

## Oil Consumption Pattern among the Residents of Chidambaram Town, Tamilnadu

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### Abstract

### Original Research Article

Oils are an important ingredient in food worldwide. The consumption pattern in terms of quantity, blending/combination and cooking process including reuse and reheat of oils are of interest to all concerned with health. The literature, on ill effects of excess consumption and unhealthy cooking process of reheating/reusing are indicative of the need for knowing the behaviour pattern of the population in the consumption of oil. In this context, the present study was undertaken in Chidambaram town, Tamilnadu among 218 households. Dietary assessment was made using 24 hours recall method. The results showed that a majority of the households were consuming more than recommended level. The per capita intake of oil was found to be 13.2 kg per annum. The reuse of oil was reported by 58.3% and percentage of energy from fat was within the recommended level for a majority of the households (82.6%). The pattern of consumption in terms of changing and combination of oil usage was found to be associated with education and income of the head of the households. However, the excess intake and reuse of oil are of concern. To address these two issues of excess consumption and reuse, specific messages are to be delivered at community level.

**Key words:** Oil consumption, combination, changing and reuse of oil.

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### INTRODUCTION

The role of diet in the etiology of most NCDs is extremely important [1]. Fat is an important ingredient of human diet. The functional role of fat in the diet is manifold. Fat is a most concentrated source of energy. The content of fatty acids as well as the ratio between unsaturated and saturated fatty acids is important parameter for determination of nutritional value of certain oil [2]. Fats are essential in the diet for the absorption and mobilization of fat-soluble vitamins such as vitamin A, vitamin E and fat-soluble antioxidants. Essential fatty acids (EFA) are those fatty acids, which the body cannot synthesize and need to be supplied through diet. EFAs are long-chain unsaturated fatty acids derived from linolenic (which is PUFA and is also called as Omega-3), linoleic (which is PUFA and is also called as Omega-6), and oleic acids (which is MUFA and is also called as Omega-9). Omega-9 is necessary yet "non-essential" because the body can manufacture a modest amount on its own, provided essential EFAs are present [3]. Coronary artery disease (CAD) and its pathological atherosclerotic process are closely related to lipids. Lipids levels are in turn influenced by dietary oils and fats [4]. Cooking oils

possess different fatty acid composition. It is a common practice to heat cooking oil and reuse it in order to cut expenses [5]. The use of repeatedly heated cooking oil predisposes to various cardiovascular diseases. Oxidation and hydrolysis occur when oil is heated repeatedly due to thermal decomposition. It had been suggested that consumption of repeatedly heated oil could be a health hazard [6]. There is a wide variety of cooking oils from plant sources such as groundnut oil, coconut oil, sunflower oil, gingerly oil, olive oil, palm oil, soybean oil, canola oil (rapeseed oil), corn oil, and other vegetable oils, as well as animal-based oils like butter and lard. However, in Tamil Nadu, major cooking oils consumed are groundnut oil, gingerly oil, coconut oil and sunflower oil. Common and daily Consumption of animal based oils like butter and lard are very negligible in Tamil Nadu compared to the major vegetable cooking oils [7]. Consumption of repeatedly heated cooking oil (RHCO) has been a regular practice without knowing the harmful effects of use and thermal oxidation of cooking oil generates free radicals and dietary consumption of such oil results in detrimental health effects [8].

With this background, this cross sectional study was undertaken to find out the pattern of cooking oil consumed, practice of reusing oil among the residents of Chidambaram town, Tamilnadu.

## OBJECTIVES

The study was carried out to find out the pattern of cooking oil consumption and reuse practices of households in Chidambaram town.

## MATERIALS AND METHODS

This cross sectional study was carried out in the field practice area of Urban Health Centre, Rajah Muthiah Medical College, and Annamalai University. A total of 218 households with a population of 914 were included in the study. Convenience sampling method was adopted. The study was conducted in October, 2014.

### Data collection

Data collection was carried out using a pre-tested, interview schedule. This schedule consist of socio demographic variables, type and combination of oil used, purchasing pattern, quantity consumed, changing of oil, reuse and times of reuse of oil details.

Dietary assessment was made using 24 hours recall method.

### Data analysis

The data were analysed using SPSS software for windows (Statistical Package for Social Sciences) version 20. Classification of age and sex of the household members, family size of the households, educational status and occupation of the head of the households, annual family income, type and combination of oil, purchasing pattern and consumption, change, reuse and times of reuse of oils were obtained by descriptive statistics. Further, per capita fat intake, per capita oil consumption, percentage of energy from fat and percentage of energy from visible and invisible fats were also obtained.

Association among education, occupation, income of head of households and quantity, combination, changing and reuse were obtained by chi square tests. Association between family size and quantity of oil consumed was also tested.

## RESULTS

**Table-1: Classification of the households on the basis of age group and sex of the family members and size of family. (Number= Population 914 and Households 268)**

Variables	Category	Frequency	Percentage
Age Group	0 -5 years	91	9.9
	6 -15 years	123	13.4
	16 – 30 years	209	22.8
	31 – 60 years	121	40.4
	Total	914	100
Sex	Male	431	47.15
	Female	483	52.85
	Total	914	100
Family Size	Less than 2	30	13.8
	3 – 4 members	105	48.2
	5 – 6 members	65	29.8
	More than 6 members	18	8.2
	Total	218	100

A majority (40.4%) of the members of the households were in the age group of 31 -60 years. Females constitute 52.85% of the members of the households studied. A majority (48.2%) of the households were having the family size of 3 – 4 members.

A majority (39%) of the head of the households have studied up to secondary level followed by graduation (33%). With regard to occupation, a majority (50.5%) were semi-skilled followed by skilled (41.3). A majority (38.5%) have income of more than two lakhs per year (Table-2).

**Table-2: Characteristics of Head of Households (Number 218)**

Variables	Category	Frequency	Percentage
Education of head of Household	Illiterate	25	11.5
	Primary	15	6.9
	Secondary	85	39.0
	Higher Secondary	21	9.6
	Graduation	72	33.0
Occupation	Unskilled	18	8.2
	Semi – Skilled	110	50.5
	Skilled	90	41.3
Income	Less than 24,000	10	4.6
	25,000 -50,000	14	6.4
	51,000 – 1,00,000	36	16.5
	1,00,000 – 1,50,000	43	19.7
	1,50,000 -2,00,000	31	14.2
	More than 2,00,000	84	38.5

**Table-3: Classification of the Households on the basis of pattern of oil consumption (Number=268)**

Variables	Category	Frequency	Percentage
Type of oil used	Palm oil	17	7.8
	Groundnut oil	16	7.3
	Gingely oil	13	6.0
	Sunflower oil	165	75.7
	Rice bran oil	7	3.2
Combination of oil used	Yes	19	72.9
	No	59	27.1
Quantity per month	Less than 1 litre	14	6.4
	1 – 2.9 litres	82	37.6
	3 – 5 litres	85	39
	More than 5 litres	37	17
Changing of oil	Yes	89	40.8
	No	129	59.2
Reuse of oil	Yes	127	58.3
	No	91	41.7
Frequency of Reuse*	Once	38	29.9
	Twice	57	44.9
	Thrice	32	25.2
Usage of vanaspathi oil	Yes	64	29.4
	No	154	70.6
Purchasing Frequency	Daily	13	6
	Weekly	45	20.6
	Monthly	160	73.4

Refers to 127 households only

With regard to type oil used, a majority (75.7%) were consuming sun flower oil. 72.9% were using combination of oil. A majority (39%) were consuming 3 to 5 litres of oil per month. As regards the change of oil, 40.8% were found having the oil changed which is good one. It was observed that 58.7% were

reusing oil and among them a majority (44.9%) was found using the oil twice. It was found that only 29.4% were found using vanaspathi which is considered to be good. A majority (73.4%) of the households purchase oil on monthly basis.

**Table-4: Classification of the households on the basis of Per capita consumption of oil per year (Number=914)**

Variables	Category	Frequency	Percentage
Per capita oil consumption	Less than 7.5 litres	193	21
	7.5 – 9 litres	122	13.24
	9 – 11 litres	134	14.62
	More than 11 litres	465	51.14
	Total	914	100

Mean intake of oil = 13.11 kg /person /year

A majority (51.4%) were consuming more than 11 kg of oil followed by 21% with a consumption of less than 7.5 kg. The mean intake of the members of

the families was found to be 13.11 kg per person per year.

**Table-5: Classification of the households on the basis of percentage of Energy derived from Fat (Number 218)**

Variables	Category	Frequency	Percentage
Energy from Fat	Less than 20 percent	110	50.5
	21 – 30 percent	70	32.1
	31 – 40 percent	24	11.0
	More than 40 percent	14	6.4
Energy from Visible Fat	Less than 30 percent	74	33.9
	31 – 60 percent	93	42.7
	More than 60 percent	51	23.4
Energy from Invisible Fat	Less than 30 percent	32	14.7
	31 – 60 percent	73	33.5
	More than 60 percent	113	51.8

On the basis of dietary assessment by 24 hours recall method, the fat intake and energy obtained from fat and from both visible and invisible fat were calculated. As regards the total energy derived from fat, half of the households have obtained less than 20 percent energy from fat. However, getting more than 40

percent energy was observed for 6.4 percent. Regarding the energy derived from visible and invisible fat, it was found that a majority (42.7%) has 31 – 60 percent of energy from visible fat and 51.8 percent have more than 60 percent energy from invisible fat.

**Table 6: Association between family size and quantity oil consumption (Number 218)**

Variable	Category	Quantity of oil consumed				X <sup>2</sup>	Sig
Family Size		<1 litre	1-2.9 litres	3-5 litres	>5 litres	28.602	0.001*
	Less than 2	3(10)	17(56.7)	9(30)	1(3.3)		
	3- 4	7(6.7)	44(41.9)	43(41)	11(10.5)		
	5 -6	4(6.2)	15(23.1)	29(44.6)	17(26.2)		
	More than 6	0(0)	6(33.3)	4(22.2)	8(44.4)		

\*Significant at <1%

Association between educational status and quantity of oil consumption is found significant. The

results indicate higher the family size higher the consumption.

**Table-7: Association among Education, Occupation, Income and Quantity of oil consumption (Number 218)**

Variable	Category	Quantity of oil consumed				X <sup>2</sup>	Sig
		<1 litre	1-2.9 litres	3-5 litres	>5 litres		
Education		3(12)	6(32)	9(36)	5(20)	7.771	0.803
	Illiterate	1(6.7)	6(40)	7(46.7)	1(6.7)		
	Primary	8(9.4)	30(35.3)	32(37.6)	15(17.6)		
	Secondary	0(0)	10(47.6)	8(38.1)	3(14.3)		
	Higher Secondary	2(2.8)	28(38.9)	29(40.3)	13(18.1)		
	Graduation	14(6.4)	82(37.6)	85(39)	37(17)		
	Total						
Occupation	Unskilled	1(5.6)	7(38.9)	7(38.9)	3(16.7)	0.322	0.999
	Semi-Skilled	8(7.3)	41(37.3)	43(39.1)	18(16.4)		
	Skilled	5(5.6)	34(37.8)	35(38.9)	16(17.8)		
	Total	14(6.4)	82(37.6)	85(39)	37(17)		
Income	Less than 24,000	1(10)	7(70)	1(10)	1(10)	13.737	0.546
	25,000 -50,000	0(0)	7(50)	5(34.7)	2(14.3)		
	51,000 – 1,00,000	3(8.3)	12(33.3)	17(47.2)	4(11.1)		
	1,00,000 – 1,50,000	4(9.3)	16(37.2)	18(41.9)	5(11.6)		
	1,50,000 -2,00,000	1(3.2)	11(35.5)	14(45.2)	5(16.1)		
	More than 2,00,000	5(6)	29(34.5)	30(35.7)	20(23.8)		
	Total	14(6.4)	82(37.6)	85(39)	37(17.0)		

No significant differences were found in the quantity of oil consumption with regard to the education, occupation and income of the head of households.

**Table-8: Association among Education, Occupation, Income and Combination of Oil used (Number 218)**

Variable	Category	Combination of oil used		X <sup>2</sup>	Sig
		No	Yes		
Education	Illiterate	7(28)	18(72)	5.340	0.254
	Primary	7(46.7)	8(53.3)		
	Secondary	25(29.4)	60(70.6)		
	Higher Secondary	3(14.3)	18(85.7)		
	Graduation	17(23.6)	55(76.4)		
Occupation	Unskilled	6(33.3)	12(66.7)	0.741	0.690
	Semi-skilled	31(28.2)	79(71.8)		
	Skilled	22(24.4)	68(75.6)		
Income	Less than 24,000	6(60)	4(40)	16.168	0.006
	25,000 -50,000	4(28.6)	10(71.4)		
	51,000 – 1,00,000	6(16.7)	30(83.3)		
	1,00,000 – 1,50,000	19(44.2)	24(55.8)		
	1,50,000 -2,00,000	7(22.6)	24(77.4)		
	More than 2,00,000	17(20.2)	67(79.8)		

Income of the head of the households was associated with the use of combination oil. 79.8 % of the households with an income of more than 2 lakhs were using combination of oil.

**Table-9: Association among Education, Occupation, Income and Changing of oil (Number 218)**

Variable	Category	Changing of oil used		X <sup>2</sup>	Sig
		Yes	No		
Education	Illiterate	3(12)	22(68)	11.390	0.02
	Primary	6(40)	9(60)		
	Secondary	36(42.4)	49(57.6)		
	Higher Secondary	12(57.1)	9(42.9)		
	Graduation	32(44.4)	40(55.6)		
Occupation	Unskilled	11(61.1)	7(38.9)	0.834	0.659
	Semi – Skilled	68(68.8)	42(31.2)		
	Skilled	50(55.6)	40(44.4)		
Income	Less than 24,000	7(70)	3(30)	0.912	0.969
	25,000 -50,000	8(57.1)	6(42.9)		
	51,000 – 1,00,000	21(58.3)	15(41.7)		
	1,00,000 – 1,50,000	27(62.8)	16(37.2)		
	1,50,000 -2,00,000	18(58.1)	13(41.9)		
	More than 2,00,000	48(57.1)	36(42.9)		

Education of head of household was found to be associated with the changing of oil. A majority (57.1%) among those who have educated up to higher secondary level were found changing of oil. No

significant associations were found with regard to the occupation and income of the head of households in the changing of oil.

**Table-10: Association among Education, Occupation, Income and Reuse of Oil (Number 218)**

Variable	Category	Reuse of Oil		X <sup>2</sup>	Sig
		Yes	No		
Education	Illiterate	14(56)	11(44)	0.875	0.928
	Primary	8(53.3)	7(43.7)		
	Secondary	50(58.8)	35(41.2)		
	Higher Secondary	14(66.7)	7(43.3)		
	Graduation	41(56.9)	31(43.1)		
Occupation	Unskilled	10(55.6)	8(44.4)	0.094	0.954
	Semi-skilled	65(59.1)	45(40.9)		
	Skilled	52(57.8)	39(42.2)		
Income	Less than 24,000	5(50)	5(50)	5.336	0.376
	25,000 -50,000	6(42.9)	8(57.1)		
	51,000 – 1,00,000	18(50)	18(50)		
	1,00,000 – 1,50,000	29(67.4)	14(32.6)		
	1,50,000 -2,00,000	29(67.7)	10(32.3)		
	More than 2,00,000	48(57.1)	36(42.9)		

No associations were found among education, occupation and income of head of households with reuse of oil.

## DISCUSSION

This cross sectional study was carried out to assess the pattern of cooking oil consumption in terms of type of oil, quantity of consumption, combination of oil use, changing of oil and reuse of oil. Among the total 914 population of the households studied, a majority of them were in the age group 31 -60 years and 52.85% were females. 48.2% of the families have 3 -4 members. Of the 218 head of the households, a majority (39%) has studied up to secondary level, 50.5% were doing to semi-skilled job and 38.5% were earning more than 2 lakhs per annum. Regarding type of oil used, a majority (75.7%) were using sunflower oil. Other studies [9, 10] have reported 25% to 36% preference to sunflower oil. In the present study, a majority (39%) of the study households found consuming 3 -5 litres per month. In contrast, 19% from Coimbatore and 62%

from Raipur cities were reported with 3-5 litres and more than 5 litres respectively [5, 10]. Reuse of cooking oil was found among 58.3% of the study households in the present study whereas in a study conducted in Malaysia [6] found 73% of respondents admitted that they use cooking oil repeatedly for frying. With regard to changing of oil consumption with different type of oil, only 40.8% of the households in the present study reported positively. Oil usage in terms of combination was found among 72.9% of the households. Education and income of the head of the households were found to be associated with changing and combination of oil usage respectively. Regarding the percentage of energy derived from fat, 82.6% of the households derive within 30% of energy from fat which is the recommended level. In a study of salt and fat consumption pattern in regional Indian diet among hypertensive and dyslipidemic patients, 24.1% of energy from fat was

reported. In the present study, per capita consumption calculated for the members of the household stands at 13.2 kg per annum which are in excess of recommended level of 10.5 kg per capita/per annum. Overall, the consumption of sunflower oil by the households, which has polyunsaturated fatty acids, is considered to a good one. However, the reuse of oil by the households is not a good practice as it may lead to increase the consumption of Tran's fatty acid due to reuse/reheat. Hence, it is concluded that the ill effects of increased consumption of oil and reuse/reheat are to be addressed by designing specific messages on these aspects.

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