among individuals; one person may define it as uninterrupted sleep throughout the night, while another may perceive a short sleep onset latency as indicative of good quality sleep. In addition to self-reported measures, objective assessments such as polysomnography and actigraphy are utilized to gauge perceived sleep quality (Goelema et al., 2017). Furthermore, study by Liu, Wheaton, and Croft (2020) emphasizes a subjective approach to defining sleep quality, which aligns with common practices in sleep research where individual perceptions and self-reported measures are critical for understanding sleep quality.

Thus, according to Carney et al. (2012), the Consensus Sleep Diary provides a structured way to measure sleep quality through subjective self-reports. However according to Buysse et al. (1989), Sleep quality can also be defined as a composite measure that integrates these dimensions to provide a comprehensive view of an individual's sleep experience. The PSQI aims to capture both subjective perceptions and objective aspects of sleep to evaluate overall sleep quality effectively.

1.7.6 Operational Definition of Sleep Quality (Consensus Sleep Diary)

In this study, sleep quality is operationally defined by scores of four constructs namely total sleep time, sleep efficiency and sleep quality from Consensus Sleep Diary (Carney et al., 2012), based on this multifaceted construct a more accurate assessment for the sleep quality can be recorded in an objective measure.

1.7.7 Operational Definition of Sleep Quality (Pittsburgh Sleep Quality Index)

This study also applied another operational definition of Sleep quality which are measured using Pittsburgh Sleep Quality Index (PSQI) developed by Buysse et al. (1989), PSQI which operationalizes sleep quality through a structured questionnaire which consist of 19 self-report items that are categorized into seven component scores. These scores obtained often used to distinguish between "good" and "poor" sleep quality.



1.7.8 Conceptual Definition of Total Sleep Time

Total Sleep Time (TST) is conceptually defined as the total duration an individual spends asleep during a sleep episode, typically measured over the course of one night. TST is a crucial indicator of sleep sufficiency, excluding any periods of wakefulness that occur after initially falling asleep. Adequate TST is essential for progressing through various sleep stages, including REM and non-REM sleep, which are vital for restorative sleep and overall health (Ohayon & Carskadon, 2011). Similarly, Carney et al. (2012), in their work on the Consensus Sleep Diary, provide a detailed conceptualization of TST within the context of self-reported sleep measures. They emphasize that TST is a key metric for quantifying the total amount of actual sleep obtained during a sleep episode, typically assessed over a single night.



1.7.9 Operational Definition of Total Sleep Time

In this study, total sleep time is defined based on scores from the Consensus Sleep Diary (Carney et al., 2012). Participants record their total sleep time each morning, based on their perception of how long they slept, excluding periods of wakefulness after initially falling asleep. Consequently, total sleep time is considered a subjective measure, dependent on the individual's ability to recall and estimate their sleep duration.





1.7.10 Conceptual Definition of Sleep Efficiency

Sleep efficiency is defined as the ratio of total sleep time (TST) to the total time spent in bed (TIB). It reflects how effectively an individual achieves restorative sleep during the time designated for sleep. A high sleep efficiency indicates that a large portion of time in bed is spent sleeping, whereas low sleep efficiency suggests difficulties in falling asleep or maintaining sleep. This measure is commonly employed in sleep research and clinical settings to assess and monitor sleep quality (Morin et al., 2016). Carney et al. (2012) use a similar definition in their Consensus Sleep Diary, emphasizing that sleep efficiency is derived from the relationship between total sleep time and total time in bed.



1.7.11 Operational Definition of Sleep Efficiency

In this study, sleep efficiency is operationally defined as the ratio of total sleep time (TST) to the total time spent in bed (TIB). Participants document their sleep duration and the total time spent in bed each night using the Consensus Sleep Diary (Carney et al., 2012). Sleep efficiency is calculated by dividing the total sleep time by the total time spent in bed, resulting in a percentage. This percentage indicates the proportion of time in bed that is spent sleeping, serving as a measure of how effectively an individual achieves restorative sleep relative to the time set aside for sleep.





1.8 Theoretical Approach

This section of this paper is to state the theoretical approach that is used in developing and complete in this study on the association between social rhythm, sleep hygiene, and sleep quality in young adults.

1.8.1 Social Zeitgeber Theory

The theory that is used to develop and conduct this study is the Social Zeitgeber Theory developed by Ehler, Frank, and Kupfer (1988). This theory proposed that disturbances in biological rhythm may be the results of previous disruptions in social interactions, which serve as an external cue for the rhythm.

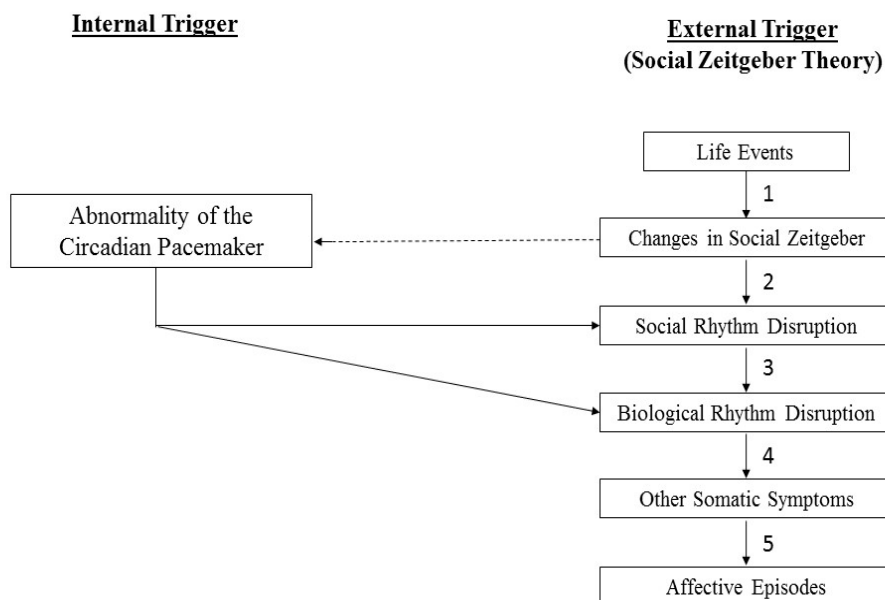


Based on this theory, disturbances in biological rhythms affect somatic symptoms, potentially triggering major depressive episodes in certain individuals. This theory stems from substantial evidence indicating that individuals with depression exhibit irregular biological rhythms, including disruptions in sleep-wake cycles, temperature regulation, and fluctuations in melatonin and cortisol levels (Howland & Thase, 1999).



Figure 1.1

Description of the internal and external triggers in Social Zeitgebers Theory. Adapted from Grandin et al., (2006)



In accordance with Grandin et al. (2006), consistent with the social Zeitgeber theory, life events (external triggers) may disrupt the circadian rhythm, consequently leading to affective episodes in vulnerable individuals (see Figure 1.1). The internal triggers are characterized as abnormalities within the body, such as genetic mutations. Furthermore, Ehlers, Kupfer, Frank, and Monk (1993) noted that the primary pathway of the social Zeitgeber theory involves a series of events wherein instability of social rhythms can result in instability in specific biological rhythms, particularly sleep. Therefore, social zeitgebers, such as personal relationships, meals, exercise, and social demands, are activities that serve to regulate biological rhythms, such as temperature, hormones, and sleep (Monk et al., 1990).

The use of Social Zeitgebers Theory in the proposed study focusses on the External triggers of the life events such as social interactions and social routines which causes indirect disruptions to the internal triggers which are the brain's suprachiasmatic nucleus (SCN) which regulates an individual's circadian rhythm which is responsible in controlling the body's biological rhythms such as sleep-wake cycles, temperature, melatonin and cortisol rhythms as stated before. Therefore, complementing the aim of the study which is to identify factors that predict sleep quality, focusing on either sleeping habits (sleep hygiene) or daily rhythmic behaviour (social rhythm).

1.8.2 Cognitive Model Insomnia

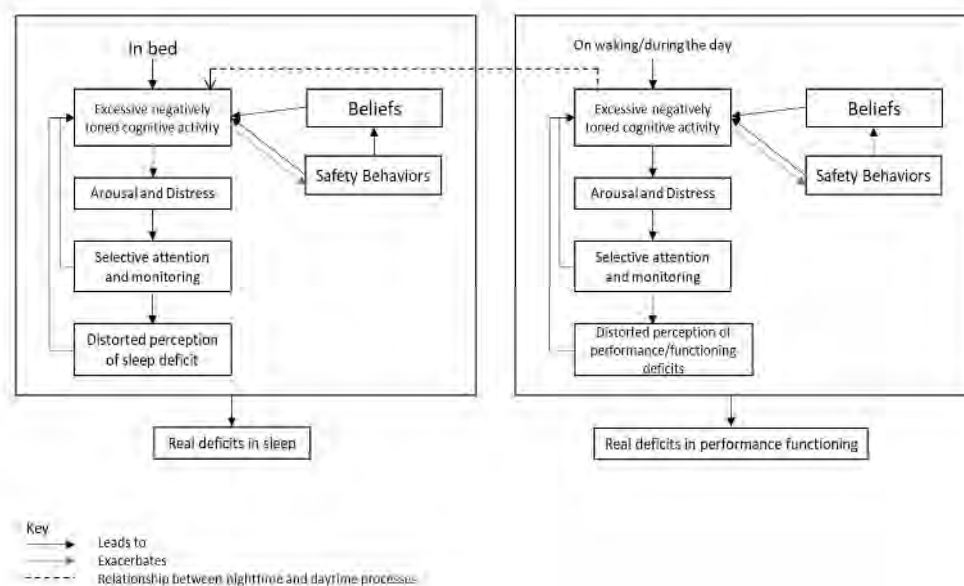
The model that is used to develop and conduct this study is the Cognitive model of Insomnia developed by Harvey (2002). The cognitive model of insomnia emphasizes that individuals suffering from insomnia often endure poor sleep quality. According to this model, individuals who suffer from insomnia tends to be overly worried about their sleep and about the daytime consequences of their sleep deprivation. The worrying of the individuals on the deprivation of sleep will result in stresses which leads to anxiety, and this anxious state and the attentional processes triggers an individual into overestimating the extent of the perceived deficit in sleep and also daytime performance.

According to the model, the detection of sleep-related deficits is followed by the belief that internal triggers or environmental stimuli are interfering with the initiation or maintenance of sleep. During the day, adverse results (e.g., being late to

work) can lead to loss of sleep or poor sleep quality (Perlis, Ellis, Kloss, & Riemann, 2016).

Figure 1.2

The application of Cognitive Model to the day and night (Harvey, 2002)



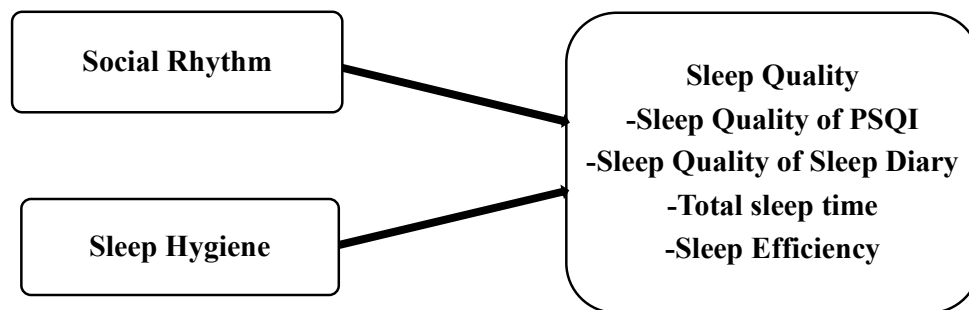
Harvey's model points that negatively toned cognitive activity leads to autonomic arousal and emotional distress, followed by selective attention and monitoring, and distorted perception of sleep deficits that continuously interferes with sleep initiation or sleep maintenance. The continuous cycle of individuals perception causes the transition of acute sleep problems to chronic sleep problems. This then encourages individuals to selectively attend to the sleep related deficits and the daytime consequences of insomnia, which strengthens the negatively toned cognitive activity (Figure 1.2). For example, as stated by Harvey, individuals experiencing insomnia often approach bedtime preoccupied with the urgent need to fall asleep quickly (Safety Behaviours) and to acquire as much sleep as possible (Beliefs). This heightened anxiety about sleep deficit can result in actual sleep deprivation, as attempting to initiate sleep

amidst catastrophic worries, physiological arousal, and anxiety is challenging and can impact daytime functioning (Molen, Carvalho, Prado, & Prado, 2014). The use of Cognitive Model of Insomnia in the proposed study focusses on the cognitive activity of an individual which starts the continuous cycle which leads to real deficits in sleep and in daytime performance functioning due to excessive anxiety of sleep deficits as stated in Harvey's model. Therefore, this model complements the aim of the study which is to illustrate the indirect but interconnected relationship among sleep hygiene, sleep quality, and daytime performance/functioning (Social Rhythm).

1.9 Conceptual Framework

This section of the paper aims to explore the Conceptual Framework of the study which is the logical and abstract structure of this study on the association between social rhythm, sleep hygiene, and sleep quality in young adults.

As illustrated in Figure 1.3, the conceptual framework shows the relationship between variables of the study. Social Rhythm and Sleep Hygiene are independent variable and sleep quality is the dependent variable.

Figure 1.3*Conceptual Framework of the study.*

Social Rhythm refers to the regularity of daily routines and activities, such as eating, exercising, and social interactions. Consistent social rhythms are hypothesized to contribute to better sleep quality by promoting regular sleep-wake cycles and reducing disruptions to circadian rhythms. While, Sleep Hygiene encompasses behaviours and environmental factors that promote healthy sleep, such as maintaining a consistent sleep schedule, optimizing the sleep environment, and avoiding stimulants before bedtime. Good sleep hygiene practices are expected to enhance sleep quality by fostering conditions conducive to restful sleep. In addition, Sleep Quality as the dependent variable is conceptualized as a multidimensional construct that includes subjective sleep satisfaction, sleep duration, sleep latency, and the frequency of sleep disturbances. It is influenced by both social rhythm and sleep hygiene, as these factors directly impact an individual's ability to achieve restorative sleep.

This conceptual framework illustrates the hypothesized direct effects of social rhythm and sleep hygiene on sleep quality. By structuring the study around this

framework, the research aims to empirically test the relationships between these variables, contributing to a deeper understanding of how lifestyle factors influence sleep among young adults.

This framework not only guides the study's design but also provides a basis for interpreting the results in the context of existing literature on sleep health and behaviour. By identifying and analysing the pathways through which social rhythm and sleep hygiene affect sleep quality, this study seeks to offer insights into potential interventions that could improve sleep outcomes in this population.

1.10 Hypothesis

The null hypotheses of the study are listed below:

H₀₁: There is no significant correlation between sleep hygiene and sleep quality of PSQI.

H₀₂: There is no significant correlation between social rhythm and sleep quality of PSQI.

H₀₃: There is no significant correlation between sleep hygiene and sleep quality of Sleep Diary.

H₀₄: There is no significant correlation between social rhythm and sleep quality of Sleep Diary.

H₀₅: There is no significant correlation between sleep hygiene and total sleep time.



H₀6: There is no significant correlation between social rhythm and total sleep time.

H₀7: There is no significant correlation between sleep hygiene and sleep efficiency.

H₀8: There is no significant correlation between social rhythm and sleep efficiency.

H₀9: Social rhythm is not a better predictor of sleep quality of PSQI over sleep hygiene.

H₀10: Social rhythm is not a better predictor of sleep quality of Sleep Diary over sleep hygiene.

H₀11: Social rhythm is not a better predictor of total sleep time over sleep hygiene.

H₀12: Social rhythm is not a better predictor of sleep efficiency over sleep hygiene.

