

25. COMPARISON OF SLEEP HYGIENE INDEX IN VIRTUAL, TEXTBOOK AND HYBRID LEARNERS IN UNDERGRADUATE STUDENTS

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 <https://www.youtube.com/live/fSpXH-3Xy5w?t=3514s>

BACKGROUND: Sleep hygiene is a set of behavioral and environmental factors that promote healthy sleep (1). The digital age has changed the way we learn by incorporating technology with textbooks. Screens emitting blue light suppress melatonin release and alter the Circadian rhythm, leading to an irregular sleep-wake cycle and poor sleep quality, which can be measured by sleep hygiene (2-9). Healthcare students are at an increased risk of developing poor sleep hygiene due to their long study and clinical hours. This study explores the relationship between different learning modes (textbook, virtual, and hybrid) and sleep hygiene among students at Shalamar Institute of Health Sciences. **METHODS:** An IRB-approved, cross-sectional, questionnaire-based study was conducted with a sample size of 400 students from Shalamar Institute of Health Sciences. Participants were selected through simple randomization, ensuring equal representation from each academic year. The study utilized a Sleep Hygiene Questionnaire, which included demographic questions, mode of study, study screen time, and the validated Sleep Hygiene Index (SHI) (6). SHI scores were categorized into three groups based on the Likert scale: healthy (scores <26), normal (scores 27-43), and unhealthy (scores >35). Data were analyzed using SPSS 20, employing chi-square tests to assess associations between learning modes and SHI scores, correlation analysis to examine the relationship between study screen time and SHI scores, and ANOVA to identify differences in SHI scores among different learning modes. Tukey's HSD post hoc test was used to further interpret significant findings. **RESULTS:** Of the 400 students, 20.9% identified as textbook learners, 20.9% as virtual learners, and 58.1% as hybrid learners. Analysis of SHI scores revealed that 22.4% of students had unhealthy sleep hygiene, 23.3% had normal sleep hygiene, and 54.4% had healthy sleep hygiene. The chi-square test showed a significant association between learning mode and SHI scores ($p < 0.05$). Additionally, a positive correlation was observed between study screen time and SHI scores ($r = 0.36$, $p = 0.01$), indicating that higher screen time is associated with poorer sleep hygiene. ANOVA results revealed significant differences in SHI scores among different learning

modes, with virtual learners scoring worse compared to textbook and hybrid learners. The Tukey's HSD test provided further details on these differences, showing that virtual learners had significantly higher SHI scores, suggesting poorer sleep hygiene. **CONCLUSION:** The study concluded that virtual learners exhibited poorer sleep hygiene compared to textbook and hybrid learners. Increased screen time associated with virtual learning is linked to higher SHI scores, suggesting that extended use of electronic devices negatively affects sleep hygiene. These findings highlight the need for strategies to manage screen time and promote better sleep practices among students engaged in virtual learning.

Table 1: Comparison of Sleep Hygiene Scores Across Different Learning Modes in Undergraduate Students.

Preferred mode of learning	Sleep Hygiene Score			Total
	<=26 Healthy	27-34 Normal	>=35 Unhealthy	
Textbooks	60 71.4%	16 19.0%	8 9.5%	84 100.0%
Hybrid	144 61.8%	58 24.9%	31 13.3%	233 100.0%
Virtual	14 16.7%	19 22.6%	51 60.7%	84 100.0%

Table 2: Pairwise Comparisons of Study Screen Time and Sleep Hygiene Index (SHI) Scores Across Different Learning Modes.

	Preferred mode of learning	Mean Difference	Std. Error	P Value	
Study Screen time	Textbooks	Hybrid	-2.468	0.305	.000
		Virtual	-4.528	0.370	.000
	Hybrid	Textbooks	2.468	0.305	.000
		Virtual	-2.060	0.305	.000
	Virtual	Textbooks	4.528	0.370	.000
		Hybrid	2.060	0.305	.000
SHI Score	Textbooks	Hybrid	-2.645	1.032	.029
		Virtual	-12.96	1.251	.000
	Hybrid	Textbooks	2.645	1.032	.029
		Virtual	-10.31	1.032	.000
	Virtual	Textbooks	12.96	1.251	.000
		Hybrid	10.31	1.032	.000

Key Words: Sleep Hygiene, Screen Time, Circadian Rhythm.