International Journal of Enhanced Research in Science, Technology & Engineering
ISSN: 2319-7463, Vol. 12 Issue 3, March-2023, Impact Factor: 7.957

Effects of Regular Sleeping Routine: Study on Sleep Quality

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ABSTRACT

Irregular bedtime schedules and average sleeping hours are factors that have a questionable influence on sleep quality. The goal of the study is to explore the relationship between having a regular sleeping routine and sleep quality, which is measured by different biometrics. Since some of the data measured were self-reported, which is dependent on the respondents' mental conditions, some studies also employ psychological assessments to validify the credibility of the responses of different participants. The current study integrates the results from findings of different studies, which are with respect to different targeted groups, involving discrepancies in age and region. Through evaluating different sleeping irregular bedtime frequencies, the study attempts to yield a conclusive answer towards the relationships between sleeping routine and sleeping quality and the legitimacy of the circadian rhythm proposed. Overall, we found that people adopting irregular bedtime schedules may experience poor sleep quality, which was significant in Pittsburgh Sleep Quality Index (PSQI) figures.

Keywords: Sleep routine, screen time, sleep quality, PSQI Index, circadian rhythm, fatigue.

Subject: Medical Science

INTRODUCTION

Under the hectic lifestyle of individuals, the irregular bedtime schedule has evolved to become a social norm. However, the current practice has posed concerns regarding its effect on people's sleep quality, which influences their cognitive and behavioral functioning in the daytime. Although there may be other daily practices, such as screen time, that may be factors that may not be addressed in the experimental results, the current study provides accurate information about sleep quality regarding different sleep schedules. The study incorporates the results of three studies; the first evaluates the association between an irregular bedtime schedule and sleep quality, daytime sleepiness, and fatigue among undergraduate Taiwan students. The second scrutinizes the relationships between daily routines and sleep quality among community-dwelling Israeli Russian elderly, while the third investigates the relationship between habitual after-school activities of Chinese students from grades 4 to 8 and their sleep duration, schedule, and quality on a regular school day.

Method

The study on Taiwan students features randomly selected first-year undergraduates from medical universities in Taipei in Taiwan (81 males and 79 females with mean age of 20.3 ± 1.9), excluding subjects with a history of either chronic medical or psychotic disorders, or currently on medication. Participants had to maintain a prospective 2-week sleep log, and their sleep schedule and average daily sleep time data were analyzed through three indicators. Their sleep quality is measured by PSQI, which formulates through the assessment of 19 criteria, and yields a score from 0 (good quality) to 21 (poor quality) of sleep. Their daytime sleepiness is measured by the Epworth Sleepiness Scale (ESS), which comprises 8 questions in total, each of which scores from 0 (never nod off) and 3 (high chance) of falling asleep in different scenarios. Their fatigue is measured in accordance with the Fatigue Severity Scale (FSS), which includes 9 statements that require respondents to rate their rate of fatigue, yielding a total score from 9 (no fatigue) to 63 (severe fatigue) (No Author, 2016, p. 11). Participants were divided into three groups, each adopting different irregular bedtime frequencies: (low: ≤ 1 night per week (26.9%), Intermediate: 1–3 nights per week (38.8%), High, ≥ 3 nights per week or not having a regular bedtime (34.4%)) (Kang & Chen, 2009, p. 10). Psychological disorders or distress were also taken into account through the Chinese health questionnaire-12 (CHQ-12), which was administered to assess somatic symptoms, anxiety and depression. (Zhang, Hou, Zheng, Lu, Zou, Qian & Yang, 2020, p. 11)

The study on 96 Israeli Russian-speaking elderly living in a retirement community (69 women and 27 men with mean age of 75 ±13.88) was assessed on the Scale of Older Adults Routine (SOAR) by a trained interview at 3-time points 2

weeks apart, which covers 5 dimensions (Basic, Instrumental, Social, Leisure and Rest Activities) (Zisberg, Young &Schepp, 2009, p. 10). Their sleep quality was assessed by PSQI while their daily functional status was assessed with the Lawton Instrumental Activities of Daily Living (IADL), evaluating the elderly's ability to perform tasks such as using a telephone, doing laundry, and handling finances, etc. (Graf, 2008, p.10) and consists of eight items, with a summary score from 0 (low function) to 8 (high function) (Graf, 2008, p. 11). The study also features social rhythm metrics (SRM), which quantifies an individual's typical daily social rhythm pattern to record events that occur on a regular basis. Scores range from 0 (least regular) to 7(most). (Zisberg, Gur-Yaish,Shochat, 2010, p.10)

The study on Chinese students assessed the sleep hygiene of students, which consisted of three aspects, namely the timing, duration (between bedtime and wakeup time) and quality, which the quality was calculated in terms of the Multidimensional Sub-health Questionnaire of Adolescents (MSQA), a questionnaire composing of 71 items, 32 in physical sub-health part and 39 in psychological part. (Qi, Tao & Hu, 2008, p. 11)

RESULTS

Regarding the study on students of Taiwan, results showed that the irregular bedtime schedule would induce a lower average sleep time per day, also revealing that irregular bedtime frequencies were positively correlated with PSQI scores, in particular for intermediate (partial $r=0.18$, $p = 0.02$) and high (partial $r = 0.15$, $p = 0.05$) frequency group, (where partial r stands for the direct correlation after ruling out other factors, and p standing for the possibility that it occurs by chance). Unsurprisingly, the average daily sleep time was still the more prominent factor compared to irregular bedtime. Among the respondents, males (12.9 min) generally had slightly less sleeping onset latency (how long it takes to fall asleep) than females (15.2 min), which also contributed to a higher sleeping efficiency (91.1%:89%). Females generally had a higher average daily sleep time (6.8 h) than males (6.6 h), so as a higher PSQI (5: 4.8). However, females had a lower FSS score (38) compared to males (38.5), but a higher ESS score (6.7: 5.9). This showed that there is only slight difference between two genders of the same age group, and their PSQI scores remain relatively satisfactory. (Kang & Chen, 2009, p. 10)

Regarding the research on elderlies, the study reported that 7 elderlies dropped out due to personal reasons. The mean PSQI was 9.37, which was due to their age constraints, assuming that the difference is likely attributed to increased variation in sleep disturbances in older adults. The IADL, on average was 45, elucidating that elderlies generally had abilities to handle daily tasks. The SOAR mean standard deviation for the duration of basic activities (14.92 min), duration of instrumental activities (41.37 min), and mean standard deviation for frequency of basic activities (0.23) and frequency of instrumental activities (0.12) were all acceptable, showing a positive relationship between the sleep quality of elderlies and the influence towards their daily functioning, which counter-proposes that the activities undergone by elderlies in the daytime may unintentionally promote enhanced sleep quality and efficiency of elderlies. It also reflected that the higher sleeping efficiency was due to more lifestyle regularity, including sleeping in a more routine manner. The high PSQI total score was significantly related to SRM ($r=-0.74$), which showed that more regular lifestyle patterns, which include a regular sleeping routine, would permit better sleep quality. (Zisberg, Gur-Yaish, Shochat, 2010, p.10)

Regarding the research on Chinese students, more senior students generally had fewer hours of sleep than younger ones. Moreover, younger students are more prone to confining themselves to adopt the regular early schedule of sleeping as they used to, going to bed at 9. However, senior students had pushed their bedtime backwards, with students $\geq$13 years old altering their sleeping schedule to 10 at night. These MSQA figures illustrated why more senior students experienced daytime tiredness (13 years old:37.8%) compared to kids (less than 10 years old: 25.2) ($p<0.001$) but had similar metrics regarding the difficulty in initiating and maintaining sleep. (Qi, Tao & Hu, 2008, p. 11)

DISCUSSION

Although the average sleep time shows a more proportionate influence on the sleep quality of an individual, the circadian rhythm has proven to be of significant importance towards the proper functioning of an individual and should not be neglected. More importantly, we have established a relationship that taking up irregular sleep practices may decrease one's actual hours of rest. Violating the Circadian Clock may possibly cause a variety of mental and physical disorders to arise, and may negatively impact safety, performance, and productivity. (Vitaterna, Takahashi &Turek, 2001, p.11). The current study mainly covers the effect of sleep routine and time on sleep quality, but there are other external factors, such as academic pressure, work-life balance, etc., that are worth investigating. Other limitations that cannot be eradicated include biased responses and self-reported estimations, and the sample size deployed may not be fully representative of the entire region.

REFERENCES

[1]. Kang, J. H., & Chen, S. C. (2009). Effects of an irregular bedtime schedule on sleep quality, daytime sleepiness, and fatigue among university students in Taiwan. BMC public health, 9, 248. https://doi.org/10.1186/1471-2458-

9-248

[2]. Zisberg, Anna; Gur-Yaish, Nurit (2010). Contribution of Routine to Sleep Quality in Community Elderly, *Sleep*, Volume 33, Issue 4, Pages 509–514, https://doi.org/10.1093/sleep/33.4.509

[3]. Graf C. (2008). The Lawton instrumental activities of daily living scale. The American journal of nursing, 108(4), 52–63. https://doi.org/10.1097/01.NAJ.0000314810.46029.74

[4]. Zisberg, A., Young, H. M., &Schepp, K. (2009). Development and psychometric testing of the Scale of Older Adults' Routine. Journal of advanced nursing, 65(3), 672–683. https://doi.org/10.1111/j.1365-2648.2008.04901.x

[5]. C.-c. Zhang, L.-h. Hou, X. Zheng, J. Lu, J.-y. Zou, Y. Qian, T.-z. Yang, (2020). Factor structure of 12 items in the Chinese Health Questionnaire among the elderly population in mainland China, Public Health, Volume 187, Pages 143-149, https://doi.org/10.1016/j.puhe.2020.08.006.

[6]. No Author (2016), Fatigue Severity Scale, Shirley Ryan Abilitylab, https://www.srafatiglab.org/rehabilitation-measures/fatigue-severity-scale#:~:text=The%20items%20are%20scored%20on,and%20maximum%20score%20being%207.

[7]. QI Xiu-yu, TAO Fang-biao, HU Chuan-lai,(2008) . Study on of multidimensional sub-health questionnaire of adolescents[J]. Chinese Journal of Public Health, http://dx.doi.org/10.11847/zgggws2008-24-09-01

[8]. Vitaterna, M. H., Takahashi, J. S., &Turek, F. W. (2001). Overview of circadian rhythms.Alcohol research & health: the journal of the National Institute on Alcohol Abuse and Alcoholism, 25(2), 85–93. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6707128/

[9]. Carla Graf (2008) The Lawton Instrumental Activities of Daily Living Scale By detecting early functional decline, the scale can help nurses with discharge planning. https://nursinLwg.ceconnection.com/ovidfiles/00000446-200804000-00023.pdf

[10]. Lawton MP (1969) Lawton IADL Scale, The Gerontological Society of America https://www.cgakit.com/f-1-lawton-scale