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The Impact of COVID-19 on the Dietary Habits of Middle-Class Population in Mulund, Mumbai, India

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ABSTRACT

In India, the SARS-CoV-2 COVID-19 pandemic has grown to 112,359 cases and 3,435 deaths as per 21st May, 2020. The severe acute respiratory syndrome (SARS) affected the world with 4,893,186 cases and 323,256 deaths as of 21st May, 2020. The WHO declared the outbreak as a public health emergency of international concern on 30th January, 2020 and it was declared as a pandemic in March 2020. Clinical studies conducted on hospitalized cases show that the onset of COVID-19 is associated with symptoms commonly associated with viral pneumonia, most commonly fever, cough/sore throat and myalgia/fatigue. COVID-19 world pandemic imposed a new set of challenges for the individual to maintain a healthy diet. When compared to the USA, India is currently facing lesser cases of the pandemic because of early implementation of the preventive measures such as a lockdown. Because of the lockdown imposed, India has and is facing a downfall in every aspect, such as the economy, the agriculture, the health sector, the IT and management sectors and also tourism. This in turn, will have a negative impact on the quality of life and economy in India. The present paper aims to find out the impact of COVID-19 pandemic on the health sector and is based on the results obtained from a survey about the eating patterns of participants from Mulund, Mumbai, India. It was seen that the mental stress caused due to the pandemic had an effect on the dietary behaviors of the participants.

Keywords: COVID-19, Economy, Health Sector

1 Introduction

The severe acute respiratory syndrome corona virus 2 (SARS-CoV-2) is the main causal factor for the viral infectious disease coronavirus-2019, which is abbreviated as COVID-19. COVID-19 is thought to have higher mortality than seasonal influenza, even as wide variation is reported [1]. In India, the SARS-CoV-2 COVID-19 pandemic has grown to 112,359 cases and 3,435 deaths as per 21st May, 2020. The severe acute respiratory syndrome (SARS) affected the entire world with 4,893,186 cases and 323,256 deaths worldwide [2]. The WHO declared the outbreak as a public health emergency of international concern on 30th January, 2020 and it was declared as a pandemic in March 2020 [3]. The COVID-19 virus spread has been a product of technological and digital revolution which has already had and is still having a huge impact on the economy of different countries, different sectors such as health, financial, societal, tourism, management, IT, etc. and has been reported to have a major impact especially on the mental health of the general population. One major cause for this is the lockdown that has been imposed in various countries, including India, where specifically, the general population faces issues like unavailability of food items, scarcity of fruits and vegetables, financial insecurities, mental stresses, all of which together lead to emotional and mental breakdowns.

'Quarantine' is one of the oldest and most effective tools of controlling communicable disease outbreaks [4]. The imposition of lockdown and rapid testing conducted in India have helped India control the spread of the virus to an extent, when compared to other nations like the USA [2]. Rumors about the spread of the disease through consumption of chicken led to a drastic decrease in the prices of chicken, which in turn affected the economic conditions of people involved in the poultry industry [6] According to the ICRISAT, the ICAR has imposed various guidelines for the farmers during lockdown, which include lesser manpower/ laborers. This reduction in the labor has indirectly led to increased mental and physical stress on the farmers, and decreased crop production [7]. The low production of crops along with decreased transportation services led to a decrease in the food products such as grains and vegetables reaching the local population. This, in turn, led to increased consumption of ready-to-eat foods and increased prices of the fruits and vegetables [6] [7].

The present observational study aims at evaluating the changes in the food habits of local population in Mumbai, India and thereby relating them to the economical downfall that the nation faces due to COVID-19. The Indian data in this context is very limited. Hence, in order to highlight this important topic, the present study was undertaken with the hypotheses that the consumption of packaged and ready-to-eat foods has increased considerably during the lockdown, because of the unavailability of fruits and vegetables and also other groceries.

2 Methodology

About 63 individuals were approached for the study. Individuals who denied consent were excluded (n=13) and finally, a total of 50 participants were chosen from a residential society in Mulund, Mumbai, India. These participants were selected using purposive convenient sampling. The sample selection technique was such that 25 females and 25 males were recruited for the study belonging to the age group of 20-50 years of age who consumed both- vegetarian and non-vegetarian diets. Both, working and non-working populations were included and no exclusion was made for participants who reported the presence of co-morbidities. A structured questionnaire of 15 questions in total [Appendix 1] was administered to each participant personally and questions were explained to them in Hindi if they faced any confusion. Verbal consent was taken from the participants before administering the questionnaires and they were informed that their answers will be used anonymously for research purposes.

3 Tools used for data collection

The following tools were used for data collection-

3.1 ANTHROPOMETRIC ASSESSMENT

Anthropometric measurements are methods used to assess the height, weight and BMI of individuals to know the nutritional status of the participants.

a) **Body height-** to measure the height of the participant, they're supposed to stand straight, bare foot, touching the wall and the height can then be measured using a stadiometer or a measuring tape. Here, the data about the participant's height was recorded using a measuring tape.

b) **Body weight-** Body weight is measured using a calibrated weighing machine. The subjects stand bare foot with light clothing on the machine. Here, a weighing machine was used for the participants.

c) **BMI-** Body Mass Index is used to assess the weight in relation to the height and gives data whether the individual is underweight, normal weight, overweight or obese. It was calculated using the formula-

$$BMI = \text{weight (kg)} / \text{height (m}^2\text{)}$$

3.2 SOCIO-DEMOGRAPHIC QUESTIONNAIRE

A socio-demographic questionnaire was structured which included basic information about the participant, the work-related details, and their diet and lifestyle related questions. Questions such as the choice of dietary habits, the physical activities performed, changes (if any) in the dietary habits due to lockdown were asked. The questionnaire also contained questions regarding the existing diseases if the participants had any.
The responses of the participants were then coded into a Microsoft Excel sheet and the analysis was done.

4 Results

The mean average age of the participants recruited for the study was 37 years. Both, males and females were recruited in equal numbers for this study, i.e. 25 each. About 28% of the participants were non-working and this mostly comprised of housewives and a major percentage, i.e. 72% of the study population was working. 52% of the participants (n=26) reported the absence of any co-morbidities which included diabetes, cardiovascular diseases, thyroid disorders, hypertension, chronic respiratory diseases and cancers. The maximum reported co-morbidities presented were hypertension and diabetes, which were 16% each. Followed by these, 10% (n=5) participants reported the presence of thyroid disorders, which was followed by cardiovascular diseases found in 4% of the study population (n=2). Chronic respiratory disease, specifically asthma was found in 1 participant whereas 1 participant reported the presence of migraine [Fig.1]

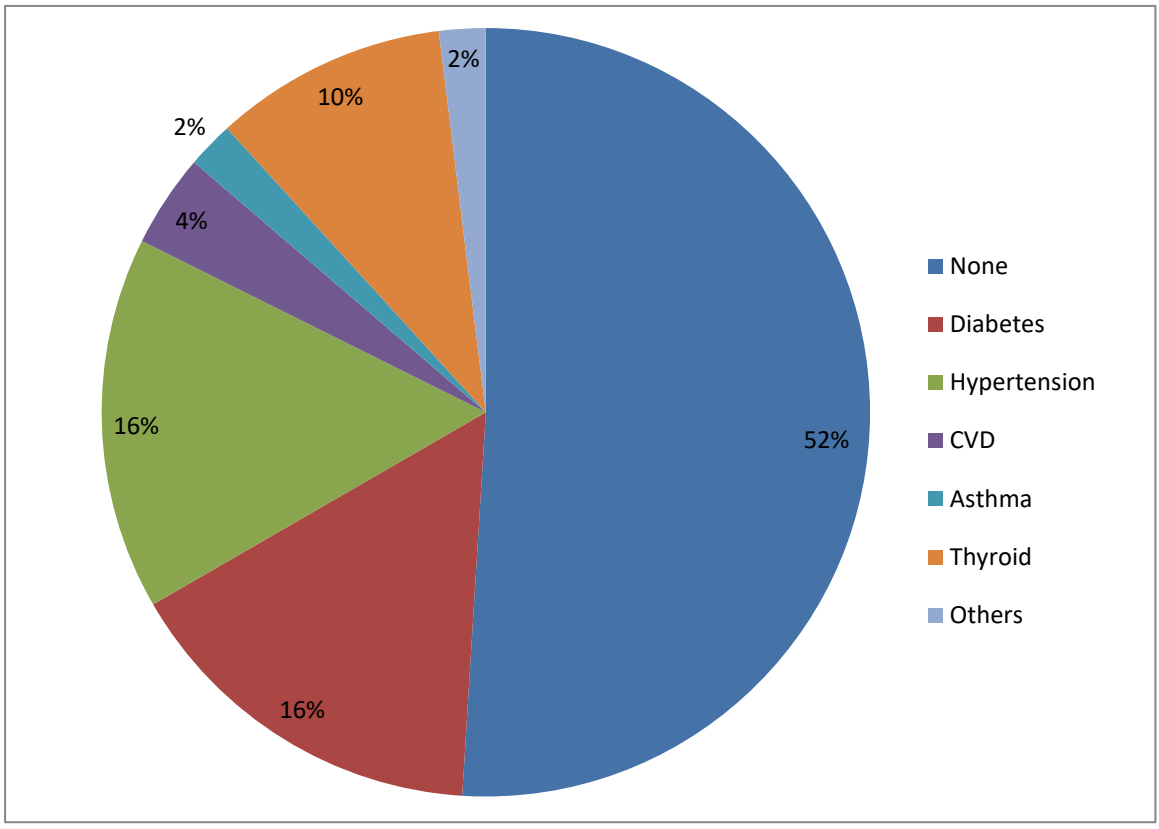

Figure 1: Co-morbidities reported by the participants

Most of the participants, i.e. 34% reported that they moved out of the house at least once in the past 7 days because of reasons such as buying groceries, vegetables and medicines. 32% of the population reported that they didn't move out of the house since the past 10-14 days, not even once. 26% of the participants went out in the past 7-10 days while 8% (n=04) of the participants said that they stayed at home for more than

20 days. These 8% of the participants were older in age and showed the presence of different co-morbidities, and hence took preventive measures to ensure their own safety.

Stress was majorly found to have increased in about 76% of the population. The major contributing factor for this increasing stress was the severity of the COVID-19 pandemic and the increasing number of cases, because of which the participants always felt stressed about themselves/ their family members falling a prey to the disease. Another major factor that caused stress was the financial insecurities, which led to emotional stress and thereby increased breakouts and anxiety.

When asked about the changes in their fruits, vegetables and fried foods intakes, the following results were obtained [Fig. 2]-

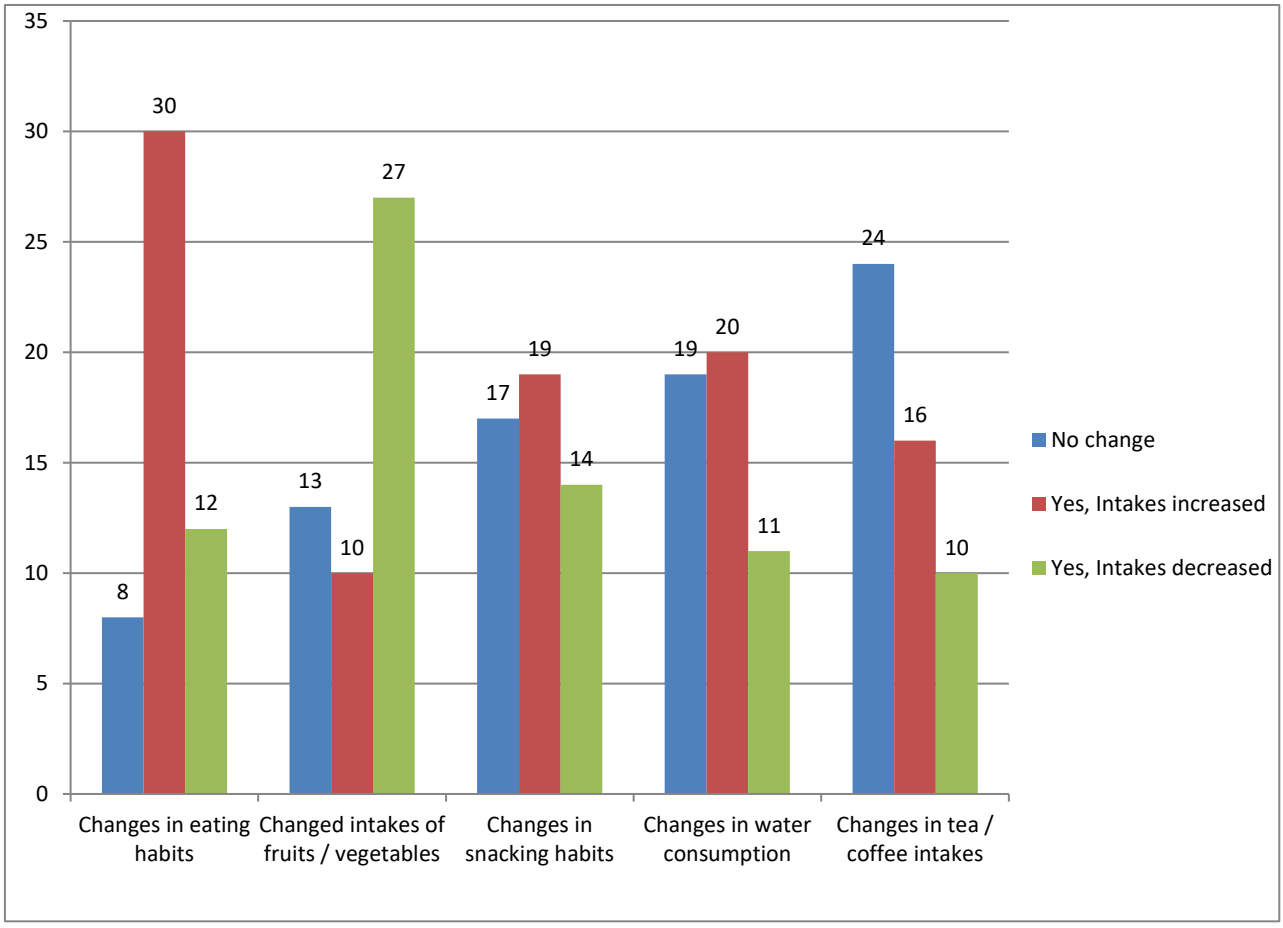

Figure 2: Dietary changes reported during lockdown

When asked whether any financial changes occurred to the participants because of the lockdown, 78% reported no changes. However, 22% of the participants reported that they faced some changes especially in their salaries which affected some of their food choices. 17 participants, i.e. 34% didn't report any changes in their patterns of main meal consumptions, while 32% of the participants (n=16) reported frequent changes. 36% of the participants (n=18) indulged themselves in regular exercising while 26% of them did not perform any exercise. The rest of the participants i.e. 38% of the participants reported frequent/rare indulgence in any type of exercises.

5 Discussion

According to Lippi G. et al, 2020, "Lockdown" is a term that is conventionally used for "mass quarantine", and is based on the order of "stay-at-home" passed by the government for imposing appropriate social distancing and thereby limiting the spread of the present pandemic, COVID-19. Mandatory home-stay

leads to physical inactivity and this, in turn leads to weight gain. The weight gain can also be caused due to increased caloric intake during the lockdown [1]. In the view of Kaneriya S. et al, 2020, lockdown-imposed stress can lead to either under/ over eating in individuals and in most cases, binge-eating episodes may be observed [8]. The present paper was in line with this finding by Kaneriya S. [8], as about 58% of the total participants from the present study reported episodes of over eating. The participants reported that the frequency of eating per day, including major meals and snacks increased during the lockdown as compared to what it was before the lockdown. Intakes of fried and fatty foods also increased and in 62% of the participants during the lockdown and this could be a result high stress (Food and Agriculture Organization of the United Nations).

Changes in dietary habits were reported in 84% of the study population, which was in line with the results of a study conducted by Lippi G et al, 2020 which concluded that improper dietary habits due to various reasons during the lockdown may lead to weight gain post lockdown [1]. These improper dietary habits mainly included decrease in the fruits / vegetable's intakes, increased snacking, increased tea/ coffee consumptions, and increased intakes of ready-to-eat or processed foods in the present study.

Changes in the consumption of main meals were also observed in the present study, i.e. about 56% of the participants reported increase in the amounts of consumption, about 27% reported changes in the preferred foods for main meals and the rest reported changes in the timings of consuming main meals. About 42% of the participants reported that they chose foods which required minimal preparations, 28% reported that they preferred ready-to-eat foods and others reported that they preferred legumes/ vegetables/ animal-based foods for their main meals.

The FAO suggests 6-8 glasses of plain water per day for most adults, and the results of this study were in line with this recommendation. About 40% of the participants reported that they consumed more water during the lockdown and the major reason behind this was the summer season. About 38% of participants reported that there was no change in their water intakes and 24% said their water intakes decreased because of physical inactivity. Most of the participants included in the study consumed about 6-10 glasses of water per day. The consumption of tea/coffee increased amongst the participants during lockdown, which was reported to be about 3-5 cups per day. This could lead to an improper absorption of various nutrients in the body and thereby can cause various deficiencies [1] [9].

When we talk about the exercises performed per day, about 26% of the participants reported no exercises and 12% reported rare exercise sessions, which contributed to physical inactivity during the lockdown. This finding supported the findings by Lippi G et al & Zhang X et al, 2020 [1] [10]. Stress was seen to increase in the study population. This occurred because of various reasons; the most common one's being financial insecurities and the increasing cases of the COVID-19 pandemic. This increasing stress led to anxiety and mood disorders, the most common being emotional breakouts. Increasing stress can also cause other problems such as Obsessive-compulsive disorders, somatic disorders, psychosis, and substance use disorders [8].

The downfall in the Indian economy in various sectors has an effect on the food choices made by the individuals because of their own financial downfalls [8]. The same result was found in the present study. About 22% of the participants reported downfalls in their financial conditions. 32% of the participants reported that the increased prices of fruits, vegetables and other goods affected their consumption in some way, irrespective of their financial status. Hence, it can be concluded that a downfall in agriculture led to an increase in the prices of the most commonly used fruits and vegetables and this in turn, led to a decreased consumption of them amongst the local population which may lead to various nutritional deficiencies in the future.

Below are some practical tips which can be followed by the local population in order to eat healthy and stay fit during the lockdown imposed because of COVID-19 pandemic:

1. Look for more locally available fruits and vegetables, including apples, watermelons, oranges, spinach, fenugreek, potatoes, onions, etc.
2. Prepare foods which contain more of legumes, cereals and other food groups, rather than relying on ready-to-eat foods.
3. Include a variety of foods in the daily routine.
4. Include immunity-boosting foods that are high in Vitamin A, Vitamin C, Zinc and Protein.
5. Ensure to get enough protein from the diet, about 1-1.2grams/kg body weight for the wear and tear of the body.
6. For hobbies such as baking, use healthier ingredients such as oats/ ragi instead of refined flour.
7. Indulge yourself in physical activities or home workouts.
8. Develop new hobbies to keep yourself busy.
9. Do not panic/stress over things. Mental health is important. Talk to people close to you.
10. Get proper sleep for at least 8 hours per day. Maintain proper sleeping hours.

The present study can however be used to determine the effects of different behaviors affecting food habits and choices. Also, it can be used to study how the financial conditions of the individuals affected their food choices.

6 Conclusion

The present study aimed at observing the changes in dietary patterns caused in participants from Mulund, Mumbai, India because of the imposition of a lockdown to fight COVID-19 pandemic. It consisted of 50 participants, 25 males and 25 females. The results concluded that certain changes were observed, which occurred mainly because of the unavailability of basic foods such as fruits and vegetables. Other factors responsible for causing the observed changes included changes in financial conditions, cravings, etc. The most commonly observed changes were increase in the snacking habits and tea/coffee consumptions, increased intakes of ready-to-eat foods, decrease in the intake of fruits, vegetables, legumes and other healthy foods and an increase in mental stress. Although the workload in the study population was lower than before, the mental stress increased due to reasons like financial insecurities and instabilities, presence of co-morbidities and stress about the ongoing pandemic. It was observed that people relied on sweet foods to satisfy their cravings, along with fried, fatty and processed foods. Also, the physical activity levels decreased in the population to an extent which could be a home for future diseases.

7 Declarations

7.1 Study Limitations

The present study had certain limitations. It could not determine the factors in depth related to mental health which affected the food choices of the participants and it could not determine the durations of physical activities that the participants indulged themselves in.

7.2 Acknowledgements

I'd like to thank the Almighty for His blessings and my family for being the constant support throughout this research. Also, I'm grateful to all the participants who actively participated in the research. I would also take a moment to thank all the researchers who have conducted researches relating to the present topic in the past.

7.3 Informed Consent

Informed consent was taken from each respondent.

7.4 Competing Interests

The author declared that no conflict of interest exists in this publication.

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Supplementary Materials

Appendix 1: Questionnaire administered to the participants.

1. Basic information-
Name-
Age-
Gender-
Height-
Weight-
BMI-
Highest education qualification-
Profession-
No. of people in the family-

2. Do you have any health problems?
- Yes
- No

If yes, what are they?
- Cardiovascular disease
- Diabetes
- Hypertension
- Chronic respiratory disease
- Hypo/Hyper thyroidism
- Cancer history
- Others

3. For how long have you been in quarantine?
- Less than 7 days
- 7-10 days
- 10-14 days
- 15-20 das
- More than 20 days

Do you think staying at home makes you more stressed than that you were before the lockdown?
- Yes
- No

If yes, why do you think that the stress increased?
- Emotional stress causing breakouts
- Financial insecurities
- Constant stress about falling a prey to the disease
- Stressing over the existing co-morbidities
- Unavailability the of basic food items

4. Do you think your eating habits have changed during the lockdown?
- Yes
- No

If yes, what did it lead to?
- Increase in food portion size
- Decrease in food portion size

5. Has the frequency of eating increased during the lockdown for you?
- Yes
- No

6. Has the intake of fried/ fatty foods increased for you during the lockdown?
- Yes
- No

7. Is there any change in the amounts of fruits and vegetables you consume per day?
- Yes
- No

If yes, have they-
- Increased
- Decreased

8. Do you work from home during the lockdown?
- Yes
- No

If yes, how many hours do you work for in a day?
- Less than 2 hours
- 2-4 hours
- 4-6 hours
- More than 6 hours

9. Has there been any change in your economic conditions since the lockdown?
- Yes
- No

If yes, has your economical condition affected your food choices in any way?
- Yes
- No
- Sometimes

10. Do you think there has been any change in your main meal consumption patterns during the lockdown?
- Yes
- No
- Frequently
- Rarely

If yes, what are they?
- Increase in the amount of main meals
- Decrease in the amount of main meals
- The time of consumption of my main meals has changed
- The preferred food for my main meals has changed
- The frequency of consumption of my main meals has changed

11. Has there been a change in the cooking method used to cook your main meal?
- Yes
- No

If yes, which is/are the most appropriate to you from the following?
- I prefer consuming legumes more
- I prefer consuming vegetable dishes more
- I prefer ready-to-eat foods
- I prefer fried foods for my main meal
- I prefer animal-based foods
- I prefer foods which require minimal preparation

12. Do you think there has been any change in the snacking pattern during the lockdown?
- Yes
- No

If yes, has it-
- Increased
- Decreased

13. Has there been any change in your fluid intake during lockdown? (includes only water)
- Yes, it has increased
- Yes, it has decreased
- No change

14. Has your tea/coffee consumption been affected by the lockdown in any of the following ways-
- Yes, it has increased
- Yes, it has decreased
- No change

15. Do you perform any exercises / home work out during the lockdown?
- Yes
- No
- Sometimes
- Rarely

By signing below, I am indicating that this form has been explained mean have understood it. All Questions About The Evaluation Have Been Answered. Indicate that I have understood the way in which the evaluation data may be used and how my privacy will be protected. By signing this form, I am agreed to participate in the study.

Name of the participant:

Signature of participant:

Date

I CERTIFY THAT I HAVE BEEN EXPLAINED FULLY TO THE ABOVE SUBJECT DENATURE AND PURPOSE, PROCEDURES AND THE POSSIBLE RISK AND POTENTIAL BENEFITS OF THIS EVALUATION

Signature of principal investigator

Date