

Original Research Article

COVID-19 and its effect on nutrition

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ABSTRACT

Background: Pandemic induced lockdown has led to various changes in dietary habits and physical activity amongst the general population like increased consumption of processed food, snacking between meals and decreased consumption of vegetables. This unhealthy lifestyle leads to increase in weight and obesity, which are long-term risk factors for various chronic disorders and impairs the immune system which is vital during a pandemic. Therefore, this study was conducted to document changes in the nutritional habits.

Methods: A descriptive cross-sectional study was conducted. Written informed consent was obtained and the purpose of the study was explained. A self-administered questionnaire was circulated as Google forms to collect data.

Results: 422 volunteers participated. Around 23.5% (n=56) consumed vegetables less than twice a week. Snacking between meals 1-3 times a day was observed in 72% (n=304), of which 54.9% (n=167) do not exercise at all or less than before lockdown and, 52.6% (n=160) showed a significant increase in weight. Out of the 50.2% (n=212) with a changed eating schedule, 30.18% (n=64) skipped at least one meal and 22.3% also showed gastrointestinal disturbances.

Conclusions: Many changes were observed in dietary habits of people due to lockdown, which are a step towards a weak immune system and also forms a basis for chronic diseases in the future. Therefore, it is advisable to consume a balanced diet, as it is an unexcelled way of boosting the immune system which will help in fighting all types of infection including the novel coronavirus infection and lead a healthy lifestyle.

Keywords: Nutrition, COVID-19, Pandemic, Lockdown, Dietary habit changes

INTRODUCTION

The current outbreak of coronavirus has caused a worldwide health emergency which has forced the government to take necessary actions such as social distancing, isolation and home confinement which has led to several constraints in usual living. The best way to implement these has been in the form of a lockdown. Though these were vital to allay the spread of COVID-19, the effect of these restrictions on nutrition and lifestyle at home are innumerable.¹ These measures include insufficient access to shops, a poorer quality of food products due to discernible effect on family income, and

overeating due to various reasons.² It has also led to disturbance of the work routine leading to boredom, which in turn is associated with higher energy consumption.

Stress caused by the global pandemic and by various reasons like hearing or reading continuously about the COVID-19 from the media leads to sleep disturbances and a low mood, altogether leading to overeating, especially of 'comfort foods' rich in sugar, defined as "food craving".³ Such foods, rich in simple carbohydrates, reduce stress by increasing the serotonin production leading to a positive effect on mood. This increases the total consumption of unhealthy food items over healthy food items, thus

alarming the health of individuals. Existing evidence demonstrates a profound effect of diet on the human immune system. Specific nutrients and their combination cause activation of cells, production of signalling molecules, gene expression, and contribute to the gut flora, thus maintaining a functional immune system.^{4,5} Therefore, a healthy balanced diet is important not only during this pandemic but also in daily living. It necessarily doesn't prevent the disease but does play an integral part in enhancing the host's defence mechanism.^{6,7}

Research also suggests that following appropriate diets is directly proportional to the accessibility of food items, which have been a limitation taking into consideration the lockdown and thus impacting the overall quality of the diet. Moreover, the fear of reduced incomes, unemployment and uncertainties might lead to some people reducing their expenditure, thus skipping on the quality of food items. Thus the principle nutrients are often missed and substituted by less nutritional ones.^{8,9} Increased time spent at home has been hypothesized to increase hyper caloric diets with increased meal size and intermittent snacking. Together with it, home confinement restricting outside travel has taken a toll on the physical activity not only on those who accessed gyms regularly but mainly upon the general population that acquired adequate levels of physical activity at work or via the travel to work.¹⁰

All of these habits can lead to increased risk of developing obesity and cardiovascular diseases, beyond a chronic state of inflammation that has been shown to increase the risk for more severe complications of COVID-19. Different studies have also reported a relation between sleep disturbances and obesity due to increase in the secretion of pro-inflammatory cytokines by increasing the adipose tissue that could alter the circadian cycle.¹¹⁻¹³ Recent studies show that the nationwide lockdown is likely to increase the number of patients having uncontrolled diabetes and its complications as a consequence of increasing obesity.¹⁴

By this study we tried to assess the impact of COVID-19 induced lockdown on the dietary changes in the Indian general population, in order to increase awareness regarding the recommended nutritional guidelines and thereby preventing the consequences of an unhealthy lifestyle, which might otherwise lead to a spike in chronic medical condition in patients recovered from COVID-19 and those in the vulnerable group.¹⁵

METHODS

A descriptive cross-sectional study was conducted amongst the general population of India, for a period of four months, from April-July in the year 2020. Written informed consent was obtained from the volunteers and the purpose of the study was explained. A self-administered questionnaire was used which was circulated with the aid of Google forms in-order to collect data structurally. 422

responses were received. Confidentiality of the volunteer was maintained as the name, email address or any other data regarding the volunteer wasn't asked for throughout the study. This questionnaire was divided into two parts: The first part included socio-demographic details like age, sex, employment status and the type of diet followed. The second part obtained information regarding the changes in the dietary habits with respect to various factors such as consumption of fruits, vegetables, junk food, and dairy products in a comparative manner as for before and during the lockdown. Comparison between consumption of water and physical activity status was also obtained.

In order to weigh the effects of these, information regarding gastrointestinal tract (GIT) problems was also asked for. This was followed by data analysis. Data analysis was done using excel sheets.

RESULTS

The data was obtained from a total of 422 volunteers, of these the majority, that is, 83.89% (n=354) belong to the age group between 20-50 years. Males were 43.6% (n=184) and females were 56.4% (n=238). Of which 37.92% (n=160) were students, 31.75% (n=134) were employed including those earning daily wages, 21.33% (n=90) were unemployed or currently out of work or housewives and 9% (n=38) were retired.

From the survey we could analyze that basic goods (vegetables, fruits, grains, milk, etc.) were available to a vast majority, that is, 83.6% (n=353) of the population, however to the 14.1% (n=59) population these goods were available in a limited quantity and 2.3% (n=10) did not have access to it, as seen in Figure 1.

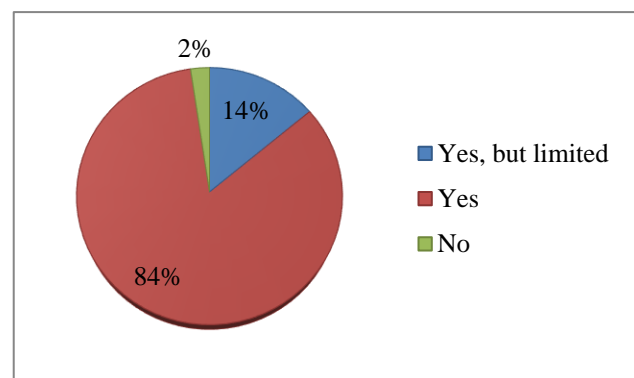


Figure 1: Were basic goods available during the lockdown period?

As observed in Figure 2, the type of diet followed by the group of volunteers included mixed diet, by 43.2% (n=182) and vegetarian diet by 56.8% (n=240). The consumption of non-vegetarian food was found to be reduced significantly during lockdown for 20.4% (n=86) while 10.4% (n=43) did not consume it at all.

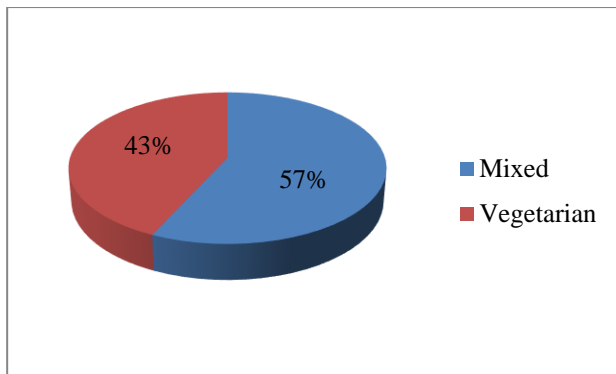


Figure 2: Type of diet followed.

As for the ones following a vegetarian diet, the quality of diet was severely affected as 23.5% (n=56) consumed fruits and vegetables less than twice a week and 28.7% (n=69) consumed it 3-4 times a week. While only 17.8% (n=75) showed a reduction in the consumption of dairy

products, 4.5% (n=19) did not consume it at all. Several reasons were attributed to this decrease in consumption of vegetables and fruits as shown in Figure 3. However, for the majority of the population the consumption remained the same.

Of those eating 1-3 times a day, that is, 72% (n=304), as per Figure 4, 51.3% (n=156) ate only “comfort foods” such as pizzas, sandwiches, biscuits, chips, carbonated drinks, tea, coffee, etc. While 13.7% (n=42) consume only fruits, smoothies, salads; 22.8% (n=69) consumed both. And only 12.2% (n=37) consumed only a cup of green tea or black coffee. Amongst these eating between the meals 1-3 times a day, 54.9% (n=167) do not exercise at all or do less than before lockdown and 52.6% (n=160) showed a significant increase in weight.

Around 22.3% (n=68) of the people eating between the meals, especially junk foods also showed gastro-intestinal disturbances such as acidity and constipation.

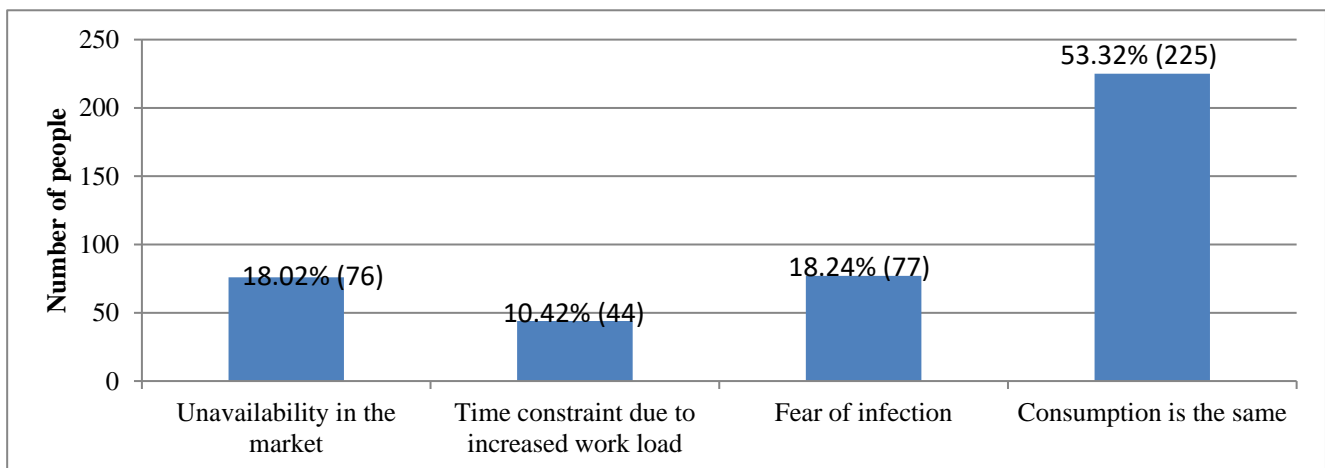


Figure 3: Reasons for reduced consumption.

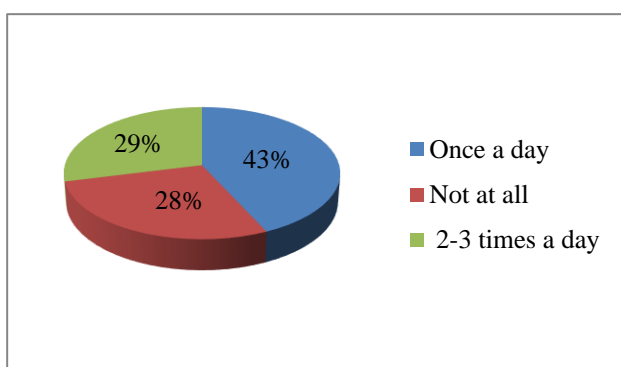


Figure 4: Frequency of eating between the meals.

Out of the 50.2% (n = 212) population claiming a change in their eating schedule (Figure 5), 30.18% (n=64) skipped at least one meal and 28.77% (n=61) skipped a meal only sometimes while the rest did not skip any meals. Amongst the 11.1% (n=47) suggesting that there might be a change, 63.79% (n=30) skipped only sometimes. Even though

38.6% (n=163) of the population declared to have no change in their eating schedule, 11.04% (n=18) still skipped their meals while 14.7% (n=24) did so only sometimes, and the rest 74.23% (n=313) of this population had all their meals. Amongst these, the most skipped meal was breakfast 30.1% (n=64) and the least skipped was lunch 4.7% (n=10).

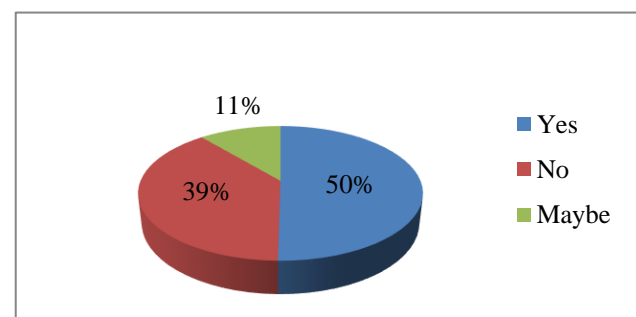


Figure 5: Has your eating schedule changed?

While 26.89% (n=113) gave more than one reason; most complained of a disturbed sleep cycle affecting their eating schedule, as per Figure 6.

Staying at home has not only affected the eating habits but has also led to a decrease in consumption of water as compared to before lockdown in 19% (n=80) of the population.

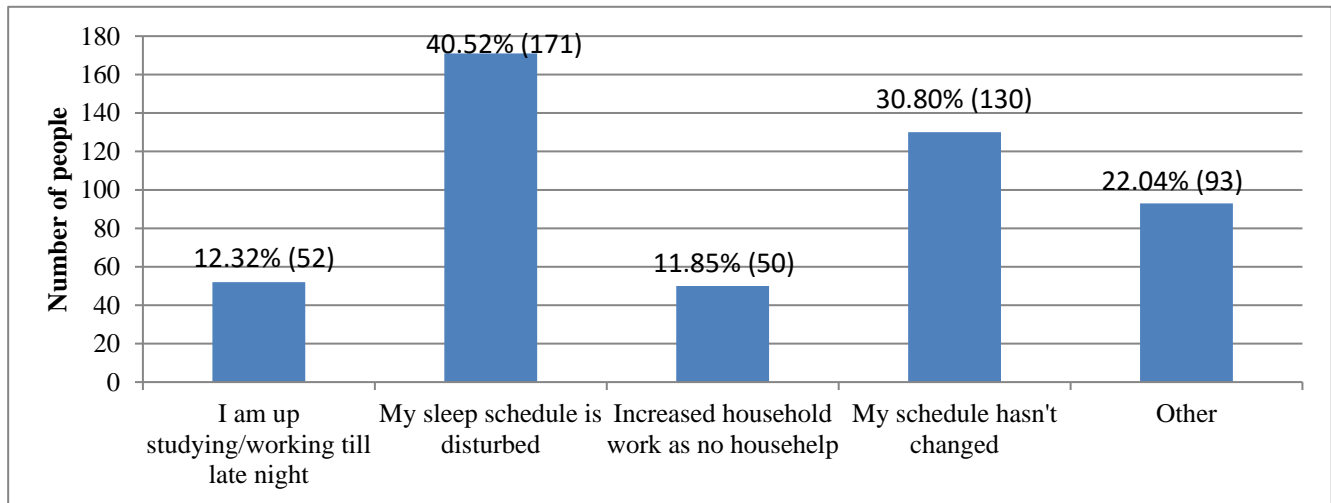


Figure 6: Reasons for the change in eating schedule.

DISCUSSION

This study primarily aimed at assessing the impact of lockdown on the quality of nutrition in the general population as a result of the various restrictions implied during the lockdown. A negative impact on health and a reduced quality of nutrition was seen, with increased eating between the meals, changed eating schedule, skipping meals, and a reduction in physical activity. Despite basic necessities being available to most, fear of infection or time constraints were seen to reduce the consumption of vegetables, fruits or non-vegetarian in the majority of the population.

Around 50.2% (n=212) suggested a change in their eating habits which had a significant relation with increasing weight and gastrointestinal problems. While skipping meals had a significant relation with gastrointestinal problems, no significant relation was seen between weight and skipping meals.

Most people, that is, 72% (n=304) of the population ate at least once between the meals and this had a significant relation with gastrointestinal problems and also with increasing weight. A disturbed eating schedule and snacking in between meals showed to have a negative impact on health.

About, 30.8% (n=130) of the study population complained of having a disturbed sleep cycle which had a significant relationship with eating in between meals wherein majority of the population ate at least once a day in between meals. Eating in between meals could lead to increase in weight and subsequently to obesity. Similar studies were conducted by Deschasaux-Tanguy et al, amongst the French population who observed an increase in snacking

between meals (27%), decrease in consumption of fresh fruits and vegetables (17%), decreased physical activity (52.8%) and an increase in weight (35%), difficulty in maintaining an eating schedule (10.1%) which can lead to long term consequences.¹⁶ Various other studies suggested that obesity leads to a disturbed sleep schedule and thus eating in between meals could indirectly lead to a disturbed sleep cycle. Thereby, eating in between meals and disturbed sleep cycle are interdependent.

A significant decrease in consumption of fruits and vegetables was also observed which was in correlation to a study of fruit consumption patterns in students of Maharashtra conducted by Pratinidhi et al.¹⁷ Fruits and vegetables are considered to be an important source of elements such as calcium, phosphorus, magnesium, potassium and iron. They are also a source of vitamins like A, C, D, K and certain B complex vitamins, of which vitamin C plays a major role in boosting the immune system, the importance of which was also concluded in the study conducted by Langlois et al.¹⁸ The survey showed a significant decline in the consumption of these due to various reasons.

A significant reduction in the consumption of non-vegetarian food was also noted. Non-vegetarian food supplies the body with basic amino acids and is considered to be a rich source of proteins like tryptophan, sulphur containing amino acids, etc. They are a source of vitamin A, D, B complex (Richest source of vitamin B12). It also provides microelements such as iron, zinc, etc. The decline in consumption can lead to a poor quality of nutrition thereby leading to various manifestations caused by the deficiency of the specific nutrient. Basic nutrients like proteins, carbohydrates, vitamins, minerals, iron and zinc shape the immune system and consequently manage the

immune responses in the body. Nutritional deficiencies, thus, are associated with an impaired immune system and render the body susceptible to various infections. Therefore, maintaining a healthy immune system, especially during a global pandemic is of utmost importance in order to have a good immune system.

While the survey showed a decrease in consumption of the fruits, vegetables and non-vegetarian food, a significant increase was seen in the consumption of dairy products which are said to be the richest source of calcium and certain vitamins like vitamin D.

For maintaining a healthy lifestyle, not only does the dietary habit play a role, but equally important is an active lifestyle is it in the form of exercise or indirectly via a work routine. However, from the study a decrease in the amount of exercise done by the population was observed, leading to a significant increase in weight which in the long course of time can lead to obesity which acts as a risk factor for various other chronic disorders.

World Health Organization (WHO) has set certain guidelines which include: consumption of less than 5 gm salt/day, limiting sugar as well as fat intake (fruits should be chosen for sweet cravings), optimum hydration (avoid excess amounts of strong tea, coffee or other caffeinated drinks), consume enough fibre. However, there was a lack of these habits as per the survey conducted. Thus, for a healthier life and a strong immune system these guidelines should be followed.¹⁹

CONCLUSION

As per the study several changes were observed in the dietary habits of people which are considered to be a step towards an unhealthy life and a weak immune system. Therefore, it is advisable to consume a balanced diet, in order to maintain an effective immune system and to live a healthy life. This can be done by consumption of fruits, vegetables, and milk and milk products and reducing foods rich in fats and carbohydrates, thereby including all the nutrients important for the body. Regular physical exercise for a short duration will also help in maintaining body weight thereby reducing the risk of various chronic disorders. A healthy lifestyle remains an unexcelled way of boosting the immune system which will help in fighting all types of infection including the novel coronavirus infection.

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