Original Article

Impact of lockdown on sleep wake cycle and psychological wellbeing in South Indian population: A Cross-Sectional and Descriptive Study

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Abstract

Background: The COVID-19 pandemic has created a wide range of crises affecting many nations, resulting in adverse health consequences. The implementation of the lock down upended the lifestyle of mostly all people and was associated with disturbed sleep. Our study is to estimate the variation of the sleep-wake cycle during lockdown and after lock down among people aged 15-60 years and its impact on Psychological wellbeing.

Materials and Methods: We have done a cross-sectional and descriptive study with a sample of 304 participants formed using convenience sampling method by online google form. They were administered with The Munich Chronotype Questionnaire (MCTQ) and The Flourishing scale. The responses were collected during and after lock down. The data obtained is subjected to descriptive analysis.

Results: In this study we have recruited and included 304 participants. Out of 304 participants, 151 (49.7%) were male and 153 (50.3%) were female. Flourishing scale scores mean during lockdown was 28.83 ± 4.75 and after lockdown was 41.50 ± 4.42 and the mean value was more in after lockdown period and a paired-t test showed statistically highly significant difference at p-value<0.01.

Conclusion: The variation in the sleep-wake cycle was more in adolescents than in other age groups and the Psychological wellbeing of women was affected more than men in all age groups during lockdown.

Keywords: lockdown, sleep-wake cycle, psychological wellbeing, age difference, gender difference

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Introduction

The World Health Organization (WHO) on 31 December 2019, was informed of a new case of pneumonia in Wuhan City, China. On 7 January 2020, a novel coronavirus was identified in China and was temporarily named “2019-nCoV ". Coronaviruses are a kind of dreadful virus causing a wide range of illnesses that even leads to death. The first case of the Covid case in India was identified in Kerala. Seeing the rapid negative effect of this virus, numerous countries have implemented curfews to safeguard the people. In Tamil Nadu, the first case was confirmed in a resident from Kanchipuram in Chennai on 7 March 2020. On 23 March 2020, to prevent the spread of the virus, The Government of Tamil Nadu announced a state-wide lockdown. There was an association between decreased sleep quality and increased negative mood due to the outbreak of COVID-19. [1] COVID-19 pandemic resulted in home quarantine which had a detrimental effect on sleep quality. [2] There was a reduction in night-time sleep and an increase in daytime napping due to shifts to a later bedtime and waking time. [3] Sleep disturbances during the pandemic harmed the immune system function by affecting the regulation of immunological markers and their cells. [4]

Increased sleep duration and decreased daytime functioning were observed even though there was longer sleep latency, worse sleep efficiency, and massive sleep medication use during forced confinement. [5] There was a differential impact on the sleep wake cycle due to excessive digital media exposure among Indians during the lockdown. [6] Hence is this study to estimate the variation in the sleep-wake cycle during the lockdown and after lock down among people of age group 15 to 60 and to compare the psychological wellbeing scores of

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different groups of people during and after lockdown. The main objectives of our present study was to find the variations in the sleep-wake cycle between genders; to find the variations in the sleep-wake cycle between adolescents, adults and middle Ages; to find the variations in the sleep-wake cycle between males and females of different age groups in workdays and free days; to find the difference in the Psychological wellbeing scores of people of different age groups during and after lockdown; and to compare the difference in the Psychological wellbeing scores of males and females during and after lockdown.

Need for the study: There was much research, finding the association of COVID-19 with major psychological distress and significant symptoms of mental health illness. The sudden implementation of a nationwide curfew by the government of India on 24 March 2020 had put a barrier in the daily functioning of every individual. The lifestyle of every human, right from kids to old age people was upended and the focus was on social distancing, quarantine, and other health care measures. They had no chance to avail themselves of much of the social settings (educational institutions, working places, sacred sites, etc...) which made them remain in their home. Some studies have concluded that there is no uniform effect of the lock down on sleep quality. [7, 8] Hence the need of our study is to specify the effect of lock down on the sleep-wake cycle based on age differences and gender differences and its impact on the Psychological wellbeing of the common population.

Materials and Methods:

In our present cross-sectional and descriptive study, we have included 304 participants belonging to Coimbatore, South India including males and females with an inclusion of aged between 15 and 60 years were selected using convenience sampling method. Our study assessed the same participants in 2 different time ranges. Those who were not willing they were excluded from this study. The first response was collected during May 2020 (during lockdown) and the second response was collected during March 2021 (after the lockdown). In May 2020 an informed consent was taken from the participants and the questionnaire was administered through social media using google forms. First, the participants were asked to fill up their socio-demographic details and were asked to read the questions carefully before answering them. They were also asked to answer the questions one by one as in the order in the questionnaire.

Assessment tools and its descriptions:

(1). The Munich Chronotype Questionnaire (MCTQ) and
(2). Flourishing Scale

1. The Munich Chronotype Questionnaire (MCTQ): This questionnaire was developed by Till Roenneberg and Martha Merrow at Ludwig- Maximillian's University (LMU). It is a self-rated scale to find out the differences in the sleep wake pattern in work days and free days for ages 6 to 65 years. It is a tool to collect information regarding sleep time, sleep latency, and sleep inertia.

2. Flourishing Scale: The Flourishing Scale is a brief 8-item summary measure of the respondent's self-perceived success in important areas such as relationships, self-esteem, purpose, and optimism. [9] The scale provides a single psychological well-being score. Once the form was filled up, the responses of each individual was recorded. The same procedure of administration was made in March 2021 with the same participants as before. Both the responses were collected and recorded. **Data Management:** Data were entered and complied using Microsoft Excel 2010 [Microsoft Ltd., USA]. Data were analyzed using SPSS 20.0 version [IBM Ltd., USA].

Statistical Analysis: The categorical variables were presented using descriptive analysis like frequency and percentages. Measures of central tendency like mean. Paired t-test was used to find the difference between flourishing scale scores during and after lockdown. $p<0.05$ was taken as statistically significant.

Ethical Consideration: This study was done with proper permission and willingness from all study participants.

Results:

In our present study, we have recruited and incorporated 304 participants. Out of 304 participants, 151 (49.7%) were male and 153 (50.3%) were female. More or less equal no. of the participants in all age-groups. Age group among gender classification as shown in **Table – 1**.

Table - 1 Distribution of demographic data among gender classification

Age groups	Gender Classification	No. of Responses (%)
Adolescence (15 to 18 years)	Males	50 (16.4)
	Females	52 (17.1)
Adulthood (19 to 40 years)	Males	50 (16.4)
	Females	51 (16.8)
Middle age (41 to 60 years)	Males	51 (16.8)
	Females	50 (16.4)

The patterns of variations seen in the Sleep wake cycle of the Participants in terms of (a). Time at which they get ready to sleep, (b). Time at which they go to bed, (c). Time needed to fall asleep, (d). Time at which they wake up, (e). The time taken to get out of the bed after waking up as shown **Table – 2.**

Table – 2 Variations in sleep - wake time among different age-groups during and after lock down

Table – 1a. Getting ready to sleep – Male (Timing in PM)							
During Lockdown				After Lock down			
Mean Time - workdays		Mean Time – free-days		Mean Time - workdays		Mean Time – free-days	
Age-Groups	Time	Age-Groups	Time	Age-Groups	Time	Age-Groups	Time
Adolescence	11.25	Adolescence	11.47	Adolescence	10.33	Adolescence	11.04
Early adulthood	10.45	Early adulthood	10.46	Early adulthood	10.27	Early adulthood	10.23
Middle age	10.16	Middle age	10.21	Middle age	10.10	Middle age	10.37
Table – 1b. Getting ready to sleep – Female (Timing in PM)							
Adolescence	11.21	Adolescence	11.25	Adolescence	10.26	Adolescence	10.12
Early adulthood	10.19	Early adulthood	10.45	Early adulthood	10.17	Early adulthood	10.39
Middle age	10.16	Middle age	10.38	Middle age	10.13	Middle age	10.15
Table – 2a. Going to bed – Male (Timing in PM)							
Adolescence	11.34	Adolescence	11.42	Adolescence	10.41	Adolescence	11.13
Early adulthood	10.50	Early adulthood	10.52	Early adulthood	10.28	Early adulthood	10.12
Middle age	10.22	Middle age	10.34	Middle age	10.18	Middle age	10.13
Table – 2b. Going to bed – Female (Timing in PM)							
Adolescence	11.32	Adolescence	11.34	Adolescence	10.49	Adolescence	10.14
Early adulthood	10.35	Early adulthood	11.04	Early adulthood	10.44	Early adulthood	10.23
Middle age	10.28	Middle age	10.50	Middle age	10.35	Middle age	10.40
Table – 3a. Time needed to fall asleep – Male (Timing in Minutes)							
Adolescence	20.00	Adolescence	12.14	Adolescence	20.00	Adolescence	19.29
Early adulthood	18.41	Early adulthood	14.54	Early adulthood	16.35	Early adulthood	14.54
Middle age	15.52	Middle age	15.13	Middle age	14.18	Middle age	14.17
Table – 3b. Time needed to fall asleep – Female (Timing in Minutes)							
Adolescence	26.22	Adolescence	24.37	Adolescence	16.55	Adolescence	17.07
Early adulthood	16.49	Early adulthood	18.25	Early adulthood	15.07	Early adulthood	17.07
Middle age	16.05	Middle age	17.29	Middle age	14.13	Middle age	13.43
Table – 4a. Wake up time – Male (Timing in AM)							
Adolescence	8.25	Adolescence	8.07	Adolescence	7.33	Adolescence	8
Early adulthood	7.29	Early adulthood	7.49	Early adulthood	6.45	Early adulthood	6.50
Middle age	6.18	Middle age	6.17	Middle age	5.40	Middle age	6.02
Table – 4b. Wake up time – Female (Timing in Hour)							
Adolescence	7.22	Adolescence	8.05	Adolescence	6.33	Adolescence	7.30
Early adulthood	6.47	Early adulthood	7.34	Early adulthood	6.07	Early adulthood	6.39
Middle age	6.30	Middle age	6.40	Middle age	6.15	Middle age	6.23
Table – 5a. Getting out of bed – Male (Timing in Minutes)							
Adolescence	11.01	Adolescence	12.14	Adolescence	5.28	Adolescence	10.57
Early adulthood	10.08	Early adulthood	13.30	Early adulthood	5.55	Early adulthood	10.13
Middle age	7.08	Middle age	9.13	Middle age	6.07	Middle age	7.04
Table – 5b. Getting out of bed – Female (Timing in Minutes)							
Adolescence	18.5	Adolescence	19.58	Adolescence	10.02	Adolescence	19.30
Early adulthood	10.02	Early adulthood	14.18	Early adulthood	2.30	Early adulthood	12.10
Middle age	7.03	Middle age	7.35	Middle age	6.04	Middle age	6.50

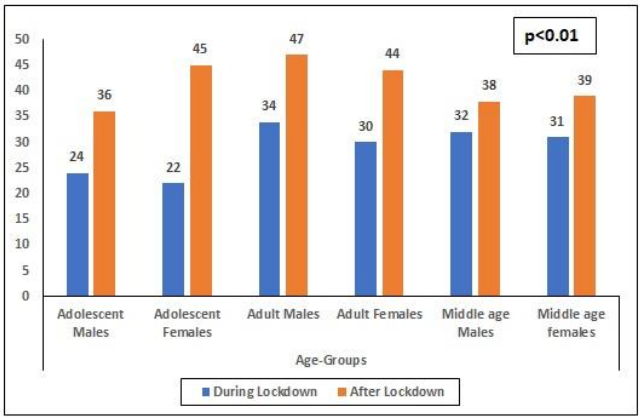
The Flourishing scale score was very high in adult males and very low score in adolescent females in during lockdown. The Flourishing scale score was very high in adult males and low in adolescent males in after lockdown as shown in **Table – 3.**

Table – 3 Flourishing scale scores – During Lockdown and after lockdown

During Lockdown		After Lockdown	
Adolescent Males	24	Adolescent Males	36
Adolescent Females	22	Adolescent Females	45
Adult Males	34	Adult Males	47
Adult Females	30	Adult Females	44
Middle age Males	32	Middle age Males	38
Middle age females	31	Middle age females	39

The average Flourishing scale scores during and after lockdown was 28.83 ± 4.75 and 41.50 ± 4.42. The mean value was more in after lockdown period and a paired t-test showed statistically significant difference with a critical value of -5.240 at p-value <0.01 as shown in **Figure – 1**.

Figure – 1 Distribution and comparison of average of Flourishing scale scores between during and after lockdown



Discussion:

This present cross-sectional and descriptive study was done with a sample of 304 participants. They were administered with The Munich Chronotype Questionnaire (MCTQ) and The Flourishing scale. The responses were collected during and after lock down. Middle-aged people get ready to sleep earlier, both during and after lockdown.

Gender difference: On workdays, both during and after lockdown Males get ready to sleep later. On free days, during the lockdown

both Males and Females get ready to sleep relatively at the same time whereas, after lock down, Females get ready to sleep later. From adolescence through early adulthood, sleep duration is developmentally patterned. [11]

2. GOING TO BED

Age difference: During workdays there is a shift of bedtimes to late hours [12] which supports our finding - During the lockdown, Early adults go to bed later and adolescents go to bed earlier. After lock down, adolescents go to bed later whereas Middle-aged people go to bed-earlier.

Gender difference: On workdays, during lock down Males goes to bed late whereas after lock down Females go to bed late. All age groups show increased usage of digital media, especially males. On free days, during lock down Females go to bed late whereas, after lock down, Males go to bed late. In comparison to other circadian – types during pandemic evening – types had an alarming increase in sleep and mental health problems. [13]

3. TIME NEEDED TO FALL ASLEEP:

Age difference: Adolescents took more time to fall asleep, both during and after lockdown. Middle-aged took less time to fall asleep, both during and after lockdown. Changes in both the weekend bedtime and wakeup time had detrimental effects on the brain which led to poor school performance. [14]

Gender difference: On workdays, both during and after lock down Males took more to fall asleep. On free days, both during and after lockdown Females took more time to fall asleep. Certain adverse childhood experiences such as physical, sexual, and emotional abuse and neglect have a lasting impact on sleep quality in adulthood, highlighting the need to mitigate their impact to prevent negative health outcomes associated with poor sleep quality. [15]

4. WAKE UP TIME:

Age difference: Middle-aged people woke up early and early adulthood woke up late, both during and after lockdown. Sleep profiles are associated with cardio metabolic health in adults and children. The overall good sleeper pattern is associated with more favorable cardio metabolic health. Middle-aged woke up early. A study concludes a sleep loss on free days (resulting from more overall sleep during workdays in non-system relevant jobs on adulthood of well-educated participants aged between 25 – 65 years and Adolescent woke up late, both during and after lock down. [16]

Gender difference: On workdays, both during and after lockdown Females woke up early. In free-days, both during and after lockdown Females woke up early. Reports from 3,778 young adults (20.6±0.86 years) indicate a higher prevalence of poor sleep quality in females than males (65.1% vs 49.8%). [17] On workdays, both during and after lock down Males get up early. On free days, during lock down Males woke up early but after lock down, Males and Females woke up at a relatively similar time.

5. GETTING OUT OF BED:

Age difference: Adolescents get out of bed late, Middle-aged get out of bed soon, both during and after lockdown. A finding suggests that there is an increased risk of late -onset of dementia due to short sleep duration in midlife. [18]

Gender difference: On workdays, during lock down males got out of bed late, and after lockdown, Females got out of bed late. On free days, both during and after lockdown, Males got out of bed late. As women with Chronic Insomnia Disorder (CID) get older, they increase time spent in bed to maintain the sleep time, but remain with a resultant increase in the wake. [19]

6. PSYCHOLOGICAL WELL BEING:

Age difference: The Psychological wellbeing of adolescents seem to be profoundly affected when compared to that of adults and middle aged due to lock down. [20]

Gender difference: The Psychological wellbeing of women of different age groups seem to be profoundly affected when compared to that of men due to lock down. [20]

Conclusion:

Sleep wake problems were found to be present commonly during the COVID-19 lock down. From our study, we could infer that there was a variation of sleep-wake cycle among males than in females. The variation of the sleep-wake cycle was more in adolescents, relatively less in adults and much less in middle aged. The variation of the sleep-wake cycle could be seen more during free days rather than on working days. The Psychological wellbeing of individuals of different age, Gender is found to be better after lockdown than during lockdown

Implications: Our study has a diverse group for assessment, consisting of gender and age difference along with the variation in the sleep-wake cycle during workdays and free days, which helps to determine the severity of the physical and psychological problem for a particular group of people which would help to improve the work-life balance. It further helps in addressing the problems created by the varied sleep wake cycle of students in adolescence in their academic performance.

Limitations:

1. Our study comprises people belonging only to a particular part of India – living in southern part of the country.
2. Our study comprises people belonging only to the age group of adolescence, early adulthood, and middle adulthood.
3. This study was cross-sectional, conducted at a specific period which comprises a single phase of lock down.
4. The present study estimates the variation of the sleep-wake cycle among participants but does not infer any health effects.

Recommendations:

1. For much more precise results people from different temperatures, zones be included in the study.
2. Future studies can include people from the age groups of childhood and old age for better results.
3. Studies could be made longitudinal, for an extended period comprising multiple phases of lock down.
4. Detrimental health effects due to variations in sleep wake patterns could be inferred with the future study.

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Here, SD – Sonali Devarajan, SM – Samyuktha Mylsamy, TV – Tamizhini Venkatachalam, GV – Gobinath Veerasamy.

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