

# Knowledge, Awareness, and Practices among Consumers Regarding Trans-Fat: A Cross-Sectional Study

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## Abstract

**Introduction:** Processed and preserved food items are the major source of dietary trans fat. Despite various legal provision, public awareness toward trans fats are limited. **Objective:** To examine the awareness of participants about various aspects of trans fats and improving their knowledge through education. **Methods:** A cross sectional pre- and posttest survey was conducted online through a webinar. The questionnaire has 11 questions about trans fats. Received responses were coded. Mean and frequency of continuous data were calculated. Chi-square or *t*-test were used to find the difference in pre and posttest. **Results:** Eighty five out of 95 participants completed both pre- and posttest. The scores for each question were compared to find out awareness improvement. The question based on FSSAI showed 57% improvement while 50% in case of World Health Organization's REPLACE initiative. The difference of mean score of pretest ( $7.57 \pm 1.8$ ) and posttest ( $9.22 \pm 1.37$ ) was statistically significant. **Conclusion:** Nutrition education and proper labelling of food items can improve the knowledge about food ingredients and food purchasing patterns. Proper enforcement and monitoring of food items labeling guidelines can be recommended.

**Keywords:** Dietary trans-fat, food package labeling, food purchasing behaviors, trans fat

## INTRODUCTION

It has been estimated by World Health Organization (WHO) that every year intake of trans-fat causes more than 500,000 deaths globally and 77, 000 deaths in India from cardiovascular disease due to increased low-density lipoprotein level.<sup>[1]</sup> With increasing commercialization of processed and preserved foods, people are more inclined toward the consumption of trans fatty acid-rich foods which mainly come from industrial sources by process of partial hydrogenation of edible oil and from transformation of unsaturated fatty acids in the rumen of ruminants by the bacteria.<sup>[2,3]</sup> The key sources of transfats are cookies, crackers, cakes, margarine, animal products, fried potatoes, popcorn, sweets, and desserts.<sup>[4]</sup>

Intake of trans fatty acids is quite soaring in many countries, especially in middle- and low-income countries wherein partially hydrogenated vegetable oils (PHVO) usage is remarkably high; with India being one of them where vanaspati PHVO are replacing the clarified butter (traditional ghee) considering its cheaper availability and price.<sup>[5]</sup> With

increasing consumption and adverse effects of partially hydrogenated oil, these trans fats are no longer considered as safe by Food and Drug administration due to its deleterious health effects.<sup>[6,7]</sup>

Hence, to mitigate the adverse health consequences of trans fats, several countries such as Denmark have virtually eliminated, limited, and have put a legally ban on the consumption of industrially produced trans fats through imposing limits on the amount in the packaged food.<sup>[8]</sup>

In addition, the WHO also recommends that trans fats intake should be limited to 1% of total energy intake and has called for the reduction and elimination of these harmful fatty acids from the food supply chain globally by releasing the REPLACE action package.<sup>[9]</sup> According to dietary requirements of fats,

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trans fatty acids should be restricted to <1% of energy and saturated fats to <10%.<sup>[10]</sup>

Although many legislations and laws have been in place for the elimination of industrially produced trans fatty acids, the public knowledge of trans fat in foods is unsatisfactory without much accessibility of reliable data.<sup>[11,12]</sup> Reformulation of food products and spreading awareness to the manufacturers and consumer is the most effective tool for eliminating the trans fats from the daily routine.<sup>[13]</sup> Hence, a survey was felt needed realizing the adverse health consequences of trans fats and to reduce their consumption in the entire participants by assessing their level of awareness about trans fats and increasing their knowledge of indulging in healthy food choices with appropriate education programs while encouraging the participants to check the nutritional label of packaged food before consuming.

## METHODS

The present study was cross-sectional and was conducted online through a webinar using an online survey platform with a pre- and post-test designed questionnaire to determine the knowledge, awareness, and practices regarding transfat among participants. The study was ethically approved by the Institute's Ethics Committee, Postgraduate Institute of Medical Education and Research, Chandigarh (PGI/IEC/09/2019–1387). A total of 95 participants responded in pretest questionnaire and 86 participants responded in posttest. All the subjects were explained about the purpose of the study, and data were collected through Google Forms circulated at the start and the end of the webinar.

After the data collection, coding was done. The correct response/answer was scored as 1 and incorrect as 0. The data were then tabulated, and percentages for frequency distribution and mean  $\pm$  standard deviation for continuous variables were calculated. The descriptive statistics were used for percentage variable. The statistical differences between the pre- and post-test score and responses were assessed using Chi-square test or *t*-test. The statistical significance was considered at  $\alpha < 0.05$ , and data were analyzed using SPSS Version 26.0 for Window of (IBM Corp., Armonk, New York, USA).

## RESULTS

The webinar included pre- and post-test questionnaires to assess the gain of knowledge among the participants. The pretest included total  $n = 95$  responses, whereas posttest included  $n = 86$  responses.

The questionnaire included 11 questions based on trans fat topic in both pre and posttest. The question #1 showed 8% improvement, question #4 showed ~11% improvement, and question #7 based on REPLACE initiative depicted ~50% increase in positive responses (*yes*) in posttest. Question #9 and #10 showed 57% and 39% improvement in positive responses (*yes*) respectively. The questions like “Q1. Do

*you know what are trans fats?*, Q4. *Do you know about PHVO?*, Q7. *Do you know about REPLACE initiative taken by WHO?*, Q9. *Do you have any idea about FSSAI initiative to eliminate trans fats in India?*, and Q10. *Have you seen the trans fat FSSAI logo?* show significant differences among pretest and posttest responses [Table 1]. The question no. 3, 6, 5, 8, and 11 showed an increase in positive responses (*yes and correct*) at posttest but the increase was not found to be significant. Question number 2 showed arbitrary results which is contradictory with other responses. The mean score at pretest and posttest was  $7.57 \pm 1.8$  and  $9.22 \pm 1.37$  respectively. The difference between scores at pretest and posttest was recorded to be statistically significant ( $<0.001$ ) [Table 2]. This shows an improvement in the knowledge based on trans fats of respondent pertaining to the webinar.

## DISCUSSION

Poor nutrition during the vital points of life can have a significant outcome, which may give rise to long-term health effects. To generate awareness and understanding of trans fats among the people, the present study was done to determine the impact of nutrition awareness on consumers' knowledge, attitude, and behavior toward trans fatty acids in food products. Trans fatty acids is consistently interlinked with the risk of coronary heart disorders contributing to the global burden of disease. In rural as well as urban India, the intake of fats is generally around 20 and 30 g/day according to the studies (National Consumption Survey data by NIN 2009).<sup>[14]</sup>

On comparing the results obtained from pretest and posttest, improvement in terms of awareness, knowledge, and practices was observed. The results showed that 92% of participants did not know about the transfat which however increased to 100% after education intervention supporting the results of the study conducted by Cognet Research, in which awareness of trans fat increased in a 1 year study.<sup>[15]</sup>

According to a study conducted in a urban commuter college, out of 222 college students 37% of participants reported never checking trans fat information on a food label while consuming<sup>[16]</sup> which supports our survey, in which 10.5% did not check labels which however reduced to 5.8% postwebinar showing the enhancement in their attitude and knowledge.

Although various initiatives have been taken by various agencies at national and international level for reducing the trans fat intake in the food supply, still most of the consumers are unaware of such legislations and agencies.

In this study, responses to question pertaining to the initiative taken by FSSAI<sup>[17]</sup> preeducation intervention was 34.7% which significantly improved to 91.8%.

On comparing the results postintervention, it was found that only 34.7% were aware of the replace initiative taken by

**Table 1: The distribution of responses at pre (n=95) and post (n=86) test**

Questions	Responses	$\chi^2, P$
Q 1. Do you know what are trans fats?		
Pre	88 (92)	4.759, 0.029
Post	86 (100)	
Q.2 Is there any difference between natural and artificial/industrial produced trans fats?		
Pre	92 (96.8)	0.256, 0.612
Post	81 (94.1)	
Q. 3 Are industrial produced trans fats hazardous?		
Pre	89 (93.6)	0.283, 0.590
Post	83 (96.5)	
Q. 4 Do you know about partially hydrogenated vegetable oils?		
Pre	81 (85.2)	6.711, 0.009
Post	83 (96.5)	
Q. 5 Do you check label on packaged products?		
Pre	85 (89.4)	1.319, 0.250
Post	81 (94.1)	
Q. 6 Do you buy unpackaged food items?		
Pre	31 (32.63)	0.476, 0.490
Post	24 (27.9)	
Q. 7 Do you know about replace initiative taken by WHO?		
Pre	33 (34.7)	46.776, <0.001
Post	73 (84.8)	
Q. 8 Presently, what is the trans fats limit in India? (correct knowledge)		
Pre	58 (61.0)	0.058, 0.809
Post	54 (62.7)	
Q. 9 Do you have any idea about FSSAI initiative to eliminate trans fats in India?		
Pre	33 (34.7)	62.44, <0.001
Post	79 (91.8)	
Q. 10 Have you seen the trans-fat FSSAI logo?		
Pre	46 (48.4)	30.645, <0.001
Post	75 (87.2)	
Q.11 Best combination of oils can be used by industry to replace artificially produced trans fats?		
Pre	35 (36.8)	0.477, 0.489
Post	36 (41.8)	

Figures in parenthesis indicate percent values

**Table 2: Mean ± standard deviation values of pre- and post-test scores**

Total	n	Mean ± SD	t-test, P
Pretest	95	7.57±1.8	6.9
Posttest	86	9.22±1.4	<0.001

SD: Standard deviation

WHO. However, education sessions significantly improved the awareness regarding the initiatives among 84.8% of the subjects. The initiative was planned in response to adverse effect of the harmful effects of trans fats by ensuring sustained elimination of industrially produced trans fats.

According to the results obtained, very slight improvement in terms of knowledge of industrially produced trans fats and food purchasing behaviours among the respondents which was almost less than 10%, however not significant.

Significant results ( $P < 0.001$ ) were obtained for the question on the trans fat logo which showed improvement from 48.4%

to 87.2% postwebinar highlighting the importance of FSSAI logo on the food labels.

Considering the country India, PHVO are consumed principally through *vanaspati*, street vendor foods, baked foods, and vegetable ghee used as cooking oil and in fried snacks.<sup>[18]</sup> In the present study, more than half of the participants were aware of hydrogenated vegetable oils in prewebinar and showed improvement in awareness to nearly 6%.

The present study observed that more than half of the participants, i.e., 61% were aware of the trans fat limit in India prewebinar, which however improved to nearly 2% more postwebinar.

Combining oils is the best way which can be used by the food industry to replace artificially produced trans fats, almost 5% increase in knowledge among respondents was found postwebinar.

Isomers of trans fats formed by the process of hydrogenation have adverse effects on health<sup>[19]</sup>, and with the support of recent

evidences, it has been found that with the absence of pure oil with enhanced nutritional and functional properties, vegetable oils are modified by blending with different compositions to develop new products with desired features.<sup>[20]</sup> The correct combination of oils was answered by only 36.8% of the respondents prewebinar showing 5% improvement in positive responses after the educational sessions. The overall difference between scores at pretest and posttest was found to be significant ( $<0.001$ ), which showed a significant improvement in the knowledge based on trans fats of respondent after the webinar.

The edible oil as well as food industry should be motivated to attain lower trans fatty acid levels using blends of vegetable oils with less hydrogenation and to use natural oil fractions such as palm and coconut.

Hence, the overall difference between scores at pretest and posttest was found to be significant ( $<0.001$ ), which shows an improvement in the knowledge based on trans fats of respondents pertaining to the webinar.

## CONCLUSION

The elevated use of trans fats in the global food chain and current evidences identifying negative health effects underscores the need to sensitize the public on trans fats; double trouble for the heart health. With the lower level of awareness among people, the results recommend that nutrition education sessions and greater transparency in food labels may contribute an improvement in consumer knowledge and their attitude towards food purchasing patterns. Considering the greater amount of trans fats in fried foods and snacks, the best possible way to prevent the adverse health effects is to avoid trans-fatty acids containing foods. To keep oneself updated regarding the trans fat content, it would be helpful to purchase packed foods from reliable source. Strict monitoring of marketing methods and packaged food labels can be recommended for providing reliable information.

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## Conflicts of interest

There are no conflicts of interest.

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