



NOVEL CORONAVIRUS OUTBREAK- EATING PATTERN AND OTHER LIFESTYLE CHANGES OF SELECTED PARTICIPANTS DURING LOCK DOWN

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ABSTRACT

The present work aimed at studying the food intake and lifestyle changes that might have occurred during pandemic among healthy individuals due to self-quarantine at home. The data was collected from 150 randomly selected participants in Bengaluru city, South India using a structures questionnaire framed using Google forms. The results of the study revealed that majority (73%) of the participants were working from home and almost all followed the precautionary measures to protect themselves against infection. The anthropometric data revealed that majority (32%) were overweight and 17% were obese with little or no physical activity from following a dedicated routine exercise pattern. The screen time on gadgets was more for majority and shortage of few hours of sleep was observed in 15% of the participants. Study data revealed changes in food consumption pattern, increased cravings for specific foods in majority (63%) with an inclination towards including an extra snack item in between meals every day. Overall, the study highlights the need for voluntary monitoring of food intake and life style changes among people in order to see that no major changes in the body weight as well as health happens during the lock-down period and some important recommendations are also given for health and well-being during this challenging time.

KEYWORDS: Lock-down, self-quarantine, food intake, craving, physical activity, recommendations

I. INTRODUCTION

Coronavirus illness 2019 (COVID-19) is an infectious disease caused by the virus strain “severe acute metabolic process syndrome coronavirus 2” (SARS-CoV-2).¹ The disease was first identified in 2019 in Wuhan, China, and has spread globally, resulting in the 2019-20 coronavirus pandemic.² World Health Organization declared COVID-19 outbreak as a Public Health Emergency of International Concern³. This pandemic situation at present is rapidly evolving⁴ and the situation required a coordinated global response. The infection is often transmitted from one person to another via respiratory droplets produced through coughing and sneezing.¹ The hatching time frame for COVID-19 is commonly five to six days yet may go from two to fourteen days.⁵ Common symptoms include fever, cough, aches, shortness of breath runny nose and sore throat. Muscle pain, sputum production and raw throat area unit less common. While the majority of the cases end in gentle symptoms, some attain severe pneumonia and multi-organ failure.^(1,6) There is no vaccine or specific antiviral treatment for COVID-19. Management involves treatment of symptoms, confirming care, isolation, and experimental measures.⁷

Key part of handling the COVID-19 pandemic is attempting to decrease the epidemic peak, referred to as knocking down the epidemic curve through numerous measures to lessen the charge of new infections. So, many measures have been taken by the government around the world to check the spread of virus. The government of India also announced a countrywide lockdown for three weeks starting 24th March and is extended up to 17th May 2020 to slow down the rapid spread of COVID-19.⁸ Several

steps have also been taken by the Government, from introducing Aarogya Setu App to stay alert and informed against COVID-19, a digital bridge to fight against COVID-19 to developing various guidelines for the public to not panic against COVID-19.⁹

Recommended measures to forestall infection includes washing hands frequently for at least 20 seconds at a time with warm water and soap. Other measures emphasized on are: not to touch face, eyes, nose, or mouth when the hands are dirty, not going out if feeling sick or have any cold or flu symptoms, staying at least 3 feet from source away from anyone who is coughing or sneezing, covering mouth with the inside of the elbow when sneezing or coughing, and throwing away any tissues used right away. Cleaning of surfaces or objects touched frequently and use of disinfectants on objects like phones, computers, utensils, dishware and doorknobs has also been emphasized on as precautionary measure.²

Apart from all the precautionary measures mentioned, a strong immune system is essential to safeguard individuals from getting infected easily during Pandemic. Good nutrition is a key for strong immune system and health. Balanced intake of food is essential to maintain health. Another factor to be monitored during lock-down for healthy individuals is food cravings, as it is extremely common. It is essential to curb the temptation of eating in between meals when not hungry. Limited access to fresh foods may lead to an increased intake of highly processed foods, which tend to be high in fats, sugars and salt. Such changes in the eating behavior may have a negative impact on the immune system and the overall well-being of the individual's globally.¹⁰ Thus, during self-quarantine at home during lock-down, it is very important to keep a watch on eating habits and physical activity pattern in order to achieve optimum nutritional status and maintain a robust immune system.

Currently, the use of gadgets like mobile phones and computer/ laptops has increased and the screen time of majority working from home has also increased. The present situation of lock down has altered the routine of majority of people across the globe and it might have an impact on the general health of the people if they are not aware of ways in which they can keep themselves fit by including a balanced diet and staying active throughout the day. Emphasis on nutritional education is also important at this time. The present study assessed the changes in dietary and lifestyle pattern among selected healthy individuals who were at home during lock-down period and recommendations for health and well-being during Pandemic for normal individuals without infection has also been given.

II. METHODOLOGY

Study Design

2.1 Sample Selection: The present study was designed keeping in mind the importance of social distancing during COVID-19 lock down as per the government regulations. A random data collection from 150 participants using a structured questionnaire framed using Google forms was initiated. The links were circulated among the contact lists in India. 30 male and 120 female participants between the age group of 20 to 60 years were included for the study after taking their consent to participate in the study. The data collection was started beginning of April 2020 and lasted till third week of April 2020. During this period, the Lockdown was in motion and there was already some observable changes in the people especially with respect to food intake pattern and time spent on gadgets evident through all the social media posts with people experimenting on various food preparations at home every day. Data on anthropometric measurements, dietary pattern, physical activity, sleep pattern and recreational activities included by participants were also recorded in the questionnaire.

2.2 Somatic Status: Anthropometric Measurements – Self-reporting of Height (cm) and Weight (kg) measurements in the Google form was considered and using the measurements the indices Body mass index (BMI) was calculated using the formula (weight in kg) / (height in m²). Weight status was classified in accordance to cut off values for BMI recommended by World Health Organization (WHO,1998)¹¹

2.3 Personal History: An elaborate questionnaire was used to collect the background information (Age, gender, nationality, education, occupation) of the participants along with other information on precautionary measures followed during lock down phase.

2.4 Dietary Habits: The dietary intake was collected regarding- type of food consumed, frequency consumption of certain food groups, meal pattern, food cravings, consumption of junk foods, processed food, ready to eat food, carbonated beverages, sweets and bakery foods consumed during the lock down period.

2.5 Interpretation and Analysis of the Data: Keeping the objectives in mind, the data collected was tabulated and subjected to appropriate statistical analysis to interpret the results. The data was expressed in number and percentage. Chi-square 'Goodness of fit' test was used to know the significance level.

III. RESULTS AND DISCUSSION

The objective of the study was to observe if there was any lifestyle changes happening due to lock down during work from home situation. Background information of the selected participants (Table-1) revealed that maximum 41% were in the age group 31-40 years. Among the total participants, 62% and 31% were post-graduates and graduates respectively. Majority (73%) of the study group were working professionals and only 19% were not gainfully employed. Statistical analysis showed significant difference which was extremely high. The significant difference observed was due to unequal distribution of the subjects between the groups.

Table - 1: Background Information of the Participants

Gender	No	%	p
Male	30	20	0.0001****
Female	120	80	
Age Distribution			
21-30	44	30	0.0001****
31-40	62	41	
41-50	24	16	
51-60 and above	20	13	
Education			
Studying in College	11	7	0.0001****
Graduate	46	31	
Post-graduate	93	62	
Occupation			
Student	12	8	0.0001****
Working professional	110	73	
Not gainfully employed	28	19	

Chi-Square "Goodness of Fit" Test**** P< 0.0001- Extremely significant

Table-2 gives details of participants with respect to their awareness about the current situation. 95% of the participants were aware of the pandemic and most of them (31%) reported to be staying home since, 13-18 days of the announcement of lockdown. Majority of the participants (93%) were aware of the government regulations and precautionary measures to be taken to keep themselves and their family's safe during COVID-19. The results are indicative of the fact that all the efforts taken by the Government in spreading awareness on precautionary measures were being followed by the selected participants.

Table - 2: COVID-19 Pandemic Awareness of Participants

Aware of COVID-19 Pandemic	No	%	p
Yes	142	95	0.0001****
Now I know the meaning of pandemic	8	5	
Number of Days - Staying Home			
10-12	36	24	0.0434
13-18	47	31	
19-21	24	16	
>21	43	29	
Following Government Guidelines			
Yes	150	100	
Preventive Measures in Spreading of COVID-19			
Clean hand with alcohol based rub or wash hands with soap	2	1	0.0001****
Self-distancing	4	3	
Avoid not touching Mouth, eyes, nose	2	1	
Keeping up to date information on COVID-19 hotspots	-	-	
Staying home when unwell	2	1	
Making sure to follow respiratory hygiene	1	0.5	
All the above	139	93.5	

Chi-Square "Goodness of Fit" Test. $P > 0.05$ – Not Significant **** $P < 0.0001$ - Extremely significant

Table-3 presents the somatic status of the study group, where self-reported measures were used to calculate the BMI. Mean weight of male (73 ± 9), irrespective of their age group was higher compared to female participants (57 ± 10.1). The body mass index was calculated using Quetelet index. Although, most of the times people shy away or do not report exact weight or even report less weight with a fear of being ridiculed. It was interesting to note that according to the WHO classification of weights as furnished by participants (WHO, 1998)¹¹, there were considerable number of them who fell in the category of overweight and obesity among both male and female as can be seen in Table-3. It was observed that female participants had higher BMI of 33.6 ± 2.7 in comparison to male (31 ± 0.7), indicating obesity. Figure-1 depicts that 32% of the total participants were overweight and 17% obese. While, some did fall under under-weight category in female (4%), this data could be true or it could be an underestimation of the weight too as it is being self-reported. According to the WHO estimates, the undernourished population in the world has declined and is roughly around 1.2 billion, whereas the over nourished population has increased to 1.2 billion.¹² Studies carried out in India on the prevalence of overweight and obesity among women (Sangeetha G, et.al., 2016), shows 12.7% to be overweight and 29.6% obese.¹³ Similarly, another study by Kutlu R, et.al. (2017) showed the prevalence of overweight and obesity to be 30.8% and 47.7% respectively.¹⁴ In the present work, the attention is being more focused on people whose BMI is showing above 25 and 30 as the life-style changes that might happen among these is of concern and they are the ones who might need recommendations for health and well-being during self-quarantine at home.

Table - 3: Anthropometric Measurements of the Participants

Anthropometric Measurements and Indices	Mean Male (n= 30)	SD	Mean Female (n=120)	SD
Height (cm)	169	8.2	157.3	6.4
Weight (kg)	73.4	9	63.5	12
Body Mass Index (BMI)	25	2.9	26	5
BMI Category				
Underweight (<18.5 kg/m ²)	-	-	16.5	1.2
Normal (18.5-24.9 kg/m ²)	22.8	1.0	22.3	1.6
Over-weight (25-29.9 kg/m ²)	27.1	1.3	27.7	1.4
Obesity (>30 kg/m ²)	31	0.7	33.6	2.7

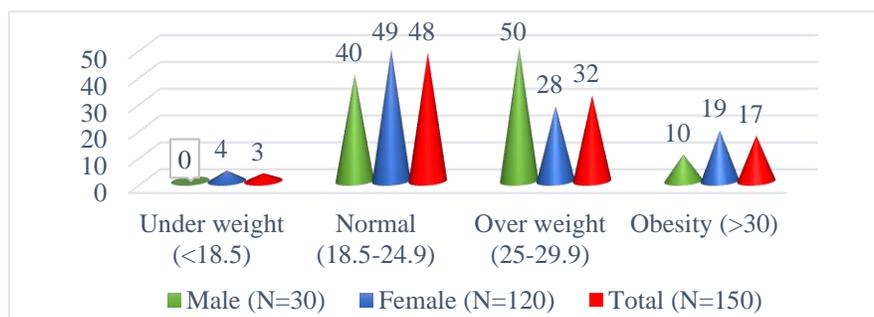


Figure - 1: Classification of BMI According WHO Standards

Food preferences (table - 4) of the participants showed that 52% were vegetarian. Most of the study group followed a three meal pattern (40%). 42% mentioned that they were following a 4 meal pattern with an extra evening snack added due to staying home, 12% reported a 5 meal pattern. 63% showed that, there was a change in the eating pattern during lockdown but still 51% did not have any increase in their intake which was statistically significant.

Figure - 2 depicts the consumption pattern of some food items among the study group. 40% reported to be non-vegetarians and included non-vegetarian food items like chicken, fish and egg once a week (38.8%) or twice a week (25.4%). 45% of the participants were observed to consume vegetables twice a day, while 35% included only once a day in their meals. Fruits consumption was found to be everyday among 60% of the participants. Fruits and vegetables supply vitamins and minerals to the diet and are sources of phytochemicals that function as antioxidants, phytoestrogens, and anti-inflammatory agents.¹⁵ and they are rich sources of antioxidants. Antioxidants are compounds that fight against free radicals in the body. It also reduces the oxidative stress.¹⁶ Apart from phytochemicals, fruits and vegetables are good sources of dietary fiber and they also play a major role in reducing weight. A study by K He. et.al, (2004), examined the changes in intake of fruits and vegetables in relation to risk of obesity and weight gain among middle-aged women. The findings suggested that increasing intake of fruits and vegetables may reduce long-term risk of obesity and weight gain among middle-aged women¹⁷. In the present study, fruit was not included daily by around 40 percent of the population, 29 percent reported to include it 'sometimes'.

Table – 4: Eating Pattern of the Participants during Lockdown

Characteristics	No	%	p
Food Preference			
Vegetarian	79	52	0.0001****
Non-Vegetarian	59	40	
Ova-Vegetarian	12	8	
Meal Pattern			
2 Meals a day (Breakfast and Dinner)	4	3	0.0001****
Breakfast, Lunch and Dinner	61	40	
Breakfast, Mid-morning, Lunch, Dinner	4	3	
Breakfast, Lunch, Evening snack, Dinner	63	42	
Breakfast, Mid-morning, Lunch, Evening snack, Dinner	18	12	
Change in Eating Pattern			
Yes	94	63	0.0001****
No	39	26	
May be	17	11	
Increase in Meal Pattern			
Yes	42	28	0.0001****
No	76	51	
May be	32	21	

Chi-Square "Goodness of Fit" Test, **** P < 0.0001- Extremely significant

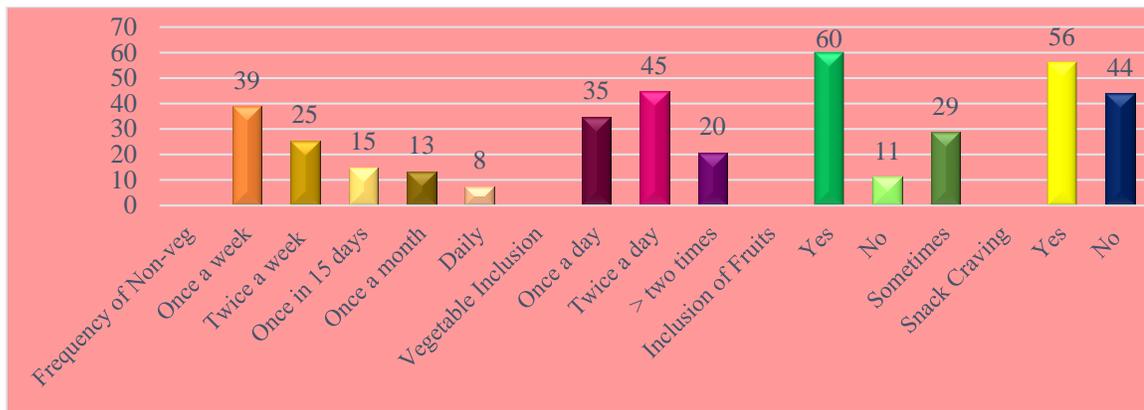


Figure - 2: Frequency Consumption of Certain Food Stuff

Data on food cravings revealed that 56% participants were craving for snack while staying home (Fig-2). It was observed that 44% were consuming chats, 30% preferred bakery foods like bread or biscuits and 20% consumed fried foods. 35% included bhel or some preparations from puffed rice. Sweets and steamed foods consumption was very less, (14% and 11% respectively). Data revealed that only 3% did not include any extra snack in particular during this period (Fig-3).

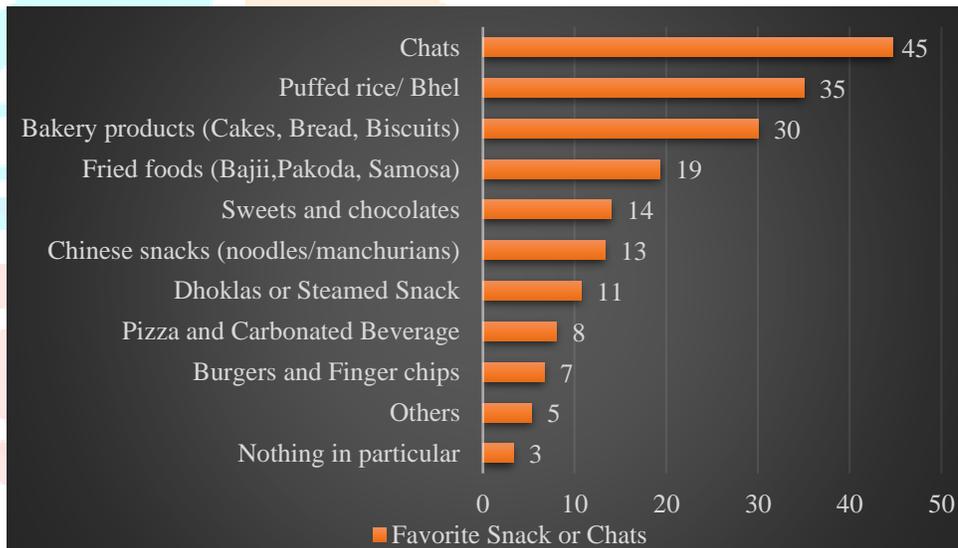


Figure - 3: Favorite Snacks of Participants in the study

Consumption of healthy snack items was also observed among some of the participants. The data on healthy snack consumption (Fig-4) among participants, showed that maximum 43% preferred nuts compared to sprouts (28%) and salad or fruit bowl (24%). According to Monitoring Project on Risk Factors for Chronic Diseases (MORGEN)-EPIC (European Investigation into Cancer and Nutrition) population-based cohort study, there was some evidence, that the consumption of energy-dense snacks (e.g., sweets, cakes, pastries, and savory snacks) was positively associated with an annual increase in weight among normal- to overweight adults.¹⁸ Contrarily, recent study by Njike et al. found that the consumption of nut-based snack bars for 12 week (compared with conventional snack bars) did not result in any weight change; however, they did observe reductions in percentage of body fat and visceral fat in overweight participants.¹⁹ In the present study, the food intake pattern showed craving for certain food items and inclusion of an extra snack (healthy or energy dense) in daily meals of some of the participants. It is one of the important observation of the study showing a changing in the food intake pattern. An interesting observation made during this time was that many took on social media to post the food items they prepared / consumed daily. Figure-5 depicts the different types of snack prepared and posted on social media by some of the participants during lock down.

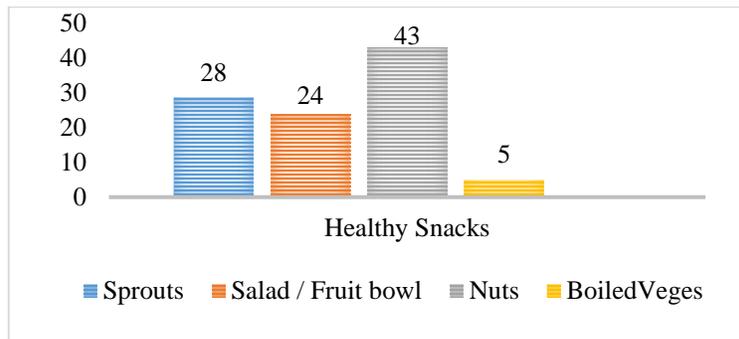


Figure - 4: Healthy Snack items included by some Participants



Figure - 5: Snacks Prepared and Posted on Social Media by Some Participants

Figure-6, illustrates data on physical activity of participants. Due to lockdown, the participants were observed to follow some forms of exercise indoors. Data showed that 21% were performing yoga, 41% were involving themselves in household activities and considered that as a form of exercise. Maids are important household help in Indian homes and due to absence of visiting maids at home daily, all the household activities were being performed by majority of the participants. The data revealed the fact that many considered household activity itself as a form of exercise and never included any other forms of exercise and thus, there is a need for tailored interventions to enhance physical activity at a limited space during staying at home.

Lockdown has provided extra leisure time to people to perform things they love and also to explore their hidden talents. Data revealed that participants involved themselves in recreational activities. Results showed that 44% were learning to cook and tried new recipes every day, 39% and 8% participants loved reading books and writing articles. 11% included drawing or painting, 14% involved themselves in singing and 13 % meditated daily (Fig-7). With COVID-19 spread across the world, and the increase in number everywhere, majority living indoors to protect themselves do require some form of activities to get rid of the boredom that they might be prone to. The inclusion of such activities help them overcome the boredom and the results of the study does reveal that majority did follow some or the other form of recreational activities.

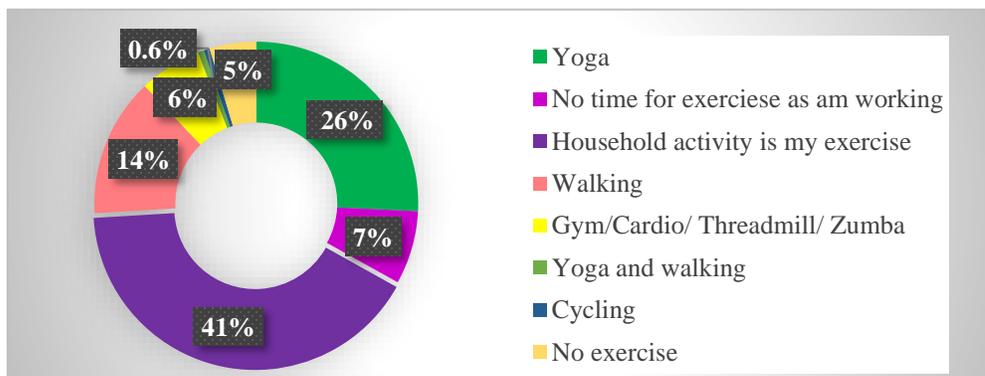


Figure - 6: Physical Activity during Lockdown Phase

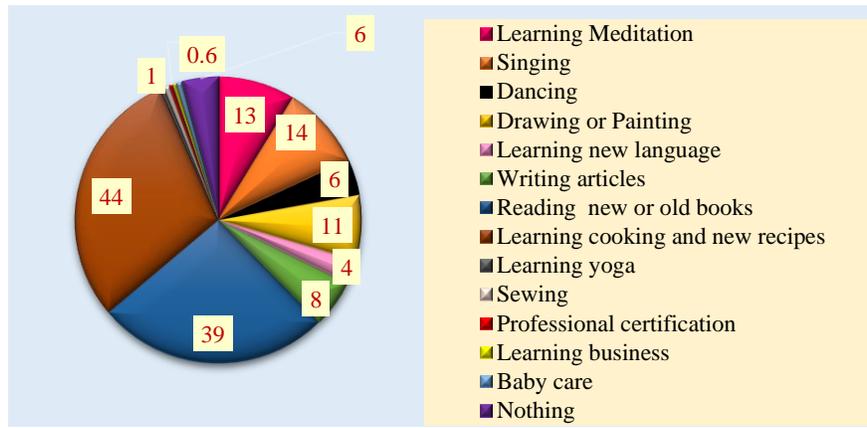


Figure - 7: Recreation Pattern of the Study Participants

Data in Table-5 indicates that due to lock-down, work from home (WFH) was in operation and 30% of the participants used their gadgets for about 6 to 8 hours a day. The result was also indicative of the fact that the screen time of participants was more and sleep pattern although showed satisfactory results for 51% with 7-8 hours of sleep a day, the remaining 33% and 15% were short of few hours of quality sleep with 6 -7 hours and 5-6 hours of sleep respectively. Significant difference (extremely high) was observed with the use of gadgets as well as in sleep patterns of participants.

Table - 5: Duration of Use of Gadgets and Sleep Pattern of Selected Participants

Usage of Gadgets	No	%	p
Less than 30 minutes a day	6	4	0.0001****
1-2 hours	35	23	
3-5 hours	65	43	
6-8 hours	44	30	
Sleep Pattern of the Participants (Hours of sleep)			
4-5	2	1	0.0001****
5-6	23	15	
6-7	49	33	
7-8	76	51	

Chi-Square "Goodness of Fit" Test **** P < 0.0001- Extremely significant

IV. RECOMMENDATIONS

Nutritional status of the people is mainly influenced by the food they consume. A balanced tasteful food gives rise to exhilaration, physical strength and vigor, mental competence, nourishment, energy, satisfaction and pleasure which plays a vital role during such catastrophe situation. Along with a healthy diet immune boosting nutrients, is emphasized as they act as a protective nutrients to safeguard the body's defence system. It is essential now that the food intake and food cravings be self-monitored by individuals staying home or working from home along with monitoring the screen time spent on gadgets. Thus, living with a positive mind-set, consuming balanced diet, including some form of exercise and a good sleep of 7-8 hours will definitely help maintain the health and well-being while staying at home. Self-quarantine can also cause an additional stress and challenge the mental health of the people. Physical activity and relaxation techniques can be valuable tool to help remain calm and continue to protect health during this time. Table-6, gives some recommendations for health and well-being for healthy individuals without infection during self-quarantine at home due to lockdown.

Table - 6: Recommendation for Health and Well-being during Lockdown Period

Recommendations	
1.	Follow all the precautionary measures given by the Government authorities in the country to keep yourself and your family safe from viral infection.
2.	No single food can meet all the nutrient needs of the body hence, <ul style="list-style-type: none"> • Emphasize on choosing a daily diet that includes foods from all the food groups • Depending on food habits and cultural practices, choose foods from Cereals, Legumes & pulses, Vegetables, Fruits, Milk and its products, Eggs, Fleshy foods, Fats and oils, as well as Nuts and oilseeds • Drink at least 8-10 cups of filtered/potable water to stay hydrated.
3.	Vitamin A and C are known to boost the immune system. <ul style="list-style-type: none"> • Vitamin A can be sourced from yellow and orange colored vegetables and spinach and other green leafy vegetables • Citrus fruits like lime, lemon, oranges etc., are rich in Vitamin C. • Choose to eat a whole fruit rather than drinking fruit juice.
4.	Probiotics like yoghurt, laban and fermented food items like idli, dosas are excellent sources to rejuvenate the composition of gut bacteria that aid in the nutrient absorption by the body. Make these food items a part of your daily diet.
5.	Include traditional spices in cooking like pepper, turmeric, ginger, coriander seeds, star anise etc., as they are known to have beneficial effects.
6.	Self-monitor your food intake. <ul style="list-style-type: none"> • Binge eating to be monitored to avoid weight gain • Curb the temptation to eat in-between meals when not hungry • Choose healthy snacks during snack time instead of fried, processed and packaged food items.
7.	Follow all food safety and hygiene steps to stay safe and healthy. Avoid wastage of food.
8.	Stay active by including some form of physical activity. <ul style="list-style-type: none"> • Practicing yoga, push-ups, skipping, following guided sessions of aerobics online or using recorded videos, brisk walking inside the house, being physically active throughout the day • Avoid long periods of resting
9.	Monitor the screen time on the gadgets
10.	Mental health is important for overall health of an individual. <ul style="list-style-type: none"> • Follow a routine through meditation, yoga, breathing exercises • A restful quality sleep is essential to facilitate relaxation to the restless mind.

V. CONCLUSION

A Healthy lifestyle involves consuming nutritious diet, physical activity and exercise, maintaining good emotional and mental health along with a good sleep pattern. Today, many changes have occurred in the lives of everyone because of a virus for which mankind is yet to discover a vaccine for. The present study was a baseline nutritional screening study while staying at home during lockdown which revealed that, obesity was prevalent among majority of the participants with a reduced daily physical activity. There was increased screen-time due to use of mobile phones and laptops, leading to a sedentary lifestyle among the selected participants. Additionally there was a hike in snacking along with an increase in the number of meals consumed. It is important now to create awareness on balanced diet and healthy eating habits among people. The food that has been passed on since generations are definitely capable of providing sustenance to strengthen the immune system, which is the need of the hour. Overall, it is time to act as a volunteer to safeguard oneself and the family from the infection and also to watch out for major changes in the food intake and lifestyle pattern which might be a cause of concern once we are out of this challenging time.

VI. ACKNOWLEDGEMENT

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REFERENCE

1. Vinayaka AM. "Things to be Know about the Coronavirus Illness (The Era of Covid-19)". *Acta Scientific Nutritional Health* 4.5 (2020): 03-09.
2. "2019 Novel Coronavirus (2019-nCoV)". Centers for Disease Control and Prevention (2020).
3. Adhikari et al. Epidemiology, causes, clinical manifestation and diagnosis, prevention and control of coronavirus disease (COVID-19) during the early outbreak period: a scoping review *Infectious Diseases of Poverty* (2020) 9:29, 1-12.
4. DIKID et al: Responding to COVID-19 pandemic: Why a strong health system is required. *Indian J Med Res* 2020.
5. Chen H., et al. "Clinical characteristics and intrauterine vertical transmission potential of COVID-19 infection in nine pregnant women: a retrospective review of medical records". *Lancet* 395 (2020): 809-815.
6. World health organization (WHO), Coronavirus disease (COVID-19) outbreak, https://www.who.int/health-topics/coronavirus#tab=tab_1
7. "2019-nCoV: preliminary estimates of the confirmed-case-fatality- ratio and infection-fatality-ratio, and initial pandemic risk assessment". instituteofdiseasemodeling.github.io (2020).
8. Priyanka Pulla. Covid-19: India imposes lockdown for 21 days and cases rise. *BMJ* 2020; 368:m1251 doi: 10.1136/bmj.m1251 (Published 26 March 2020)
9. Ministry of Family Health and Welfare. [<https://www.mohfw.gov.in/>]
10. World Health Organization, Europe. Coronavirus disease (COVID-19) outbreak. Food and nutrition during self-quarantine: what to choose and how to eat healthily. doi:10.1038/oby.2011.62.
11. World Health Organization (1998) Obesity preventing and managing the Global Epidemic: Report of a WHO consultation on obesity. Geneva: World Health Organization.
12. Misra A, Khurana L (2008) Obesity and the metabolic syndrome in developing countries. *J Clin Endocr Metab* 93: 9-30.
13. Sangeeta G, Sarit S, Anurag C, Priya B, Mahesh S (2016) An Epidemiological Study of Overweight and Obesity among Women in an Urban Area of North India, *Indian J Community Med* 41: 154-157.
14. Kutlu R, Cihan FG (2017) Comparison of the body compositions in obese and non-obese individuals: Can learning body compositions motivate losing weight? *Nigerian Journal of Clinical Practice* 20: 83-87.
15. Joanne L. Slavin, and Beate Lloyd. Health Benefits of Fruits and Vegetables. *Adv Nutr.* 2012 Jul; 3(4): 506–516.
16. Carlsohn A, Rohn S, Mayer F, Schweigert FJ. Physical activity, antioxidant status, and protein modification in adolescent athletes.

17. K He, F B Hu, G A Colditz, J E Manson, W C Willett, S Liu. Changes in Intake of Fruits and Vegetables in Relation to Risk of Obesity and Weight Gain Among Middle-Aged Women. *Int J Obes Relat Metab Disorder*. 2004 Dec;28(12):1569-74. [PMID: 15467774]
18. Hendriksen MA, Boer JM, Du H, Feskens EJ, van der A DL. No consistent association between consumption of energy-dense snack foods and annual weight and waist circumference changes in Dutch adults. *Am J Clin Nutr* 2011;94:19–25.
19. Rolls BJ, Roe L, Meengs JS. Larger portion sizes lead to a sustained increase in energy intake over 2 days. *J Am Diet Assoc* 2006;106:543–9.

