

# Pattern of edible oil consumption and practice of reuse: A health concern

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## ABSTRACT

**Background:** The per capita consumption of edible oil in Indian households has risen substantially in the last decade contributing to the rising incidence of non-communicable diseases (NCDs). Increasing prevalence of reuse of edible oil for frying is an unhealthy practice, as it gives rise to formation of free radicals and other harmful agents. Hence, present study highlights the pattern of edible oil consumption and practice of reuse among the families along with the influencing factors while purchasing edible oil. **Methodology:** A cross sectional study was conducted among 172 families of third year MBBS students belonging to different socio-demographic and cultural background. A predesigned pretested questionnaire was administered to the families preferably to the mother. The details regarding consumption and reuse of the edible oil were asked. **Result:** A total of 172 families of third year MBBS students participated in the study which comprised of 672 family members. The quantity of oil consumed was estimated to be 13.64 kg/capita/year. Majority 80% of the respondents revealed that they reuse leftover oil after frying for other cooking purposes. Groundnut and soybean were the most preferred edible oil. **Conclusion:** According to study findings, consumption of edible oil at domestic level has increased along with the reuse of leftover oil. The increased consumption can be one of the important risk factors for increase in prevalence of non-communicable diseases which is a health concern. There is a need for the increase in awareness about use of edible oil through promotional activities for effective education of general public regarding prevention of NCDs.

**Keywords:** Edible oil, NCDs, palm oil, per capita oil consumption, reuse

## Introduction

Edible oil consumption is one of the important factors in human diets as it can be harmful to health, as well as economically, if not consumed properly. Over the past ten years, Indian households' per capita income has increased significantly. Increasing economy is leading to strong expansion, which is changing the eating patterns among people and promoting ready-to-eat foods.<sup>[1]</sup>

From 2000 to 2017, the global per capita consumption of edible oil increased from 18.95 to 25 kg/year. In India, it has also gone up from 11.1 to 17 kg per year. India uses more than 24 million tons of edible oils annually.<sup>[2]</sup> After the United States, China, and Brazil, India has the fourth-largest edible oil market in the world. The demand for edible oil in India is accelerating due to factors like a growing population, rising consumption rates, and rising per capita income.<sup>[3]</sup>

Edible oil is important because, in recent decades, intake of calories from foods high in fiber, such as whole grains, pulses, and roots, have decreased while intake of calories from oils and fats have increased. Rising income and living standards are to blame for this acceleration in growth.<sup>[2]</sup> In India, vegetable oils used in cooking comprise 80% of the visible fat ingested, furthermore,

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Received: 28-02-2024

Revised: 20-05-2024

Accepted: 27-05-2024

Published: 13-01-2025

### Access this article online

#### Quick Response Code:



#### Website:

<http://journals.lww.com/JFMPC>

#### DOI:

10.4103/jfmprc.jfmprc\_325\_24

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**How to cite this article:** Saoji A, Saoji P, Hajare S, Dharmadhikari P. Pattern of edible oil consumption and practice of reuse: A health concern. J Family Med Prim Care 2025;14:322-6.

fat intake is income-dependent and a single oil is typically used for cooking, especially in rural areas.<sup>[4]</sup>

There has been an alarming increase in incidence of NCDs like obesity, cardiovascular diseases, diabetes and cancers. NCDs are estimated to account for 71% of the 41 million global deaths.<sup>[5]</sup> India is also following the same trend. One of the important contributing factors for this is increasing consumption of fast food and fried food especially by young generation ultimately leading to increase oil fat consumption.

Reusing cooking oil for food preparation, especially deep frying, is a common practice among households in developing countries owing to a lack of understanding and also to save money. Several animal studies have demonstrated that consumption of repeatedly heated oils increased the health risk.<sup>[6,7]</sup> The physical appearance of oil is altered by repeated heating as a result of a rise in viscosity and a darkening in color. Due to the faster development of oxidized and polymerized lipid species in the frying media, the quality of oil degrades with increased frying duration. Repeated heating speeds up the oxidative breakdown of oil lipid, creating harmful reactive oxygen species and depleting the natural antioxidant content along with saturated and trans fats, which raises blood cholesterol and cardiovascular risk.<sup>[8,9]</sup> Hence, if the physio-chemical properties of cooking oil degrade, the oil must be discarded since it may be toxic for human consumption. Few studies in India evaluated the genotoxic potential of such heated oils.<sup>[10,11]</sup>

Most of the researchers estimated the preferences for edible oils in India, but there is a scarcity of data regarding household per capita consumption assessment, patterns and practice of reuse of edible oil specifically in this geographical area.

In above context, there is need to find out the current trend of edible oil consumption, practice of reuse, preferred type along with the influencing factors while purchasing the edible oil and analyzing the knowledge of people regarding health hazards due to excessive use or reuse of edible oil. The Knowledge regarding consumption of amount of edible oil and reuse of oil can help in reduction of its usage and reduction of one of the risk factors for NCDs which can bring change in lifestyle and reducing the prevalence of NCDs.

## Materials and Methodology

### Study design

Cross-sectional study.

### Study setting

Department of Community Medicine, NKPSIMS and RC and LMH.

### Study population

Families of third MBBS students

### Study duration

One year.

### Sample size

172 families

### Sampling technique

Universal sampling

### Inclusion criteria

1. All the families of the third MBBS students

### Exclusion criteria

1. Those mothers who were unwilling to participate and those who did not answer the phone call on two occasions were excluded from the study.

### Statistical analysis

Data were entered in MS Excel sheet and analyzed in EPI info software version 7.0 and descriptive analysis was done by using percentage the level of significance of less than 0.05 was considered. *P* value of <0.05 was considered to be significant.

## Methodology

After the approval from institutional ethics committee a cross-sectional study was carried out among families of 200 Third year MBBS students at the medical college in Nagpur city, representing various socioeconomic and cultural backgrounds in Maharashtra. Students were asked to give contact numbers of their mothers to get their interviews access to a pre-designed and pretested questionnaire. The mothers of the students were contacted telephonically and after taking informed consent, were interviewed for the consumption and usage of edible oil. A total of 172 families of the MBBS students participated in the study comprising of 672 family members.

The mothers of the students were asked questions about quantity of edible oil, types of edible oil, Source of information about the edible oil, Reuse of edible oil, Awareness about side-effects of excessive use of edible oil consumption and practice towards changing or mixing of edible oil.

## Results

According to Table 1 total consumption of edible oil is estimated to be 764 litres/month among 172 families which comprised 672 family members. On an average 13.64 kg/capita/year of edible oil is consumed by an individual. Majority of the families 34.8% and 27.9% consumes 4 to 5 litres/month and 2.3% consume >8 litres/month.

Figure 1 depicts that majority of the families prefer groundnut oil (44%) and soyabean oil (42%).

**Table 1: Total consumption of oil by participants (n=672)**

Oil consumption per month (litres)	No. of families (%)	Total No. of members (%)	Total oil consumption (litres)
2	8 (4.65)	28 (4.16)	16
3	28 (16.28)	88 (13.1)	84
4	60 (34.88)	264 (39.29)	240
5	48 (27.91)	176 (26.19)	240
6	16 (9.3)	64 (9.52)	96
7	8 (4.65)	28 (4.17)	56
≥8	4 (2.33)	24 (3.57)	32
Total	172 (100)	672	764

Figure 2 revealed that, majority of the consumers 69% considered nutritional content as a major influencing factor for purchase whereas 58% considered quality. Other factors considered by consumers were advertisement 32%, taste and flavor 23% and price 9% for purchase of edible oil.

Figure 3 shows that primary source of information for consumer regarding edible oil is self-experience 56% followed by 36% other sources like advertisements, relatives, friends, doctors and books.

Figure 4 reveals that majority 58% families practice reuse left over edible oil once after frying whereas 34% families practice reuse of edible oil until it finishes, 20% families do not practice reuse of edible oil.

According to Table 2 total 67.44% of the consumers do not changes their edible oil and continue with the same type of oil.

According to Table 3 when asked about mixing of edible oil with any other edible oil majority 90.70% consumers denied.

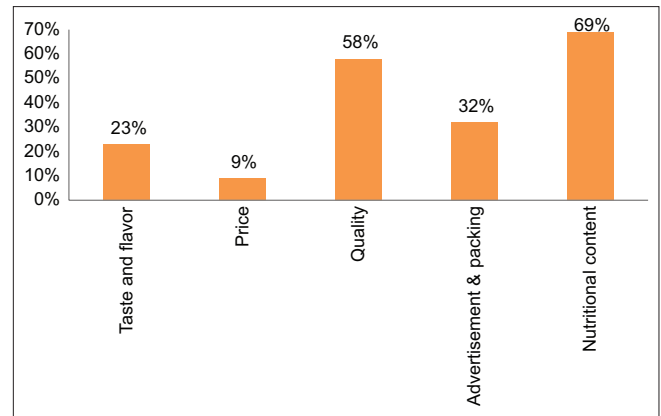
Figure 5 depicts awareness among consumers about side effects due to excessive use of edible oil. Majority 98% consumers were aware about heart diseases, 83% and 70% were aware about hypertension and obesity respectively.

According Table 4 majority of the consumers 88% are aware about the hazardous effects of reusing the edible oil.

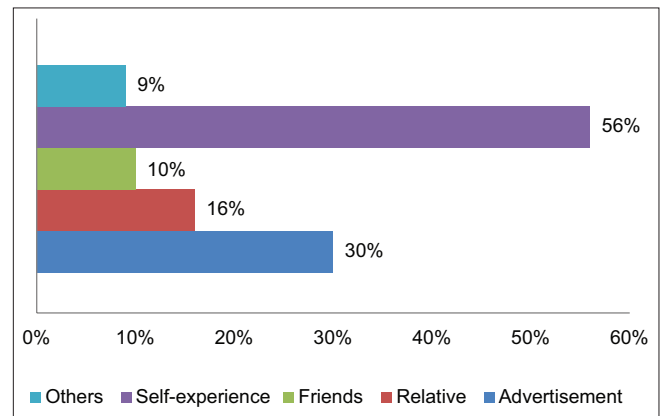
## Discussion

A total 172 students from 3<sup>rd</sup> MBBS batch participated in the study which comprised of 672 family members. The overall consumption of edible oil in the present study was estimated to be 13.64 kg/capita/year. Similarly, in the study conducted by Vyas *et al.*<sup>[1]</sup> the consumption of edible oil was 13.3 kg/capita/year and study conducted by Yadav *et al.*<sup>[2]</sup> estimated 15.6 kg/capita/year for rural population and 12.4 for urban. This rising trend is may be due to rise in household incomes and consumer demands.

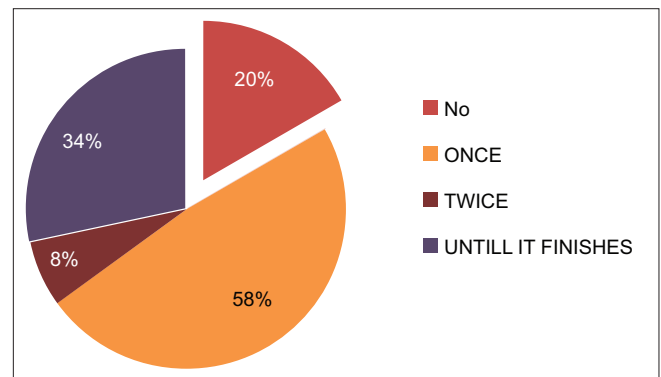
In the present study, majority families 34.8% consumed 4 litres and 27.9% consumed 5 litres of edible oil per month. Whereas



**Figure 1: Type of oil preference by participants. (Multiple responses)**



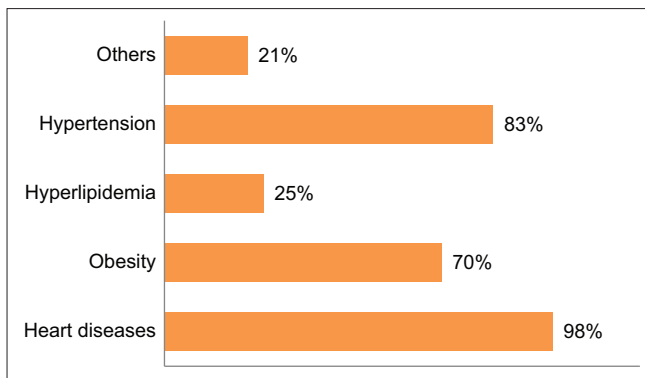
**Figure 2: Influencing factors considered by participants while purchasing edible oil (multiple responses)**



**Figure 3: Source of information for purchasing suitable edible oil (Multiple responses)**

the study conducted by N Srinivasan *et al.*<sup>[12]</sup> in the year 2019 revealed that total 39% consumed 3-5 litres and 17% consumed more than 5 litres edible oil per month. This indicates the rising trend towards per capita oil consumption.

Present study revealed that maximum consumers preferred groundnut oil 44%, soyabean oil 42%, rice bran oil 19% and sunflower oil 7%. More or less similar finding were recorded from the study conducted in city of Raipur.<sup>[1]</sup> The study conducted by Kulkarni *et al.*<sup>[13]</sup> 36% consumers preferred sunflower oil, 35%



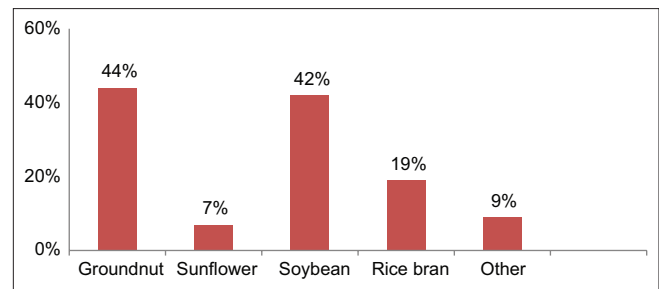
**Figure 4:** Practice reuse of edible oil

soyabean oil, 34% mustard oil, 15% palm oil and 5% coconut oil across India and mentioned that, only a small percentage of the consumers utilize coconut oil. Whereas in the study conducted by Pandey R *et al.*<sup>[14]</sup> in Patna Bihar, stated that majority, 40% of the respondents were using mustard oil for cooking purpose followed by Soyabean oil and Sunflower oil. People in the Southern India mostly preferred Sunflower and Palm oil.<sup>[15,16]</sup>

In the present study majority of the consumers 69% preferred nutritional content of edible oil (Saturated fats, Unsaturated fats contents) and 58% preferred quality (refining) whereas 32% were influenced by advertisement and 23% preferred taste and flavor. Only 9% preferred price for purchase of edible oil. More or less similar findings were reported by authors in different parts of India.<sup>[1,10,14]</sup> This concludes that people are giving more importance to health and are not influenced by advertisement or packaging of different oils. Price also does not play a key role while purchasing edible oil. A study by Mugilan *et al.*<sup>[17]</sup> presented that fortification of oil is not a factor while purchasing, as 71.6% people were not aware about fortification in her study.

Present study revealed that majority 58% families practice reuse left over edible oil once after frying where as 34% families practice reuse of edible oil until it finishes, 20% families do not practice reuse of edible oil. These findings are consistent with studies conducted in other regions by Poornima *et al.* and Srinivasan *et al.* both reported that more than 50% consumers reusing edible oil.<sup>[10,12]</sup> In contrast Vyas *et al.*<sup>[1]</sup> mentioned that majority of the consumers change their edible oil for better health.

In the present study 88% consumers were aware about hazardous effects of reusing edible oil. Similarly in the study conducted by Goswami *et al.*<sup>[9]</sup> stated clearly that edible oil becomes highly viscous and presence of harmful products increases when oil is heated repeatedly. Also, in the study conducted by Venkata *et al.*<sup>[7]</sup> mentioned about the detrimental side effects on human health after repeated heating of edible oil. Contrast findings were reported from the study conducted in Patna; Bihar where 70% respondents are not aware about the ill effects.



**Figure 5:** Side effects of excessive use of edible oil

**Table 2: Change of edible oil**

Change	Responses
Yes	56 (32.56%)
No	116 (67.44%)

**Table 3: Mixing of edible oil**

Mixing	Responses
Yes	16 (9.30%)
No	156 (90.70%)

**Table 4: Reusing of edible oil is hazardous**

Reusing is Hazardous	Responses
Yes	152 (88.37%)
No	20 (11.63%)

## Conclusion

In the present study edible oil consumption per capita per year is highlighted. An attempt has also been made to know the trends in consumer preferences towards edible oils and to find out the influencing factors related to consumer preferences in purchasing edible oils.

In this context according to study findings, rising consumption of edible oil at domestic level and increasing prevalence of reusing can be one of the important risk factors for increasing non-communicable diseases. Hence, suggesting need for the increase in awareness through promotional activities for effective education of general public regarding prevention of NCDs.

## Acknowledgement

We would like to thank all the participants who consented to participate in the study.

## Financial support and sponsorship

Nil.

## Conflicts of interest

There are no conflicts of interest.

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