

A comparative study to assess the effect of sleep deprivation on cognitive function among adolescent's male and female in selected rural and urban areas of district Mohali, Punjab

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Abstract

Adolescence may be a critical period which marks puberty and physical maturation, where there's a gradual transition between childhood and adulthood. Sleep affects the physical, mental, and emotional development of the adolescents, and it's a possible impact on their academic performance. Adolescents should sleep 8-10 hours/day on a regular basis to promote optimal health. Poor sleep has multiple effects on adolescent health which includes depression, excessive day time sleepiness and metabolic dysfunctions. Unlike adults, children don't usually complain of sleep problems or seek treatment.

Keywords: cognition, sleep, adolescence, depression

Introduction:

The considerable influence of sleep deprivation on cognition, including its impact on alertness and vigilance, sensory perception, emotion, learning, and memory, is a hallmark of our current busy society, executive functioning. Established research suggests that, without sufficient sleep, simple response time is slowed, attentional lapses become longer and more frequent, and in generally, behavior becomes increasingly, inconsistent and unstable.

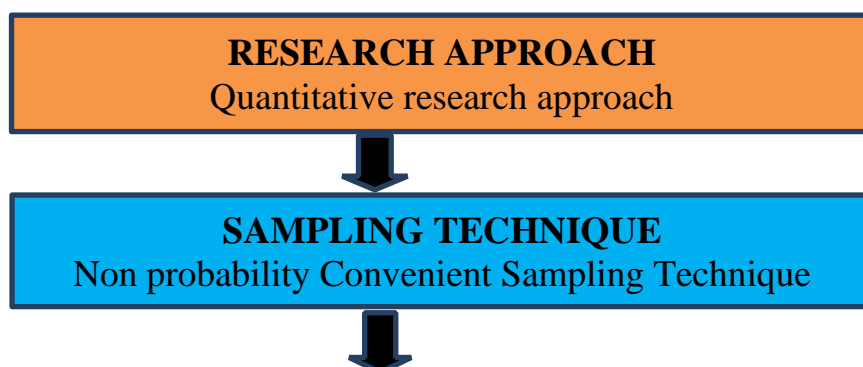
Sleep deprivation, or nap, is sleep timeless than the typical basal level of about 9 hours per night for adolescents. Studies indicate that a lot of adolescents don't obtain adequate nocturnal sleep. One-fourth of teens say they only get 6 hours of sleep per night. There is consensus concerning change in the transition from childhood to adolescence that results in increased sleep deprivation in adolescence.

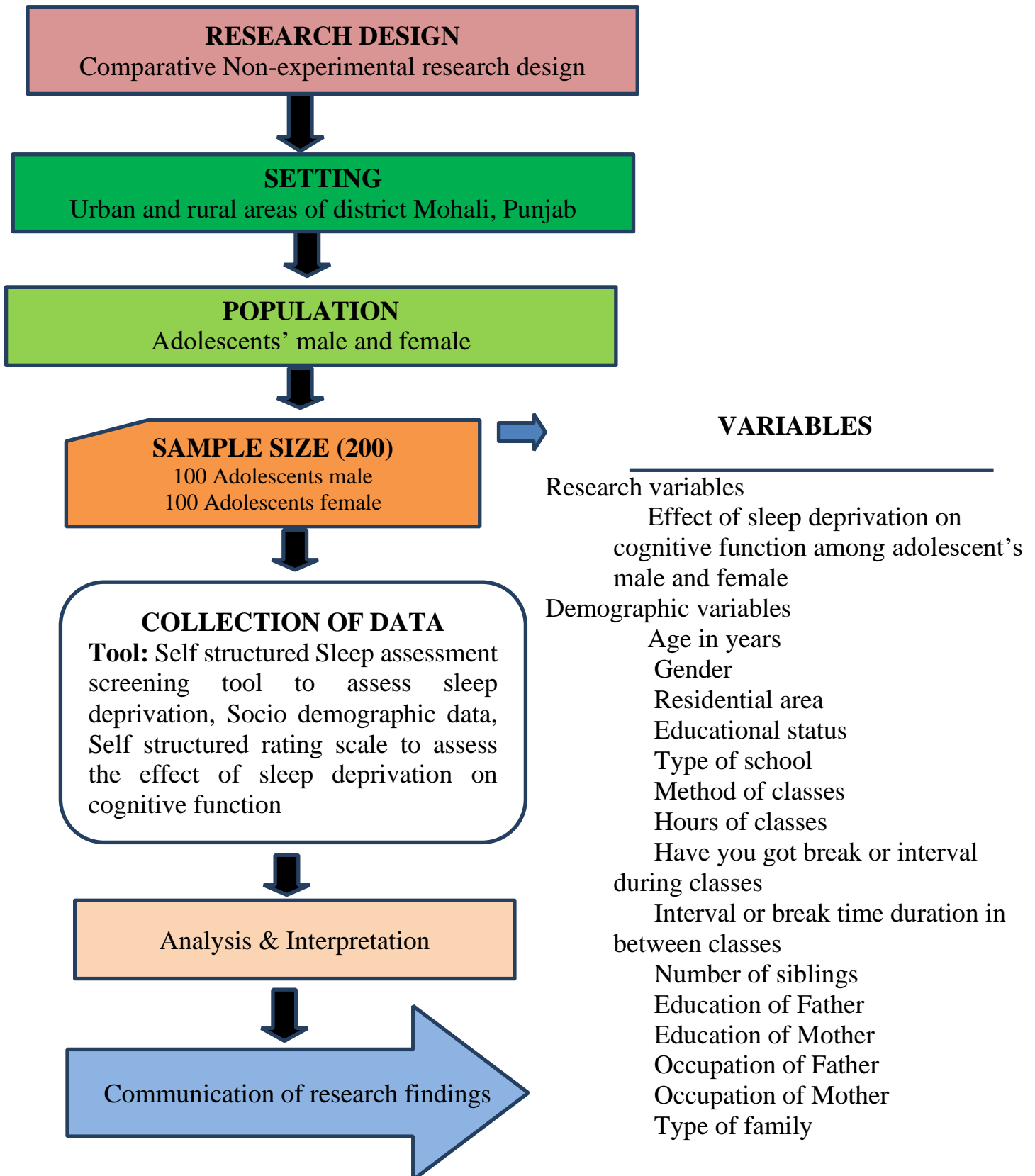
Khullar S, Sinha P, Kumar K, Singh M (2020). It was a cross-sectional study. The study was conducted at the Department of Physiology of a Government Medical College located at the Delhi/National Capital Region for 2 months between June and July 2019. The goal of this study is to see if sleep length is a factor in cognitive function in young Indian individuals. A total of 60 healthy young volunteers aged 18–25 years of both sexes were divided into two groups of 30 each: Group 1 – insufficient sleep and Group 2 – excessive sleep. Comparing the results of the Stroop test between the 2 groups, the response time of the incongruent trial was found to be significantly higher in Group 1 as compared to Group 2 ($P = 0.02$). The finding of the study revealed that the reaction time during the incongruent trial was significantly higher in sleep-deprived subjects as compared to those getting adequate sleep/day signifying a decline in cognitive function with deprivation of sleep.

Objectives

1. To assess the level of sleep deprivation among adolescent's male and female in selected rural and urban areas of district Mohali, Punjab.
2. To assess the effect of sleep deprivation on cognitive function among adolescent's male and female in selected rural and urban areas of district Mohali, Punjab.
3. To compare the level of sleep deprivation and effect of sleep deprivation on cognitive function among adolescent's male and female in selected rural and urban areas of district Mohali, Punjab.
4. To find out the association between effect of sleep deprivation on cognitive function with selected socio-demographic variables among adolescents' male and female in selected rural and urban areas of district Mohali, Punjab.

RESEARCH METHODOLOGY





SECTION-I

Findings related to selected socio-demographic variables among adolescents’ male and female

Table 1: Frequency and percentage distribution of socio demographic variables of adolescents’ male and female.

Sr. No	Socio demographic variable	Adolescent Male Frequency (F)	Adolescent Male Percentage (%)	Adolescent Female Frequency (F)	Adolescent Female Percentage (%)
1.	Age in (years)				
	12 Years	20	20%	16	16%
	13 Years	12	12%	12	12%
	14 Years	26	26%	27	27%
	15 Years	16	16%	24	24%
	16 years	21	21%	20	20%
	17 years	5	5%	1	1%
2.	Gender				
	Male	100	100%	0	0%
	Female	0	0%	100	100%
3.	Residential Area	52	52%	47	47%
	Urban area	48	48%	53	53%
	Rural area				
4.	Educational Status				
	Up to primary level	0	0%	0	0%

	Up to secondary level	100	100%	100	100%
	Up to senior secondary level	0	0%	0	0%
5.	Type of School	38	38%	36	36%
	Private	62	62%	64	64%
	Government				
6.	Methods of Classes	97	97%	98	98%
	Physical	3	3%	2	2%
	Online				
7.	Hours of Classes				
	4-6 Hours	56	56%	67	67%
	7-9 Hours	44	44%	33	33%
	10-12 Hours	0	0%	0	0%
	13-15 Hours	0	0%	0	0%
8.	Have you got any break or Interval during Classes?	100	100%	100	100%
	Yes	0	0%	0	0%
	No				
9.	Interval or break time duration in between classes?				
	15-20 minutes	46	46%	43	43%
	21- 30 minutes	54	54%	57	57%
	31-40 minutes	0	0%	0	0%
	41-60 minutes	0	0%	0	0%

10.	Number of Siblings	2	2%	0	0%
	None	13	13%	9	9%
	One	62	62%	68	68%
	Two	23	23%	23	23%
	Three or more than three				
11.	Education of Father	0	0%	0	0%
	No Formal Education	61	61%	66	66%
	Under Graduate	35	35%	31	31%
	Graduate	4	4%	3	3%
	Post Graduate				
12.	Education of Mother	7	7%	13	13%
	No Formal Education	23	23%	70	70%
	Under Graduate	20	20%	17	17%
	Graduate	0	0%	0	0%
	Post Graduate				
13.	Occupation of Father	1	1%	1	1%
	Unemployed	59	59%	53	53%
	Private Job	9	9%	9	9%
	Government Job	31	31%	37	37%
	Self Employed				

14.	Occupation of	70	70%	74	74%
	Mother	10	10%	6	6%
	Unemployed	2	2%	1	1%
	Private Job	18	18%	19	19%
	Government Job				
	Self Employed				
15.	Type of Family	77	77%	66	66%
	Nuclear Family	23	23%	34	34%
	Joint Family				

SECTION-II

Findings related to level of Sleep Deprivation among adolescent’s male and female

Table 2: Frequency and percentage distribution of sleep deprivation among adolescents male and female.

Level of Sleep Deprivation	Adolescent Male Frequency (F)	Adolescent Male Percentage (%)	Adolescent Female Frequency (F)	Adolescent Female Percentage (%)
No	0	0%	0	0%
Mild	0	0%	0	0%
Moderate	71	71%	92	92%
Severe	29	29%	8	8%

SECTION-III

Sleep Deprivation	Level of Sleep Deprivation among Adolescents Male		Mean, Median, SD	Level of Sleep Deprivation among Adolescents Female		Mean, Median, SD
	Frequency (F)	Percentage (%)		Frequency (F)	Percentage (%)	
No	0	0%	27.37 27 5.508	0	0%	23.42 23, 4.529
Mild	0	0%		0	0%	

Findings related to level of Sleep Deprivation on Cognitive Function among adolescent’s male and female

Table 3: Frequency and percentage distribution of sleep deprivation on Cognitive Function among adolescent’s male and female.

N=200

Level of Cognitive Impairment	Adolescent Male Frequency (F)	Adolescent Male Percentage (%)	Adolescent Female Frequency (F)	Adolescent Female Percentage (%)
No	0	0%	0	0%
Mild	70	70%	93	93%
Moderate	30	31%	7	7%
Severe	0	0%	0	0%

SECTION-IV

Findings related to comparison of level of Sleep Deprivation and level of Cognitive Impairment among adolescent’s male and female

Table 4.1: Comparison of level of sleep deprivation among adolescent’s male and female.

N=200

Cognitive Impairment	Level of Cognitive Impairment among Adolescents Male		Mean, Median, SD	Level of Cognitive Impairment among Adolescents Female		Mean, Median, SD
	Frequency (F)	Percentage (%)		Frequency (F)	Percentage (%)	
No	0	0%	32.79, 28, 13.046	0	0%	23.29, 21.5, 8.245
Mild	70	70%		93	93%	
Moderate	30	30%		7	7%	
Severe	0	0%		0	0%	

SECTION-V

Table 5.1: Association B/W level of Sleep Deprivation among adolescent’s male with selected socio demographics variables

N=100

Sr. No	Socio Demographic variables	Level of Sleep Deprivation among Adolescents Male				X ² , P1, df, p value
		No n ¹	Mild n ²	Moderate n ³	Severe n ⁴	
1.	Age in Years					15.746, 15.747, 5,
	12 Years	0	0	19	1	
	13 Years	0	0	8	4	

	14 Years	0	0	21	5	0.008*
	15Years	0	0	10	6	
	16 Years	0	0	9	12	
	17 Years	0	0	4	1	
2.	Gender					
	Male	0	0	71	29	-
	Female	0	0	0	0	
3.	Residential area					
	Urban area	0	0	27	25	19.148,19.148,1,0.000*
	Rural area	0	0	44	4	
4.	Educational status					
	Up to primary level	0	0	0	0	--
	Up to secondary level	0	0	71	29	
	Up to senior secondary level	0	0	0	0	

5.	Type of school					
	Private	0	0	18	20	16.623, 16.623, 1, 0.000*
	Government	0	0	53	9	
6.	Method of classes					
	Physical	0	0	68	29	1.263, 1.263, 1, 0.261 ^{NS}
	Online	0	0	3	0	
7.	Hours of classes					
	4-6 Hours	0	0	50	6	20.668, 20.668, 1, 0.000*
	7-9 Hours	0	0	21	23	
	10-12 Hours	0	0	0	0	
	13-15 Hours	0	0	0	0	
8.	Have you got any break or interval during classes?					
	Yes	0	0	71	29	--
	No	0	0	0	0	
9	Interval or break time duration in between classes					

	15-20 Minutes	0	0	27	19	6.264, 6.264, 1, 0.012*
	21-30 Minutes	0	0	44	10	
	31-40 Minutes	0	0	0	0	
	41-60 Minutes	0	0	0	0	
10	Number of siblings					1.477,1.201, 3, 0.753^{NS}
	None	0	0	2	0	
	One	0	0	8	5	
	Two	0	0	44	18	
	Three or more than three	0	0	17	6	
11	Education of Father					8.754, 8.324,2, 0.016*
	No formal education	0	0	0	0	
	Under graduate	0	0	49	12	
	Graduate	0	0	21	14	
	Post Graduate	0	0	1	3	

12.	Education of Mother					
	No formal education	0	0	6	1	2.002, 1.836, 2, 0.399 ^{NS}
	Under graduate	0	0	53	20	
	Graduate	0	0	12	8	
	Post Graduate	0	0	0	0	
13.	Occupation of Father					
	Unemployed	0	0	1	0	3.146, 3.247, 3, 0.355 ^{NS}
	Private job	0	0	40	19	
	Government job	0	0	5	4	
	Self employed	0	0	25	6	
14.	Occupation of Mother					
	Home maker	0	0	54	16	10.860, 9.559, 3, 0.023*
	Private job	0	0	4	6	
	Government job	0	0	0	2	
	Self employed	0	0	13	5	

15.	Type of family					
	Nuclear family	0	0	51	26	3.694,
	Joint family	0	0	20	3	3.694,
						1,
						0.055^{NS}

Table 5.2: Association B/W level of Sleep Deprivation among adolescent’s female with selected socio demographics variables

N=100

Sr. No	Socio Demographic variables	Level of Sleep Deprivation among Adolescents Female				X ² , P1, df, p value
		No n ¹	Mild n ²	Moderate n ³	Severe n ⁴	
1.	Age in Years					
	12 Years	0	0	16	0	14.717, 8.192, 5, 0.0012*
	13 Years	0	0	12	0	
	14 Years	0	0	25	2	
	15Years	0	0	21	3	
	16 Years	0	0	18	2	
	17 Years	0	0	0	1	
2.	Gender					

	Male	0	0	0	0	-
	Female	0	0	92	8	
3.	Residential area					
	Urban area	0	0	40	7	5.726,
	Rural area	0	0	52	1	5.726, 1,

4.	Educational status					
	Up to primary level	0	0	0	0	--
	Up to secondary level	0	0	92	8	
	Up to senior secondary level	0	0	0	0	
5.	Type of school					
	Private	0	0	31	5	2.650,
	Government	0	0	61	3	2.650, 1, 0.104 ^{NS}
6.	Method of classes					
	Physical	0	0	90	8	0.177,
	Online	0	0	2	0	0.177, 1, 0.674 ^{NS}

7.	Hours of classes					1.137, 1.137, 1, 0.286 ^{NS}
	4-6 Hours	0	0	63	4	
	7-9 Hours	0	0	29	4	
	10-12 Hours	0	0	0	0	
	13-15 Hours	0	0	0	0	
8.	Have you got any break or interval during classes?					--
	Yes	0	0	92	8	
	No	0	0	0	0	
9	Interval or break time duration in between classes					1.349, 1.349, 1, 0.245NS
	15-20 Minutes	0	0	38	5	
	21-30 Minutes	0	0	54	3	
	31-40 Minutes	0	0	0	0	
	41-60 Minutes	0	0	0	0	
10	Number of siblings					0.598,
	None	0	0	0	0	

	One	0	0	8	1	0.807, 2, 0.668^{NS}	
	Two	0	0	62	6		
	Three or more than three	0	0	22	1		
11	Education of Father						
	No formal education	0	0	0	0	7.906, 6.964, 2,0.031*	
	Under graduate	0	0	64	2		
	Graduate	0	0	25	6		
	Post Graduate	0	0	3	0		
12.	Education of Mother						
	No formal education	0	0	13	0	3.350, 2.738, 2, 0.254^{NS}	
	Under graduate	0	0	65	5		
	Graduate	0	0	14	3		
	Post Graduate	0	0	0	0		
13.	Occupation of Father						
	Unemployed		0	0	1	0	2.410, 3.525, 3, 0.318^{NS}
	Private job		0	0	47	6	
	Government job		0	0	8	1	

	Self employed	0	0	36	1	
14.	Occupation of Mother					
	Home maker	0	0	68	6	6.972, 6.287, 3, 0.098^{NS}
	Private job	0	0	4	2	
	Government job	0	0	1	0	
	Self employed	0	0	19	0	
15.	Type of family					
	Nuclear family	0	53	24	0	0.218, 0.218,
	Joint family	0	17	6	0	1, 0.641^{NS}

CONCLUSION

FROM THE FINDINGS, PRESENT STUDY CONCLUDED THAT:

- Findings related to the level of sleep deprivation among adolescent’s male and female: It shows that the majority of males 71 (71%) were having moderate sleep deprivation and 29 (29%) were having severe sleep deprivation. Among females the majority 92 (92%) were having moderate sleep deprivation and 8 (8%) were having severe sleep deprivation.
- Findings related to the effect of sleep deprivation on cognitive function among adolescent’s male and female: It showed that the majority of males 70 (70%) were having a mild cognitive impairment and 30 (30%) were having moderate cognitive impairment. Among females the majority 93 (93%) were having mild cognitive impairment and 7 (7%) were having moderate cognitive impairment.

3. Findings related to comparison of effect of sleep deprivation on cognitive function among adolescent's male and female: it showed that adolescents female were more sleep deprived at a moderate level as compared to males i.e. (92.0%), (71.0%). And according to severe level adolescent's male were more sleep deprived according to females i.e. (29.0%) (8.0%).

4. Adolescents' female was more cognitive impaired at a mild level as compared to adolescent's male i.e. (93.0%), (70.0%). And according to moderate level adolescent's male were more cognitive impaired as compared to adolescent's female i.e. (30.0%), (7.0%).

5. Association of the level of sleep deprivation and effect of sleep deprivation on cognitive function among adolescent's male and female with socio-demographic variables: it showed that there was a significant association of level of sleep deprivation among male with age, residential area, type of school, hours of classes, interval or break time duration in between classes, education of father, occupation of mother.

There was a significant association of level of sleep deprivation among adolescents female with age, residential area, education of father. There was a significant association of effect of sleep deprivation on cognitive function among adolescent's male with residential area, type of school, hours of classes, interval or break time duration in between classes, education of father, education of mother, occupation of father, occupation of mother.

There was a significant association of the effect of sleep deprivation on cognitive function among adolescent's female with residential area, type of school.

RECOMMENDATIONS

Based on results of the study following recommendations are made:

- The similar study can be repeated in another setting with large sample size to generalized the findings.
- A descriptive study can be conducted to assess the effect of sleep deprivation on cognitive function among adolescent's male and female.
- A co-relational study can be done to assess the influence of factors on level of sleep deprivation among employees.
- An experimental study can be done to assess the effectiveness of therapy in reduction of effect of sleep deprivation on cognitive function.

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