Impact of covid-19 pandemic lockdown on dietary patterns of young adults

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Abstract - **COVID – 19 pandemic and implemented lockdown strongly impacted everyone's life. This study aimed to investigate the immediate impact of COVID- 19 Pandemic lock down on eating habits, physical activity and lifestyle changes of young adults aged between 18 – 25 years in India. A questionnaire on demographic information, anthropometric data, physical activity and dietary habits were circulated through google forms via social media and e-mail. A total of 544 respondents have responded to the study. Among 544 respondents 127 were male and 417 were female. It was noted that after lockdown, there is an increase of four percent in the overweight and 26 % in the obese category. The data of the anthropometric status of females after lockdown reports that there is an increase of three percent in overweight and 12% in obesity. This study also found that 39% of the male and 48% of the female skipped any one of the meals in a day during this lockdown. There was also a substantial increase in snack, junk, fried and fast food consumption in 31% of the male and 24% of the female respondents. This study observed that there was a strong relation between late-night snack consumption and insomnia. The onscreen time of more than 8 hours was considerably increased both in males and females as 39% and 31% respectively. The positive findings from the study were that 43% of male respondents and 54% of female respondents changed their diet plan to a healthy eating plan during the lockdown. Another positive finding was that 58% of male respondents and 59% of female respondents have started doing physical activity. Nutrition education was provided through e-posters on the importance of physical activity, stress management and healthy eating habits. It was concluded that adequate and balanced nutrition, physical activity, sound sleep, and stress management are important for a healthy lifestyle.**

Index Terms - **COVID-19, eating patterns, lockdown, physical activity, young adults.**

INTRODUCTION

The health status during the young adult years has received little attention compared with adolescents. Although young adults are sometimes grouped with adolescents, the contextual influences that shape risky behaviour, health outcomes and access to care change during the young adult years. The critical health issues of young adulthood mirror those of adolescence, including reproductive health, injury, substance use, mental health, violence, obesity and access to health care. Young adults fare worse than adolescents in many areas: rates of injury, homicide and substance use peak in young adulthood (Park et al., 2006).

COVID-19 is an infectious disease caused by the SARS-CoV-2 virus. Most people infected with the COVID-19 virus experience mild to moderate respiratory illness and recover without requiring special treatment. Older people and those with underlying medical problems like cardiovascular disease, diabetes, chronic respiratory disease, and cancer are more likely to develop serious illnesses (https://www.who.int/health-topics/coronavirus).

The lockdown was placed when the number of confirmed positive coronavirus cases in India was approximately 500. Observers stated that the lockdown had slowed the growth rate of the pandemic by 6 April to a rate of doubling every six days, and by 18 April, to a rate of doubling every eight days. As the end of the first lockdown, period approached, state governments and other advisory committees recommended extending the lockdown. On 14 April, the lockdown was extended nationwide till 3rd May, with a conditional relaxation after 20 April for the regions where the spread had been contained or was minimal *(https://en.m.wikipedia.org/wiki/COVID-19_lockdown_in_India)*. Limited access to fresh food could negatively affect overall physical and mental health. Anxiety and boredom evoked by quarantine are considered risk factors for consuming more food and food of poorer quality compared to standard living conditions. Combined with the potential for lower levels of Physical, impaired nutritional habits could

lead to a positive energy balance i.e., weight gain (Moreno et al., 2020).

Eating behaviour is strongly influenced by cultural and social aspects: sharing a meal with friends, family or colleagues is a common habit, which is deeply rooted in our culture and society. It is well known that eating behaviour is different when eating alone compared to eating with other people. Furthermore, dietary choices converge with those of close social connections, which may be explained by shared social and cultural expectations and norms. On the other hand, eating behaviour has a major impact on health conditions and the development of various diseases. Dietary habits are crucial for developing cardiovascular diseases and even for all-cause mortality (Huber et al., 2020).

Therefore, a healthy diet plays a key role in both, primary and secondary cardiovascular prevention, and is given a class I recommendation in current guidelines. Further, unhealthy diet patterns may have pro-inflammatory properties with the risk of the development and aggravation of inflammatory diseases including pulmonary infections (Scoditti et al., 2019). So far, data on behavioural and dietary changes during the COVID-19 lockdown are scarce and are mainly limited to observational studies for certain patient cohorts and regions. However, the impact of lockdown measures on healthy young adults has not been addressed yet.

It can be hypothesized that lockdown measures would influence nutrient intake and eating patterns among young adults. Hence, the study on young adults on the impact of COVID-19 pandemic lockdown on eating patterns was conducted with the objectives as to know the socio-demographic profile, and anthropometric status, distinguishing the lifestyle pattern, identify the eating pattern during Covid-19 lockdown, and evaluate the association between weight before and after lockdown, onscreen time and physical activities.

METHODOLOGY

The covid-19 pandemic and the implemented lockdown strongly impact everyone's daily life. Stressful situations are known to alter eating habits and increase the risk of obesity. In our study, we aimed to investigate the effect of lockdown measures on eating patterns among young adults (18 to 25years). The study period was from January 2021 to October 2021. A questionnaire was created using google form and the link was circulated through various social media apps like – WhatsApp, Facebook, and Instagram. The questionnaire included questions on sociodemographic parameters followed by anthropometry data, physical activity level, onscreen time, and food intake patterns.

Young adults who received the google link filled out the questionnaire and submitted the google form in the same link. The respondents information on age, gender, educational qualification and occupation was collected under socio-demographic profile. Under anthropometry participants measurement of height, and weight before and during lockdown was asked to report in the form and BMI was computed as the ratio of weight (kg) per height squared (m2). The physical activity level was also recorded through questions like their duration of physical activity during the lockdown. The dietary pattern was analysed by posting questions regarding their consumption of meals or junk foods and whether they skip their meal, or consumption of late-night snacks during lockdown due to insomnia (lack of sleep) which indicates the nutritional knowledge and the health status of the individual. Questions based on the time spent on screen and their changes in the dietary pattern due to psychological stress during lockdown were also included in the questionnaire.

Google forms store the responses received so we can analyse in detail. The forms are integrated with Google spreadsheets therefore we can access a spreadsheet view of the collected data. Hence it was comfortable to consolidate the collected data and analyse the results. The e-posters are posted to all the selected respondents through e-mail and WhatsApp. The feedback on the nutritional education was noted. This was helpful for the respondents to know the changes in their lifestyle and dietary habits. SPSS version 20 statistical tool was used to analyse the data. The association between weight before and after lockdown, onscreen time and physical activity were examined using correlation.

RESULTS AND DISCUSSION

1. Socio-demographic profile of the participants

The socio-demographic details such as gender, age, occupation of the respondents were displayed and discussed under table-1

Table – 1 Socio-demographic profile of the participants

Criteria		No of respondents = 544			
		Male (n=127)		Female (n=417)	
		No	%	No	%
Gender		127	23.3%	417	76.6%
Age	18 – 20	36	28.4%	140	33.7%
	21 – 23	65	51.1%	231	55.3%
	23 – 25	26	20.5%	46	11.0%
Total		127	100	417	100
Occupation	Student	95	74.8%	360	86.3%
	Sports person	3	2.3%	2	0.4%
	Employed	23	18.2%	32	7.7%
	Unemployed	6	4.7%	23	5.6%
Total		127	100	417	100

Among the 544 participants, 127 participants were male and 417 participants were female. From the above table, it is evident that most of the male participants (51.1%) were between 21 to 23 years old, 28.4% were under 18 to 20 years, and 20.5% comes under 23 to 25 years of age. Most of the female participants (55.3%) were between 21 to 23 years, 33.7% were 18 to 20 years, and 11% were under 23 to 25 years old. The majority of the male participants were students (74.8%) and the rest of the participants were employed (18.2%), unemployed (4.7%), and sports persons (2.3%). Among the female participants, the majority (86.3%) were students, 7.7% were employed, 5.6% were unemployed, and very few (0.4%) were sports persons.

2. Anthropometric profile of the participants

The anthropometric measures like reported height, weight and calculated BMI were discussed under below table-2

Table – 2Anthropometric profile of the participants

Anthropometric measures	Before Lockdown		After Lockdown	
	Male Mean ±SD	Female Mean ±SD	Male Mean ±SD	Female Mean ±SD
Height	163.70 ± 6.34	158.6 ± 4.15	163.70 ± 6.34	158.6 ± 4.15
Weight	71.96 ± 9.81	65.21 ± 9.32	71.96 ± 9.81	65.21 ± 9.32
BMI	24.15 ± 6.13	24.12 ± 6.14	24.15 ± 6.13	24.12 ± 6.14

BMI Classification (kg/m2) Asian Criteria	Before Lockdown				After Lockdown			
	Male (n=127)		Female (n=417)		Male (n=127)		Female (n=417)	
	No	%	No	%	No	%	No	%
Underweight <18.5	22	17	111	27	19	15	147	35
Normal 18.5-24.9	63	50	232	55	28	22	133	32
Overweight 25-29.9	33	26	58	14	38	30	69	17
Obese ≥30	9	7	16	4	42	33	68	16
Total	127	100	417	100	127	100	417	

From the above table it was clear that both the male and female respondents gained weight during the lockdown. Among male respondents before lockdown, 17% were underweight, 50% with normal BMI, 26% were overweight and nine percent were obese. But after lockdown, it was noted that there is an increase of four percent in the overweight and 26 % in the obese category. Among female respondents before lockdown 27% were underweight, 5% with normal BMI, 14% overweight, and four percent were obese. The data of the anthropometric status of females after lockdown reports that there is an increase of three percent in overweight and 12% in obesity.

3. Physical activity of the participants

Among 127 male respondents, 74 males (58%) started doing physical activity. Among 417 female respondents, 245 female respondents (59%) started doing physical activity during the lockdown. Between 74 males, 24% (18 males) underwent physical activity for 15 to 20 minutes, 10 (14%) of the participants done physical activity for 30 to 40 minutes, 10 (14%) done for 30 – 40 minutes, and 12 participants (16%) done the physical activity for more than one hour. Of 245 female participants, 91 females (37%) of the participants started physical activity for 15 to 20 minutes during the lockdown, 62 females (25%) for 20

– 30 minutes, 38 (16%) for 30 to 40 minutes, and 17 (7%) spent more than one hour for physical activity.

4. Food choices and snacking patterns of participants during pandemic lockdown

It was recorded that, among 127 male participants, about 29 (23%) males skipped their breakfast, 14 (11%) males skipped their lunch, 6 (5%) skipped their dinner and 78 (61%) males have not skipped any of their meals. Among 417 female participants 116 (28%) female skipped their breakfast, 42 (10%) female participants skipped their lunch, 218 (53%) females skipped their dinner, and 218 (53%) female participants have not skipped their meals. Thus, 39% of the male participants and 48% of female participants had changes in their eating patterns and skipped any one of their meals in a day. It was also identified that the majority of the male participants 114 (90%) and female participants 388 (93%) preferred home-made meals to fast food and restaurant meals which are considered to be the healthy choice by the respondents.

5. Time spent on screening by females

Among the 544 respondents, it was found that there was a substantial increase in the consumption of snacks, junk, fast and fried foods among 39 (31%) male respondents and 100 (24%) female respondents during the lockdown. The consumption pattern was the same as before for 51 (40%) males and 158 (38%) females. The consumption of snacks and junk foods was significantly decreased in 37 (29%) males and 159 (38%) females.

Majority of respondents {male = 83 (39%)} and {female = 254 (61%)} had no habit of consuming late-night snacks during lockdown. 7 (6%) males and 26 (6%) females consumed late-night snacks daily during the lockdown. 7 (6%) males and 14 (3%) females consumed late-night snacks once a week. 5 (4%) males and 13 (3%) females consumed late-night snacks twice a week. 25 (20%) males and 110 (26%) females consumed rarely. Nearly 60 (47%) males and 197 (47%) females consumed fruits and vegetables on a daily basis, while 21 (17%) males and 74 (18%) females rarely consumed fruits and vegetables.

Table -3 Time spent on screening and sitting by the participants

Sl. No.	Criteria	Duration Hours/day	Total no. of Respondents (N = 544)			
			Male = 127		Female = 417	
			No. of respondents	%	No. of respondents	%
1.	Time spent on screen during the lockdown.	2 – 3	14	11.02%	60	14.3%
		4 – 6	36	28.3%	132	31.6%
		8	28	22.04%	96	23.02%
		More than 8	49	38.5%	129	30.9%
2.	Time spent on sitting during the lockdown	1	97	76.3%	274	65.70%
		2 – 3	18	14.17%	83	19.90%
		4 – 5	7	5.51%	23	5.51%
		More than 5	5	3.93%	37	8.87%

From the above table, it was clear that the time spent on screening (watching laptop, mobile phones, online classes, and work from home) during this lockdown has considerably increased among both male and female respondents. Out of 127 male respondents 49 (39 %) were males and out of 417 female respondents, 129 (31%) females spent more than 8 hours on screen. Only 14 (11%) males and 60 (14%) females spent 2 to 3 hours.

On the other hand, the time spent on reading (reading books, reading newspapers) during the pandemic lockdown has considerably decreased. Out of 544 participants, majority of respondents {male = 97 (76%)} and {female = 274 (66%)} spent only one hour per day for reading, 18 (14%) males and 83 (20%) females spent 2 -3 hours/day on reading, 7 (6%) males

and 23 (6%) females spent 4 – 5 hours on reading, 5 (4%) males and 37 (9%) females spent more than 5 hours on reading.

6. Dietary habits of the participants during pandemic lockdown

Among the study participants, it was found that 17 (13%) and 67 (16%) females skipped meals in order to lose weight or to avoid gaining weight. It was also evident that 24 (19%) male respondents and 72 (17%) female respondents eat more than 3 meals per day during the lockdown. Majority of respondent's {male = 85 (67%) and female = 292 (70%)} meal timing changed during this lockdown. The majority of female respondents 226 (54%) among 417 females have changed their diet plan to a healthy eating plan during

this lockdown. On the other hand, out of 127 male respondents, only 55 (43%) males changed their diet plan into a healthy eating plan during this lockdown. Out of 544 respondents, {male= 35 (28%)} and

{female = 122 (29%) think that they were affected by disordered eating patterns during this pandemic lockdown.

7. Correlation matrix for the selected variables among the respondents

Table -4 Correlation matrix for the selected variables among the respondents

Sequence No	Variables		Pearson Correlation	Sig. (2-tailed)	N
1	Weight before lockdown for males	Weight after lockdown for males	0.833**	0.000	127
2	Weight before lockdown for females	Weight after lockdown for females	0.921**	0.000	417
3	Physical activity	Onscreen time	0.091*	0.034	544
4	BMI	Junk and fried food consumption	0.085*	0.050	531
5	Lack of sleep	Late night snacks consumption	0.268**	0.000	544
6	Psychological stress	Participants affected by disordered eating pattern	0.378**	0.000	543

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

In sequence-1, the Pearson correlation is 0.833, which interprets that there is a strong positive correlation between weight before pandemic and weight after the pandemic. The significant value is 0.000 which is lesser than the level of significance of 0.01, thus we reject our null hypothesis. Therefore, there is a strong positive relationship between weight before covid 19 pandemic period and weight during covid 19 pandemic period among selected male subjects.

In sequence-2, the sig value is 0.000 which is lesser than the level of significance of 0.01, thus we reject our null hypothesis. The Pearson Correlation is 0.921, which interprets that there is a strong positive correlation between weight before and after the pandemic. Therefore, there is a very high positive relationship between weight before COVID 19 pandemic period and weight during COVID 19 pandemic period among selected female subjects. A study by Bakaloudi et.al (2019) on the "impact of the first covid – 19 lockdown on body weight revealed that Results of a systematic review regarding body weight changes reported that a range of 11.1–72.4% of individuals asked, stated an increase in body weight after/during the lockdown period. The highest increase was observed in the study from Iraq in which the majority of the participants (45.6%) were 21–30 years old. The first COVID-19 lockdown affected the body weight of subjects ≥16 years old globally. A significant portion of the participants stated that their body weight was increased during the lockdown, resulting in overall significant body weight increments in the current meta-analysis. This overall effect is alarming due to the risk of overweight, obesity, and their relevant comorbidities.

In sequence-3, the sig value is 0.034 which is lesser than the level of significance of 0.05, thus we reject our null hypothesis. The Pearson Correlation is 0.091, which interprets that there is a strong positive correlation between physical activity and onscreen time. Therefore, there is a markedly low and negligible positive relationship between physical activity and time spent onscreen by the young adult participants during the lockdown.

In sequence-4, the significant value is 0.050 which is equal to the level of significance of 0.05, thus we accept our null hypothesis. The Pearson Correlation is -0.085, which interprets that there is a negative correlation between BMI and Snacking patterns (fried and junk food consumption) Therefore, there is a markedly low and negligible negative relationship between BMI and snacking patterns (fried and junk food consumption) among young adults during the lockdown.

In sequence-5, the significant value is 0.000 which is lesser than the level of significance of 0.01, thus we reject our null hypothesis. The Pearson Correlation is 0.268, which interprets that there is a strong positive correlation between insomnia and a late-night snack. Therefore, there is a very low positive relationship between physical activity and time spent onscreen by the young adult participants during the lockdown. Recent studies on "late night snacking pattern linked to poor sleep and obesity" supports the above statement and showed that poor quality of sleep seemed to be a major predictor of junk food cravings, and it was associated with a greater likelihood of participants reporting obesity, diabetes, and other health problems.

In sequence-6, the significant value is 0.000 which is lesser than the level of significance of 0.01, thus we reject our null hypothesis. The Pearson Correlation is 0.378, which interprets that there is a strong positive correlation between Psychological Stress and Disordered Eating patterns. Therefore, there is a Low Positive relationship between psychological stress and disordered eating pattern among the young adult participants during the lockdown. Similar to our findings, a recent study by Farhangi et.al, (2018) on mental health problems in relation to eating behaviour patterns, and nutrient intake found that a high prevalence of mental health problems in female adolescents was identified. Moreover, we found a significant relationship between behavioural eating patterns and mental health problems in female adolescents independent of age and BMI. Adolescents with higher adherence to "snacking and convenience", "planning ahead" and "meal skipping" eating patterns were more likely to have indicators of emotional disorders. Additionally, adolescents with high scores of "low fat" eating patterns were less likely to have hyperactivity disorder.

CONCLUSION

The COVID-19 outbreak led to many changes in eating behaviour, which has become less healthy during the pandemic. It also led to many changes in physical activity and lifestyle patterns. This study found that out of 544 respondents, the majority of the men and women have gained weight during the lockdown and this might be due to physical inactivity. Their meal timings were considerably changed and many respondents skipped any of their meals in a day. The insomnia was increased among the participants which ultimately made them eat late-night snacks. It was also clear from the study that the time spent on screening like watching laptops, mobile phones, online classes, and working from home during this lockdown has considerably increased among both male and female respondents. This study also made evident that the majority of the respondents have started doing physical activity and changed their meal plan to a healthy one which is a positive finding. Although some good habits and lifestyle changes increased, eating patterns and healthy BMI is necessary for a healthy individual. It is concluded that healthy life is the balance of both physical and mental health. It means that both physical and mental health should be in balance or function well together. In many instances, physical and mental health are closely linked, and a change (good or bad) in one directly affects the other. So Healthy eating habits, adequate and balanced nutrition, regular physical activity and fitness, normal Body Mass Index, proper sleep, and stress management are very much essential for a healthy living.

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