Dietary fat intake pattern of adults during the COVID-19 pandemic in the City of Mumbai, India

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ABSTRACT

Obesity is a growing public health issue across the globe and in India, which is increasing the risk of other chronic diseases. High quantity of fats and imbalance of fatty acids, contribute to inflammation, and faster disease progression. To study the food-based dietary fat intake patterns of adults during COVID-19 outbreak in the city of Mumbai, India. Adults (n=103), both males and females (30-60 years of age) were selected from one of the cities in India, Mumbai, by purposive sampling, meeting the inclusion and exclusion criteria. In this survey, KAP questionnaire was administered to understand the fat intake patterns. The data was analysed by SPSS 26 to obtain mean and SD, frequencies and percentages. Majority of the participants (60.2%) reported to be overweight, while only 27.2% of the participants reported with normal BMI. Sixty-six percent of the participants reported 'not checking' the nutrition labels before purchasing any packaged food items; 32% showed to be never changing their cooking oils; and 51.5% of them reported to be re-heating the oil. The present study had majority of the participants leading a sedentary lifestyle due to pandemic situation and nation-wide lockdown. It also covers various aspects of lifestyle behaviours and eating habits, particularly of dietary fats which contribute as major risk factors to develop non-communicable diseases (NCDs).

*Keywords***:** *Dietary fats, fatty acids, dietary patterns, COVID-19 period, pandemic*

1. INTRODUCTION
The increasing incidence of lifestyle disorders of overweight, obesity, and related chronic diseases like metabolic syndrome (MS), high blood cholesterol, insulin resistance, hypertension, Non-Alcoholic Fatty Liver Disease (NAFLD), Diabetes, Poly-cystic Ovarian Syndrome (PCOS), and other Endocrine disorders and Cardiovascular diseases (CVD) are serious public health concerns across the world as well as rural and urban India (Little et al., 2016).This has been mainly attributed to an increased intake of fats. According to current estimate, the global prevalence of NAFLD among the general population may be as high as one billion. With this growing rate of NAFLD affecting both adults and children, it is likely to emerge as the leading cause of end-stage liver disease in the years to come (Kumar et al., 2020).

Adoption of unhealthy diets and declining physical activity are major contributors to the rising prevalence of MS in developing countries. Low physical activity, high intake of calories and macronutrients and low intake of micronutrients are some listed risk factors. In many developing countries, there is a rapid dietary transition with increased domestic production and import of oilseeds and vegetable oils. Consequently, there have been marked increases in edible oil consumption and energy density of the diet in urban areas and rural areas.

Due to lack of physical activity and intake of bad fats leads to chronic illnesses in the long run. While there are general health benefits associated with avoiding excessive dietary fat, i.e. reduced risk of obesity and cardiovascular disease, specific benefits for the treatment of gallstone disease need clarification (Mendez-Sanchez, 2007; National Institute of Health and Care Excellence, 2014). Hence, healthcare systems, clinicians, and scientists have focused on the medical, drug treatment model of disease that highlights intermediate, downstream, metabolic risk factors as established predictors of diseases rather than fundamental root causes such as diet and lifestyle (Mozaffarian et al., 2008). Adequate dietary fat intake along with lifestyle modification would reduce the risk of associated diseases.

A recent Indian study revealed that in India, 44% of adults had one or more of these non-communicable diseases (NCDs) like: diabetes, hypertension, high cholesterol, obesity and depression. A thematic analysis of the findings in this review found evidence

that demographic factors, social risk factors and adverse health behavioural factors are associated mental health problems in India (Devassy et al., 2020). The present study aims to understand the knowledge of Indian people on Dietary Fats. It is the need of the hour to create awareness and prevent the hazards caused by the intake of bad fats.

2. METHODS

2.1 Study design and data collection

A cross-sectional study design was used for the study. This included the adults falling in the age group between 30 to 60 years. A self-reporting questionnaire was prepared by the investigator by researching similar dietary questionnaires. Questions relating to their personal details, socio-demographic details, clinical history were asked. This questionnaire was emailed to the participants, who responded online. The assessment of knowledge, attitude and practices of dietary fats among the participants was done by administering a set of questions. The enrolled participants were further contacted by the investigator and guided over the phone about the study procedure and questionnaire as discussed further. The participants were asked to weigh themselves due to the pandemic related lockdown. The BMI of the selected participants was calculated by dividing the recorded body weight in kilograms by the square of the height in meters (kg/m2). The grades of obesity were defined based on these measurements (Pa et al., 2019). An informed consent form was taken from all the participants for their willingness to volunteer in the survey.

2.2 Sample technique and sample size

There were 100 participants selected from Mumbai, India by using purposive sampling technique, n=20 from each zone – East, West, North, South, Central zones of Mumbai; for equal representation across Mumbai and meeting the Inclusion and Exclusion criteria.

2.3 Inclusion and exclusion criteria

The participants within the BMI 40 kg/m2 were included in the study. Pregnant women and lactating mothers were excluded from the study. Participants having cancer, tuberculosis, asthma, pulmonary fibrosis, COVID-19 patients, dialysis and surgical patients, pancreatitis, acute respiratory disorders, typhoid, malaria, jaundice, history of neurological disorders like Parkinson's disease, Alzheimer's disease and epilepsy and history of psychological disorders were not considered.

2.4 Statistical analysis

Data analysis was performed using Statistical Package for the Social Sciences (SPSS) version 26 (IBM, New York, NY, USA). Data was expressed as the mean value $\pm$ standard deviation for continuous variables. The results were presented in Mean $\pm$ SD and percentages. Independent Sample T test was used to analyse the difference in nutrient intake, when classified according to gender. $p < 0.05$ was considered to be statistically significant with a confidence interval of 95%.

3. RESULTS AND DISCUSSIONS

3.1 Demographic profile

Out of 103 participants, males (48.5%) and females (51.5%) showed an almost equal gender distribution across the sample size. Majority of the participants were in the age-group of 30-50 years (80%), while 20% were in the age-group of 50-60 years. Most of the participants were 'working' category (79.6%). Majority of the participants were leading a sedentary lifestyle, reason being, they were working from home and due to the pandemic situation all the gymnasiums were closed down. Most of the people were restricted to step out for morning/evening walks also.

Table 1: Demographic profile of the participants (n=103)

Variable	Frequency (n=103)	Percent (%)
Age Group		
30-39 years	40	39
40-49 years	42	41
50-60 years	21	20
Gender		
Male	50	48.5
Female	53	51.5
Occupational Status		
Working		
Service	47	45.6
Business	14	13.6
Professional	21	20.4
Non-Working	21	20.4

3.2 Body mass index of the participants

The body mass index (BMI) of the study participants was calculated by dividing their body weight in kilograms by the square of their height in meters. The result showed that the average height of males was 171.2±6.31 cm. The average weight of males was 78.7±9.05 kg and the average BMI of males was 26.9±2.81 kg/m2. The average height of females was 158±5.65 cm. The average weight of females was 67.6±9.6 kg and the average BMI of females was 27.1±3.78 kg/m2.
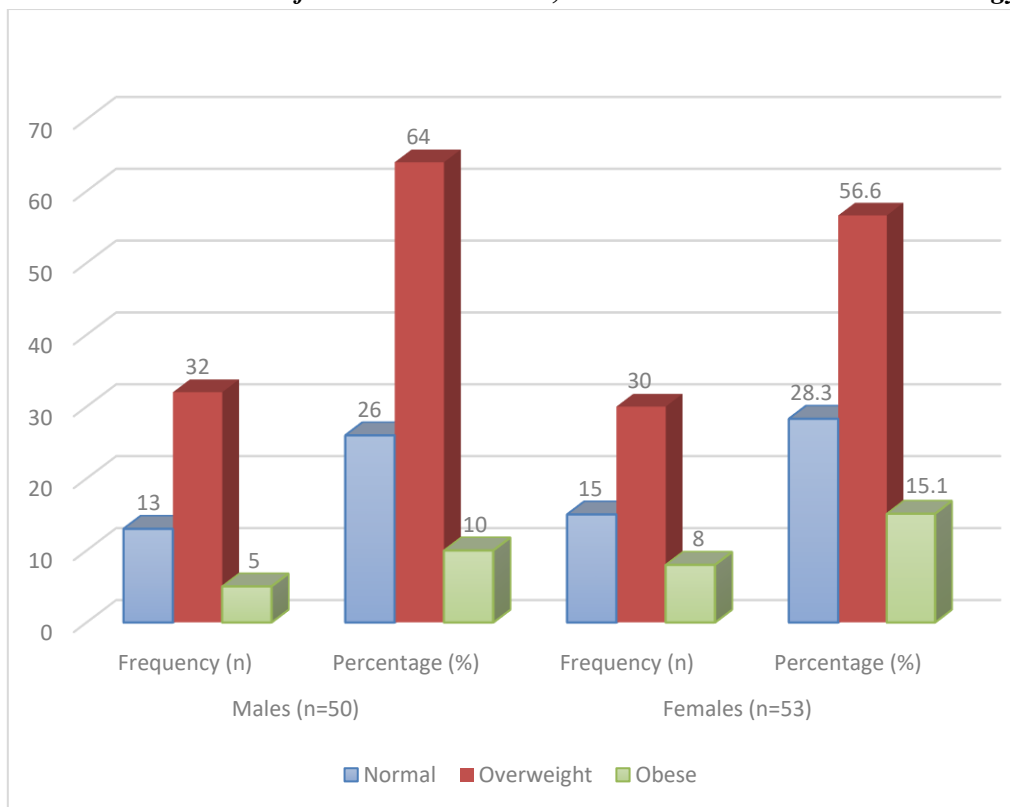
Figure 1: BMI classification of the participants

The data shown in Figure 1 represents that 26% males and 28.3% females had normal BMI. The overweight category included 64% males and 56.6% females. The obese category had 10% male and 15.1% female participants. When the participants were categorized according to the BMI standards of classification, it was observed that only 27.2% of the participants had normal BMI and 60.2% of the participants were overweight. The obese category was found to be 12.6%.

Similar findings were reported where, out of 812 subjects, 53.8% females and 46.2% males had normal BMI. There were 55.4% females and 44.6% males who were recorded to be overweight. The obese category included 76.9% females and 23.1% males (Little et al., 2016). Overweight and obese urban adults are at greater risks to develop NCDs like heart problems, diabetes mellitus, fatty liver etc. Hence the need for the present study, to generate awareness among urban adults.

3.3 Knowledge about dietary fats of the participants
The results displayed in Figure 2 showed that, 18.4% participants were unaware of 'Fat being an important' macronutrient. 81.6% of the participants considered it to be important. Also, 36.9% participants gave 'correct' responses on asking about 'Energy from fat', 50.5% participants gave 'incorrect' responses, while 12.6% of the participants were unaware of it.
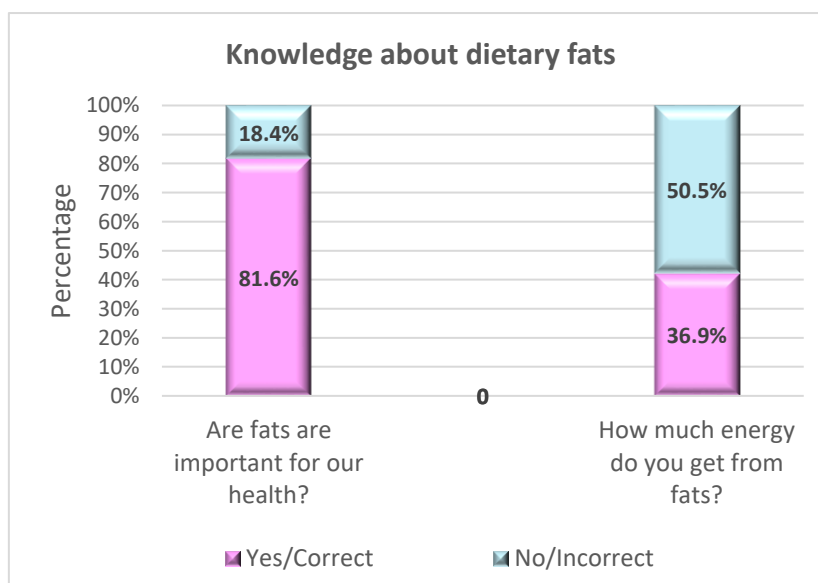

Figure 2: Percentages showing knowledge about dietary fats among the participants

Similar findings from researchers reported in one of the recent Indian study that one in ten of the total study participants (100) reported that foodstuff having lesser fat and oils as balance diet (Ajantha et al., 2015).

3.4 The attitude and practices towards cooking oil among the participants

Out of 103 study participants, 66% of the participants refused for checking the fat content before buying any packed product, while only 34% reported to be checking the fat content of any/all packed products.

An Indian study reported that out of 430 subjects, there were 37.7% consumers, who read 'nutrition facts' label. Another Indian cross-sectional study conducted in Delhi and Hyderabad reported that 92% of the participants reported of referring the food labels for checking quality and genuineness. Only one-fifth of the participants reported that they will check food labels for nutritive values. Therefore, this study was needed to assess the behavioural risk factors contributing to non-communicable diseases (NCDs) among urban adults (Ganesh and Vakayil, 2019).

From Table 2, it was observed that 83.5% used refined oil, 12.6% participants used filtered oil. There were very low percentages of participants who were using unprocessed (1.9%) and cold-pressed (1.9%).

Table 2: Attitude towards using cooking oils among the participants

Attitude Questions	Percent (%)			
Which oil processing do you use out of the following?	Refined	Filtered	Unprocessed	Cold-pressed
	83.5	12.6	1.9	1.9
What type of vessel do you use out of the following to store the cooking oil?	Stainless steel	Glass	Plastic	Other
	51.5	10.7	36.9	1
What is your mode of buying cooking oil?	Local shop	Shopping mall	Online shopping	
	47.6	38.8	13.6	
Is your cooking oil fortified with any of the following?	Vitamin A	Vitamin D	Vitamins A & D	Not aware
	8.7	14.6	62.1	14.6
What type of cookware do you use for frying purposes?	Stainless steel	Cast iron	Non-stick	Copper
	28.2	17.5	46.6	1
	Aluminium	Other		
	2.9	3.9		

The percentages reported for the types of vessel to store the cooking oil were stainless steel (51.5%), plastic (36.9%), and glass (10.7%). Majority of the participants were using local shops (47.6%) to purchase the cooking oil, followed by shopping malls (38.8%) then online purchasing (13.6%). In one of the recent findings from a study revealed that refined edible oils were preferred by consumers and were normally purchased from supermarkets for almost all their meals. Unrefined edible oils however were used mostly when needed and normally purchased in open markets (Ganesh and Vakayil, 2019).

In the present study, 62.1% of the participants reported to have their oils fortified with both Vitamins A and D, 8.7% reported Vitamin A, 14.6% with Vitamin D, whereas 14.6% were unaware of it. Majority of the participants were using non-stick pan (46.6%), followed by stainless steel (28.2%) and cast iron (17.5%). Copper, aluminium and other types reported with 1%, 2.9% and 3.9% respectively. With majority using non-stick pan, this indicates that participants were aware and made a healthier choice of cookware.
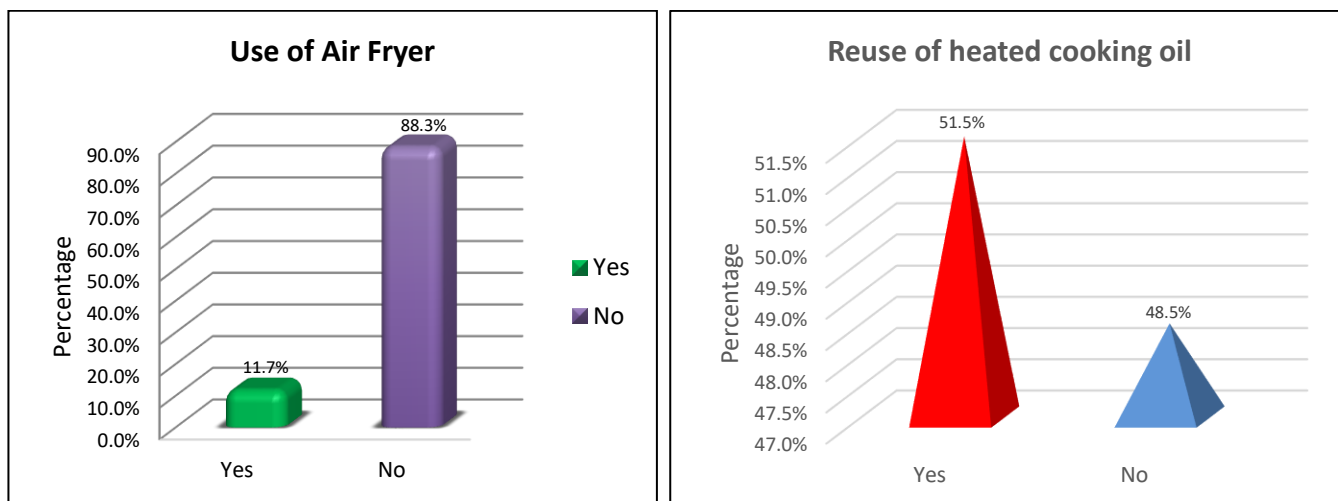

Figure 3: Percentage of usage of the air fryer and re-using heated oil among the participants

However, there was one more observation as seen in Figure 3, that only 11.7% used air fryer while 88.3% did not use it. Also, the percentage of the participants who were using reheated oil reported to be 51.5%, while 48.5% were not using it.

Recent researchers in India revealed that consumers are becoming more aware and health conscious and this trend promises a bright future of vacuum processing as a novel method of food processing (Banerjee and Sahu, 2017). Hence the present study findings indicate that Indians are making wiser choices with respect to reducing the use of oil via cookware and cooking methods.

3.5 Practices of cooking oil usage among the participants
Table 2 demonstrate the results that 32% of the participants rarely change or do not change the cooking oil. Some of the participants (15.5%) were found to be using more than 1 type of oil on daily basis. About 19% of the participants change the oil, 2 times in a week. There were some participants (28.2%) who changed the oil within a month.

Table 2: Attitude towards changing cooking oils

Variable	Frequency (n)	Percent (%)
Daily/Use multiple oils in a single day	16	15.5
Twice in a week	19	18.4
Twice in a month	7	6.8
Thrice in a month	8	7.8
Once in a month	14	13.6
Once in 2 months	1	1
Once in 3 months	5	4.9
Rarely/Never change	33	32

The present study revealed that, majority of the study participants had average knowledge about dietary fats and fair attitude and practices towards using the right type of cooking oil and the method of frying etc. The various studies mentioned in this study have highlighted on the consumer buying behaviour, also depicting the knowledge, attitude and practices towards dietary fats and edible oils. Keeping this objective in mind, the present study focuses on the similar framework for its research work.

4. CONCLUSION
According to the study, majority of the participants were overweight moving towards obese category. Most of the participants were leading a sedentary lifestyle due to pandemic situation and nation-wide lockdown. The combination of oils was not followed and variety of cooking oils was minimally used. The study also covers various aspects of lifestyle behaviours and eating habits, particularly of dietary fats which contribute as major risk factors to develop non-communicable diseases (NCDs). Most of the risk factors are modifiable and can be improved by encouraging individuals to adopt a healthy lifestyle, choosing the right type of cooking oils, following right type of cooking methods and engaging more in physical activity. The higher chances of developing diet-related chronic diseases in urban population can be reduced by keeping the optimal levels of fat intake and balancing the quality of dietary fats. Reducing the risk factors will not only help to prevent NCDs, but also ensure a good quality of life in advancing years.

5. ACKNOWLEDGEMENT

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