

Impact of COVID-19 Lockdown on Mental Health, Physical Activity, and Eating Behaviours Among IT Professionals in India

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Abstract - Governments took preventive measures like lockdown to curb the spread of the global COVID-19 pandemic, which affected mental health of many, their eating behaviours, and physical activity. This study focused on evaluating the impact of the COVID-19 lockdown on these aspects among IT professionals considering their change in working patterns. This was a web-based cross-sectional study conducted in Pune city. A total of 103 participants participated in the study by completing an online structured questionnaire shared through various social media platforms. Information regarding their vitals, physical activity, and eating behaviour was collected. The DASS-21 scale was used to assess mental health. The prevalence of stress, anxiety, and depression among IT professionals was found as 20.4 %, 44.7 %, and 35.9 %, respectively. Based on their BMI, the majority of the population was obese (63 %), and almost 57 % thought their body weight had increased during the lockdown. Participants doing any kind of physical activity significantly dropped down during the lockdown as compared to the pre-lockdown phase ($p < 0.001$). Stress levels were significantly higher among the obese participants ($p < 0.01$). Anxiety was observed to be significantly higher among the 20 to 34 year-old male participants ($p < 0.05$). Ready-to-eat snacks, instant noodles and easy to cook foods, Indian sweets, and confectionery showed a significant positive correlation with high levels of stress, anxiety, and depression ($p < 0.05$). Thus, a negative impact of COVID-19 and a subsequent lockdown was observed on the mental health and eating patterns among IT professionals.

Keywords: COVID-19; feeding behaviour; information technology; mental health; exercise

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Introduction

Coronavirus Disease 2019 (COVID-19) emerged from the Wuhan city of Central Hubei province of China in December 2019 [1,2]. The World Health Organization (WHO) declared COVID-19 a worldwide pandemic on March 11, 2020 [3]. In India, on January 30,

2020, the first COVID-19 positive case was confirmed in Kerala [4]. Following the exponential spike in COVID-19 instances in India, India's Prime Minister issued a lockdown on March 24, 2020 [5]. Due to prolonged lockdown, several changes in behaviour and lifestyle were observed, particularly in mental health status, eating behaviour, and physical activity among the population.

Lockdown is an inescapable condition that may manifest in a variety of mental health issues. Early adults are affected more by anxiety, depression, and stress [6]. These common

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mental disorders have distinct definitions. Stress is a state of emotional and physical tension due to any event; anxiety is the fear of the unknown, and depression is the lack of interest in day-to-day activities [7]. Gender has also been shown to have an alarming impact on mental health status. COVID-19 caused higher tension and anxiety in women than in men [8]. Along with age and gender, the psychological and emotional responses to the COVID-19 pandemic also heighten the probability of improper eating patterns [9]. The consumption of foods high in fat, salt, and sugar (HFSS) increased during the lockdown, which could be associated with eating food out of anxiety or boredom [10]. Lockdown also disrupts the daily routine leading to a decline in physical activity [11]. This can also be associated due to negative psychological status [12]. Furthermore, people have also experienced an increase in body weight during the pandemic [13].

Movement restrictions and safety protocols considerably impacted employees in public and private sectors in terms of traveling to the office, work hours, working patterns, and lifestyle behaviour [14]. According to the National Institute for Occupational Safety and Health (NIOSH), Information Technology (IT) professionals undergo job stress the most than any other occupational sector [15]. The Lancet Psychiatry states that the “current priority should be focused on collecting high-quality data on the mental health impacts of the COVID-19 pandemic across the vulnerable groups” [16]. Research specific to IT professionals as a vulnerable group is not extensively available. Therefore, considering the lacunae in the existing literature, this study aims to investigate the changes in lifestyle and eating behaviour during the COVID-19 lockdown among IT professionals.

Materials and Methods

This study was performed as an online cross-sectional study and conducted to determine the effect of the COVID-19 lockdown on the lifestyle behaviour and mental health of IT professionals working

in Pune city, Maharashtra. Information was collected from participants whose work was specifically related to Information Communication Technology in a Pune-based company. Due to COVID-19 movement restrictions and a limited number of primary data sources, the purposive sampling technique was used since it is a time-effective and cost-effective sampling technique. All participants were similar in their job profiles and thus can be sub-classified as a homogeneous sample for the purposive sampling method [17]. The National Mental Health Survey (NMHS) of India (2015 - 2016), undertaken in 12 states across six regions of India, reported the overall prevalence of any mental morbidity as 13.7 % lifetime and 10.6 % for current mental morbidity [18]. Taking this study as the reference, the sample size is calculated using the formula $Sample\ size\ (n) = Z^2 \times p(1 - p) / \epsilon^2$. Where z is the z-score (1.96 as the Confidence Interval level is 95 %), p is the population proportion (10.6 %), and ϵ is the margin of error (5 %). The total sample size calculated was 146.

Inclusion criteria were: IT professionals in the age group of 20 to 50 years residing in Pune and whose work was explicitly related to technical aspects of Information and Communication Technology are included. The requirement for inclusion criteria was confirmed through telephonic conversations. Exclusion criteria on the other had were: people who are not willing to participate in the study, pregnant & lactating women, and subjects currently suffering from any medical condition, sleep disorder, or known mental disorder were excluded from the study.

An online structured questionnaire was developed using Google Forms to collect data from the subjects. This was a self-reported questionnaire where participants were asked to answer based on their past experiences during the lockdown period, i.e., 24th March 2020 to 31st May 2020 due to the onset of COVID-19 and pre-lockdown period, i.e., 23rd January 2020 to 23rd March 2020. The questionnaire was shared through various social media platforms, including WhatsApp, LinkedIn, Facebook, and Gmail. The questionnaire is composed of 4 sections as follows:

1. General Information Questionnaire: This questionnaire was further divided into three sub-sections: a) Demographic details, b) Anthropometric measurements, and c) Medical history.

Participants were asked to self-report their current height in cm and weight in kilograms. Based on their current height and weight, Body Mass Index (BMI) was calculated. Similarly, they were asked to report any current medical conditions, sleep disorders, and known mental disorders to as-

sess their health status and screening purpose according to the inclusion and exclusion criteria.

2. **Physical Activity Questionnaire:** International Physical Activity Questionnaire (IPAQ) was used to assess the physical activity data [19]. Participants were asked to self-report their physical activity type, level, and frequency during pre-lockdown and during-lockdown periods.
3. **Depression, Anxiety and Stress Scale Questionnaire (DASS - 21):** It is a self-administered quantitative measure of distress used to evaluate the magnitude of three negative emotional states: Depression, Anxiety, and Stress. DASS - 21 is divided into seven items each. The sum of scores of all three attributes (depression, anxiety, stress) is further used to assess the severity of negative emotions. DASS - 21 has recommended cut-off scores for conventional severity from normal to extremely severe [20].
4. **High in Fat, Salt, and Sugar (HFSS) Food Frequency Questionnaire:** This was a self-administered food frequency questionnaire where a checklist of food items and beverages High in Fat, Salt, and Sugar (HFSS) were listed. Participants were asked about the amount and frequency of consumption of these foods during the COVID-19 lockdown, i.e., from 24th March to 31st May 2020. This tool was developed and used since it is one of the easy, cost, and time-effective ways to collect food consumption data [21]. Images of the packet, cups/Katori, and glass were depicted in the questionnaire for portion size reference and ease of understanding.

This study was approved by the Institutional Ethical Committee (SIU/IEC/278), Symbiosis International (Deemed University), Pune. Consent from the participants was obtained through the google form before the commencement of data collection.

The data was analysed using SPSS version 20 software and Microsoft Excel 2010. Descriptive statistics were performed to obtain mean values of anthropometric data, frequency, and percentage of socio-demographic characteristics and physical activity data. The scores of DASS - 21 subscales were expressed as mean and standard deviation (SD). A Chi-square test was applied to determine the association between stress, anxiety, and depression with demographic factors, BMI, and physical activity, respectively. Spearman correlation was applied to determine the relationship between food items consumed during the lockdown with common mental disorders (stress, anxiety, and depression).

Results

The objective of this study was to evaluate mental health and eating behaviour during lockdown among the IT professionals in Pune. Although we aimed to collect data from about 146 participants (the calculated sample size), we could receive only 103 responses with complete data. The results are summarized below.

Table 1 describes the sociodemographic distribution of the subjects who participated in the study. Around 47 % of the population were in their early adulthood (20 - 34 years), while 41.7 % were in middle age (35 - 44 years). We observed that the percentage of male IT professionals who participated in the study was higher than female IT professionals. 62.1 % of participants had a graduate degree, 35.9 % were postgraduates, and 1.9 % had completed a post-high school diploma.

As it was an online survey, the participants were asked to report their own height and weight. Body Mass Index (BMI) was then calculated by standard formula, using self-reported measurements. The mean BMI of the participants was 26.12 ± 3.86 . The participants were further categorized based on their BMI. The majority of the participants (63.1 %) fell

Table 1. Sociodemographic characteristics

Characteristics	Frequency (n)	Percentage (%)
Age		
20 – 34 years	48	46.6
35 – 44 years	43	41.7
45 – 50 years	12	11.7
Gender		
Female	17	16.5
Male	86	83.5
Educational Qualification		
Post Graduate	37	35.9
Graduate	64	62.1
Post High School Diploma	2	1.9

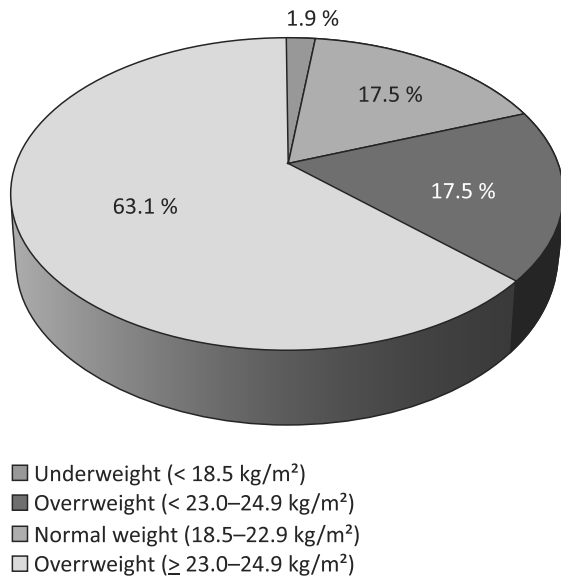


Figure 1. Pie-chart representing BMI of subjects

in the obese category, while two participants were underweight (Figure 1). When asked about participants’ perceptions regarding weight gain during the lockdown, 55 participants (56.6 %) thought that their body weight increased, while the rest, 46.6 %, thought they could maintain their body weight. The physical activity status of the participants showed that people doing some physical activity dropped down during the COVID-19 lockdown compared to the pre-lockdown phase significantly (Table 2).

One of the specific objectives of the present research was to study the prevalence of common mental disorders, namely stress, anxiety, and depression, due to the lockdown. This was assessed using the DASS - 21 scale, a validated tool for the Indian population. We noted the prevalence of stress, anxiety, and depression to be 20.4 %, 44.7 %, and 35.9 %, respectively, which was relatively high (Figure 2).

The association between stress, anxiety, and depression was studied across the demo-

Table 2. Physical activity status of the participants before and during lockdown

Variable	Before lockdown (n %)	During lockdown (n %)	p-value
No Physical Activity	6 (5.8)	21 (20.4)	< 0.001
Some Physical Activity	97 (94.2)	82 (79.6)	

graphic profile, BMI, and physical activity status (Table 3). The chi-square analysis showed that stress and BMI were significantly associated (χ^2 p value = 0.007), with obese participants having maximum stress. Similarly, anxiety had a significant association with age and sex. Prevalence of anxiety was observed highest among the participants in the age category 20 - 34 years (χ^2 p value = 0.049) and male participants (χ^2 p value = 0.034). There was no significant association observed between levels of depression and demographic profile, BMI, and physical activity status of the participants.

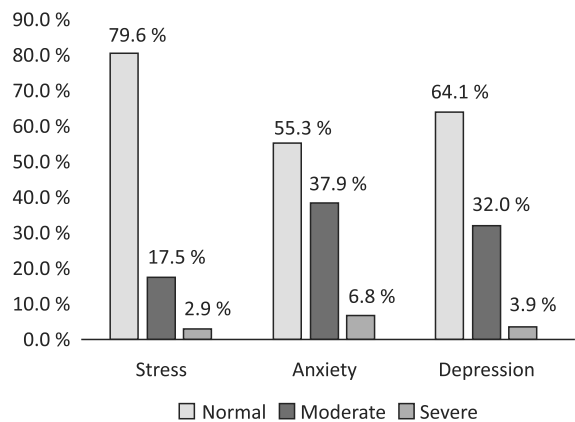


Figure 2. Prevalence of stress, anxiety, and depression among the subjects during lockdown

Table 3. Association of stress and anxiety with demographic factors, BMI, and physical activity during lockdown

Mental disorder	Variable	Category	Normal (n %)	Moderate (n %)	Severe (n %)	Chi-square-value
Stress	BMI	Underweight	1 (50)	0 (0.0)	1 (50)	0.007**
		Normal weight	13 (72.2)	4 (22.2)	1 (5.6)	
		Overweight	15 (83.3)	3 (16.7)	0 (0.0)	
		Obese	53 (81.5)	11 (16.9)	1 (1.5)	
Anxiety	Age	20 - 34 years	24 (50)	22 (45.8)	2 (4.2)	0.049*
		35 - 44 years	28 (65.1)	13 (30.2)	2 (4.7)	
		45 - 50 years	5 (41.7)	4 (33.3)	3 (25)	
	Sex	Male	51 (59.3)	28 (32.6)	7 (8.1)	0.034*
		Female	6 (35.3)	11 (64.7)	0 (0.0)	

Level of significance * p -value of < 0.05, ** p - value of < 0.01

Spearman correlation was applied to find the strength and relationship between various variables of demographic profile and mental health to the consumption of foods that are high in fat, salt, and sugar (HFSS). The results show that consuming food items high in fat like fast foods and sugar like ice cream and sweetened beverages negatively correlated with age. Foods high in fat, like ruck biscuits, cookies high in sugar and chips, and cornflakes

high in salt, were positively correlated with BMI. Literature reports that common mental disorders affect people's eating patterns and may be more prevalent during the lockdown period. Results of the correlation showed that consumption of the below-mentioned food items, classified as high in fat, salt, and sugar, had a positive correlation with stress, anxiety, and depression (Table 4). We observed that the participants consumed ready-to-eat snacks, in-

Table 4. Correlation between various variables and food items consumed during lockdown

Variable	Category of food	Food items	r - value	p - value
Age	High in fat	Fast food (pizza, burger, french fries, etc.)	- 0.23	0.02*
		Kulfi/Ice-cream	-0.273	0.005**
	High in sugar	Sugar cane juice/Shikanji/Sweetened Lassi/Sharbat	-0.243	0.013*
BMI	High in fat	Rusk (dry biscuit, toast)	0.202	0.041*
	High in sugar	Fruit cakes/Cookies	0.215	0.029*
		Salty biscuits/ chips	0.237	0.016*
	High in salt	Cornflakes	0.207	0.036*

Table 4. (Continued)

Variable	Category of food	Food items	r - value	p - value
Stress	High in fat	Open snacks (mathri, bhujia, moong dal, besan ladoo, maida barfi, besan papdi, etc.)	0.302	0.002**
		Indian sweets (halwa, jalebi, pedha, barfi, gulab jamun, soan-papdi, motichoor ladoo, rasgulla, kalakand, etc.)	0.208	0.035*
	High in sugar	Chikki	0.263	0.007**
		Fruit cakes/Cookies	0.214	0.03*
		Sugar/jaggery stuffed Indian bread	0.217	0.028*
High in salt	Instant noodles	0.213	0.03*	
Anxiety	High in fat	Open snacks (mathri, bhujia, moong dal, besan ladoo, maida barfi, besan papdi, etc.)	0.303	0.002**
		Freshly prepared snacks (bhatura, kachori, bread pakora, namakpara, samosa, aloo Tikki, etc.)	0.232	0.018*
		Fast food (pizza, burger, french fries, etc.)	0.268	0.006**
	High in salt	Processed cheese	0.201	0.042*
		Instant noodles	0.225	0.023*
Depression	High in fat	Confectionery snacks (cream roll, puffs, pastry, patty, muffin, etc.)	0.210	0.033*
	High in salt	Processed cheese	0.195	0.048*
		Instant noodles	0.264	0.007**

Level of significance * p value of < 0.05, ** p value of < 0.01

stant noodles, easy-to-cook foods, and Indian sweets and confectionery more frequently, thus having a significant correlation with high stress, anxiety, and depression.

Discussion

COVID-19 pandemic and preventive measures like lockdown significantly impact lifestyle-associated behaviour in the population. Thus, this study aimed to ascertain the impact of the COVID-19 lockdown on lifestyle choices among IT employees. Data is collected from 103 participants across Pune city of Maharashtra. Nearly one-third of the participants in our survey experienced moderate to severe levels of stress, anxiety, and depression. Several studies conducted worldwide on mental

health status during the COVID-19 pandemic show a similar trend [22-24]. Previous studies state that such psychological issues may arise due to fear of getting infected by the virus, a lack of COVID-19 awareness, stigma, lack of essential everyday requirements, fear of meeting people, loss of daily schedule, and financial loss [7,25,26]. In addition to the stated reasons, among IT professionals, these issues can also occur due to work from home, work-related burnout, no work-home boundary, work-family conflict, lack of resources, poor management, lack of communication, lack of support from other employees, over expectations in job and workload [15]. Moderate to severe stress was observed among 33.6 % of the IT professionals in our study, falling in the overweight and obese category. Many studies

have identified a similar association between poor mental health and obesity [27,28]. In our study, anxiety was significantly high among early adulthood, i.e., 20-34 years age group, compared to other older age group categories. It may be because they had additional targets to achieve, which were directly linked with their yearly appraisals. The findings were similar to the study conducted in Uttar Pradesh, where anxiety, stress, and depression levels during the COVID-19 pandemic were high among early adults. While the study by Kazmi demonstrates that females experienced more anxiety than males, the current research shows an opposite trend [6]. Our study enumerated that the male participants had a higher level of anxiety than females, which is attributed to the fact that more males participated and completed the online survey.

The work-from-home culture was unknown to the Indian population before the lockdown period. This significantly changed sleep patterns, mobile usage, eating habits, and physical activity schedules. The analysis of a study comparing the lifestyle changes of 'work at office' and 'work from home employees during the lockdown indicated that the risk of weight gain was higher (OR: 1.51, $p < 0.005$) in work from home group besides a significant increase in time spent on mobile by the group ($p < 0.005$). During the lockdown, 47.1 % of the participants from both groups did not engage in physical activity [14]. Physical activity decreased among our survey participants, and almost half of them perceived to have increased their body weight during the lockdown. These findings point toward adopting a sedentary lifestyle during the COVID-19 pandemic lockdown phase. Another study conducted in India also demonstrated that lockdown negatively affected the daily routine and reduced physical activity levels [11]. The reasons for physical inactivity might be poor mental health status, lack of time and motivation, home isolation, and restricted access to fitness centres [12,13].

The present study also assessed the correlation between the consumption of food items

high in fat, salt, and sugar with age, BMI, and psychological issues (stress, anxiety, and depression). Increased consumption of food items like cookies, ice cream, sweetened beverages, ready-to-eat snacks, packet foods, Indian sweets, confectionery, and instant noodles was observed among the participants. This pattern was significantly related to age and moderate stress, anxiety, and depression levels. The potential factors might be boredom, cravings for unhealthy foodstuffs, increase in leisure time leading to more time spent on social media, and excess storing of foodstuff due to lockdown and fear of unavailability. People in the overweight and obese category are more likely to consume unhealthy foods [29]. Anxiety can also lead to the consumption of such items [10]. Our study also observed a similar trend, where BMI was significantly positively correlated with high consumption of HFSS foods. These findings are also supported by a review carried out to summarize the effect of pandemic COVID-19 on lifestyle behaviour focusing on changes in dietary or eating behaviour, which revealed that, in general, an overall shift in eating and dietary habits than usual was observed in terms of overeating. Snacking and meal frequency was found to be increased [30]. Dey & Dey also reported that more than half of the participants were eating unhealthily during the lockdown phase [20]. Although the present study was one of the kinds which were carried out among the IT professionals whose lifestyle was severely affected due to lockdown, we could not avoid a few limitations. Since this research was a web-based study due to limited access and resources due to the COVID-19 pandemic, there is a possibility of reporting biased responses. We could not fulfil the expected sample size. Self-reported levels of stress, anxiety, depression, HFSS food consumption, physical activity, and anthropometric measurements may not always be aligned with the assessment by trained nutritionists or mental health experts. The participants might have reported socially desirable responses.

The rapid spread of COVID-19 throughout the country made the Government of In-

dia impose a lockdown to prevent coronavirus transmission. People had never experienced such a situation earlier, and thus its impact was uncertain. Previous studies worldwide have focused on the general population to assess lifestyle and behavioural changes. This is the first study conducted on IT professionals, who are one of the vulnerable groups considering their occupational stress. In conclusion, in spite of the listed limitations, the present study shows that there was a negative impact of COVID-19 on the lifestyle behaviour of IT professionals. These findings can help policymakers to undertake robust intervention programs to improve the health and overall well-being of the group. Lockdown is still undertaken where cases are high, so such studies should be continued for effective management for coping with the situations in the future. It is crucial to educate people

about nutrition and promote health, a perfect diet, and regular physical activity as there is a rise in obesity, unhealthy eating choices, and physical inactivity. The COVID-19 pandemic would have a more significant impact on those with poor mental and physical well-being. Thus, it's critical to strategize ahead and implement policies and programs that take this into consideration.

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Conflict of Interest

None to declare.

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