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Study on Consumer Knowledge, Attitude and Purchasing Practices Regarding Edible Fats and Oil in Kandy

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Abstract: Fat and oils plays one of the major roles in Sri Lankan modern unhealthy diet. The study was guided to collect, analyze, and interpret data about the awareness of general community on edible fat and oil products available in the market and their knowledge about safe/healthy ways of fat and oil usage. Convenience sampling method was used with a well-designed questionnaire for a sample of 250 purchasing women in Kandy district. Results revealed that, Coconut oil (71%) is the leading supermarket oil product purchased. From that RBD coconut oil is 46%, and white coconut oil 12% respectively. Consumption of animal fats and oil are very limited (<3%). Educational level affects significantly ($P<0.05$) on purchasing behavior. Regardless of educational level and working status, price (73%) will be the most significant factor look at during purchasing edible oils while only 11% look at the nutritional table. 57% of purchasing women use the same oil for both deep frying and stir frying. Coconut oil is the predominant for both frying types. Only 43% of women keep two different types of oils for stir frying and deep frying. 83% of the respondents use oil more than one time after first cooking. Working women prefer internet and facebook (38%) as the major food related information searching resource, while newspapers (35%) are among non-working women. All in all, lowering the price of healthy fat and community awareness programs will encourage healthy fat and oil purchasing behavior in Sri Lanka.

Summary: Fats and oils play one of the major role in unhealthy diet. Even though we get energy from non-fat part of our diet, there has to be some part from fat as well to provide essential fatty acids which the body alone unable to synthesis. Apart from that it act as a carrier of fat soluble vitamins and necessary for their absorption. Generally about one third of energy intake should obtain from fat and too much fat can leads to weight gain, and many more non communicable diseases such as CVD (Cardio vascular diseases). In the current society lifestyle factors including maladaptive diet are dominating other factors which causes systematic inflammations which will be the major process that leads to develop atherosclerosis. Fat and oils plays one of the major roles in Sri Lankan modern unhealthy diet. The study was guided to collect, analyze, and interpret data about the awareness of general community on edible fat and oil products available in the market and their knowledge about safe/healthy ways of fat and oil usage.

Keywords: edible fats; deep frying; stir frying; RBD coconut oil; purchasing women

Introduction

"Why do we eat?" answer to this question will be obviously to gain energy that we need for day to day activities and ultimately to promote survival. Conversely, our modern day food choices advocate to threaten our health and wellbeing. Biggest reason for this is what we eat has very less to with our sustenance and much more on taste.

Fats and oils play one of the major role in unhealthy diet. Even though we get energy from non-fat part of our diet, there has to be some part from fat as well to provide essential fatty acids which

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the body alone unable to synthesis. Apart from that it act as a carrier of fat soluble vitamins and necessary for their absorption(Meijaard *et al.*, 2022). Generally about one third of energy intake should obtain from fat and too much fat can leads to weight gain, and many more non communicable diseases such as CVD (Cardio vascular diseases)(Kadandale, Marten and Smith, 2019). In the current society lifestyle factors including maladaptive diet are dominating other factors which causes systematic inflammations which will be the major process that leads to develop atherosclerosis.(Ali and Kapoor, 2010) Diet and lifestyle can be modified in order to prevent these type of non-communicable diseases and this area has been the main focus of nutrition based research. In order to overcome this common complication, general public should have adequate and accurate knowledge and awareness about what they consume as food(Aksoylu Özbek, Çelik and Günç Ergönül, 2020). At the same time, there are numerous spook stories about different fats and oil varieties. Nowadays these myths about fat and oil goes way over the top among others due to large number of emerging food related health complications.

With emerging knowledge supporting media which provide ample amount of information regarding diet and overall human health, many consumers tend to take their personal health and nutritional decisions into their own hand(Kalog *et al.*, 2022). People are becoming more contingent on nutritional sources including websites, television advertisements, radio, newspapers, friends and family. This may lead to nutrition misinformation and health fraud(Ali and Kapoor, 2010). Still general public has no awareness on accurate, peer reviewed science based nutritional information(Nondzor, Tawiah and Michael, 2015). Nutrition information which not supported by science may be incomplete and misleading. It can be challenging for consumers to differentiate what is wrong and what is right. In order to solve this, there has to be online scientific and reliable communication source (blog, web page or face book page) for Sri Lankan community to raise their day to day food related issues and get accurate scientific solution quickly.

According to FAO researches(FAO, 2014), assessing and analyzing consumer nutrition related knowledge, attitudes and practices (KAP) will be one of the beneficial method in gaining a good insight into people's personal determinants on their dietary habits(Bandara *et al.*, 2021). By considering above details, the aim of this study is to identify factors which influence consumer choices on different fat and oil types available in Sri Lankan supermarkets. Additionally to review food purchasing behavior and knowledge of the community in selected study locations. Information was gathered using a questionnaire survey. Food purchasing behavior of global consumers including developed and developing countries like Sri Lanka, has significantly varies due to their income, education, global interactions, information, communication technology, urbanization and emerging health awareness(Sammy, 2011). However shopping has become a trend in current society which directly influence on consumer's food choices and dietary patterns.

But with the current economic situations mainly in developing countries, there is a common bad habit that people tend to go for cheap option. One example is using refined coconut oil in cooking. Other than supermarket customers in rural areas people used to buy bulk coconut oils from retail shops. This is really bad and at least now people has to go for good and healthy choices in the case oil selecting best cooking oil for their day today cooking(Vakayil and RS, 2019). The food environment tend to play a main role in deciding purchasing decisions in which people are living. Namely, supermarkets, convenience stores, retail shops and fast food restaurants(Zhao *et al.*, 2021). According to a study conducted by global market researcher in North America, women do most of shopping than men and they are the ruler's of kitchen and also dominate the supermarkets and retail market place(Rathee and Rajain, 2021). Therefore, purchasing women aged above 20 (working and non working) was selected as target group in this survey. Cooking oil is the most important ingredient when it comes to daily cooking. In current market there are many cooking oil under superior branded and non-brand names with different level of pricings(Rajee and Lenitha, 2022). Those are mainly coconut oil, palm oil, sunflower oil, soy bean oil, sesame oil, corn oil and ghee. Research findings show that the volume of branded oil market is less than 10% in Sri Lanka, remaining is still loose oil in grocery shops(Marina brand Sri Lanka, no date).

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Regardless of urban and rural marketing team of Marina has done a market research and the results shows that 58% of respondents purchase coconut oil and 21% purchase other vegetable oils or both. Since past coconut oil was the leading cooking oil that normally purchased highly in Sri Lanka than any other local or imported cooking oil type. Coconut oil is having a long history being a part of Asian diet(Marina, Che Man and Amin, 2009), where olive oil is in the Mediterranean diet(Mazzocchi *et al.*, 2019). Contribution of coconut oil is only about 35 to the global usage whereas palm oil contributes approx. 33% (Fernando, 2011).

According to a Sri Lankan study conducted with 4 different populations including, two rural, one sub-urban and urban, it has been revealed that amount of total fat intake was 77.82, 69 and 66 respectively and it was in a range of24-25% from total dietary energy(Weerasekara *et al.*, no date).although higher amount of lipid profile reported among urban subjects, still the value was in the non-risky range. Urban people probably consume more sources of fat other than coconut oil and coconut products which other groups do(T. S. G. Peiris, M. T. N. Fernando and S. Samarajeewa, 2004). However satisfactory lipid profiles were observed among rural community due to greater physical activity. Similar study done with two Polynesians tribes which shows 35% to 56% of total energy has been obtained from coconut(Prior *et al.*, 1981), but the heart disease incidents reported were very low. However due to their migration to Australia or New Zealand, their cholesterol level and heart diseases rate shown a significant rise.

Few years earlier there was a black mark on consumption of coconut oil saying that it causes heart related problems. There is a hypothesis which says more saturated fats (SFA) in coconut oil, palm oil and animal based fats tend to increase the probability of getting hyper cholesterol level is blood which leads to heart related diseases, whereas Polyunsaturated fatty acids (PUFA) in soybean oil and corn oil have the potential in decreasing above mentioned disease conditions. A Harvard professor, Karl Michels has reported that "coconut is one of the worst food you can eat". By contest a cardiologist Dr. Aseem Malhotra has stated the opposite idea saying that current medical evidences suggests that coconut oil is more beneficial to consume than hydrogenated fats(Sunday Times, 2018)(Sacks *et al.*, 2017).

However the main aim of this study is to identify factors influence consumer choices for different fats and oils available in supermarkets. Mainly to explore whether there is any difference in intelligent purchase between working women and non-working in working women. Further to review food purchasing behavior and knowledge of the community.

Methodology

Sampling

Purchasing women aged above 20 (working and non working) was selected as target group in this survey. A sample of 250 respondents were selected from Kandy district using convenient sampling method and generalized the total population of purchasing women who purchase edible fats and oil in Sri Lanka. The samples were drawn from supermarkets, food courts, restaurants in Kandy, Katugasthota, Peradeniya, Digana area.

Methods of data collection

Convenience sampling method was used in gathering information from subjects and a well-designed questionnaire was created including both open ended and close ended questions. Data gathering was primarily done using survey methods and data was obtained from supermarket customers of Kandy district, Sri Lanka. The questionnaire consisted of key areas including, use and purchasing of household fats and oil, the social background and related information which use to make their food choices.

Two months period was allocated to gather data and in depth results could be gained if the research time period was extended. The scope of the research was limited with 250 of respondents from Kandy district.

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Expected outcome

Ultimate target is to find out what community really want and what is lacking in the society. Further to conclude what we can do as food science researchers in order to upgrade food related knowledge in Sri Lankan community.

In order to solve this, there has to be online scientific and reliable communication source (blog, web page or face book page) for Sri Lankan community to raise their day to day food related issues and get accurate scientific solution quickly

Data analysis procedure

The questionnaire was designed by including expected variables of the study. Raw data was analyzed using descriptive statistics by SPSS, the Statistical Package for Social Science. The analysis involved in processing and transforming raw data in to tables, charts and frequency distributions.

Results and Discussion

Demographic characteristics among respondents

Areas explored: educational level, working status, whether she is a mother or not. The same variables were found in a study done by(L.Ricciuto, Tarasuk and A.Yatchew, 2006) during analyzing purchasing behavior. The consumers were asked to indicate whether they are mothers, their education level and working status in the questionnaire.

Educational level

Results revealed that more than fifty percent of respondents had completed their advance level of education (58%), and 30% of respondents had completed their graduate studies. This was followed by 11% of ordinary level education. Findings clearly indicates that most of the respondents were comparatively educated.

Working status

From total of 258 respondents, 166 (64%) purchasing women are not working while only 92 are working. Women who works in full time basis was highlighted in time saving type of behaviors. (Rajee and Lenitha, 2022)They tend to purchase convenience product with easy preparation and try to grab their supper directly from outside. Therefore working status is essential to evaluate when it comes to oil purchasing.

Mothers

Women with children did not show convenience purchasing behavior and also they make meals on their own at home. Mothers normally look in to healthiest things for their children. Through different types of information gathering methods they use to find information about fats and oils.

Edible oil types most frequently purchased from supermarkets

Table 1. Edible oil types most frequently purchased from supermarkets.

Oil type	Frequency	Percentage
RBD coconut oil	119	46.12
Sunflower oil	57	22.09
Cooking oil or vegetable oil	54	20.93
Olive oil	38	14.73
Virgin coconut oil	35	13.57
White Coconut oil	31	12.02

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Soya bean oil	10	3.88
Ghee	8	3.10
Sesame oil	6	2.33
Corn oil	4	1.55

Above table shows different type of edible oils generally purchased by women from supermarkets in Kandy district. And most of the respondents normally purchase more than one type of oil for their daily consumption. It is revealed that, majority of the respondents (71%) purchased coconut oil and from that highest was 46% goes to RBD coconut oil. Even though the contribution from coconut oil is only 3% to the world usage of edible oils when compared with palm oil which is providing 33%, oil Coconut oil is the major cooking oil type from the past in Sri Lanka. With the expansion of consumer awareness about fat and oils and their nutrition, currently there is a considerable demand for sunflower and olive oil as well. But, during the survey it was revealed that Sri Lankan purchasing women have a phobia to purchase palm oil. As they commented, palm oil was the worst type of oil among others. There is no doubt that palm oil is technical utility comes from its high melting point and it's cheap. Sunflower oil and cooking oil or vegetable oil shows the second most frequently purchased oil type from supermarkets. During survey it was observed that most of respondents purchase coconut oil as the major and they also purchase some other vegetable oil (sunflower, olive oil or vegetable oil) as the second option. Corn oil is the least purchased oil type by purchasing women in Kandy.

Factors that leads consumers to purchase edible oils

During the survey consumers were asked regarding the factors that can affect their purchasing decisions. Findings were illustrated in Table 2. And it reveals that the price of oils was the predominant factor in purchasing oil type from the supermarket. It shows the highest percentage (73%) among other factors. According to the results no one is concerning much about the quality of the container or the color of oil when they are purchasing or selecting oil from supermarkets. Second most concern is about manufacturing and expiry date. From all the respondents 51% said that they are definitely looking at expiry date before buying an oil bottle. 34% of respondents look at the brand name while only 11% look at the nutritional table. Besides, most of the respondents were having limited knowledge on saturation and unsaturation status of oil. Findings were closely similar with a study conducted in Ghana on the awareness of saturated, monounsaturated and unsaturated status of fats and oils(Nondzor, Tawiah and Michael, 2015). And another similar type of study has been conducted in Badulla district Sri Lanka and revealed that very few people have the tendency to buy and consume branded edible oils (Sandamini *et al.*, 2022). When speaking with respondents, it was identified that the brand name of the product has a strong relationship in making their purchasing decision and it comes with a good perceived quality, wealth and social class(Baziana and Tzimitra-Kalogianni, 2019).

Table 2. Factors drives consumers in purchasing edible oils.

Parameters looking when purchasing oil	Frequency	Percentage
Type of oil	0	0
Nutritional content	28	11
Quality of the container	0	0
Brand name	89	34
Manufacture & expiry date	133	51
Price	190	73
Color	14	5

How educational level affects consumer purchasing behavior

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Table 3. How educational level affects consumer purchasing behavior.

Parameter	Ordinary level	%	Advance level	%	Tertiary level	%
Oil type	0	0	0	0	0	0
Nutritional facts	1	3	13	9	14	16
Quality of the container	0	0	0	0	0	0
Price	12	41	106	75	72	82
Brand name	5	17	54	38	30	34
Manufacture and expiry	22	76	84	60	27	31
Color	2	7	8	6	4	5

Educational level affects significantly ($P<0.05$) on purchasing behavior Regardless of effect from educational level, price will be the most significant factor look at during purchasing edible oils. However more that 70% of purchasing women who are having secondary and tertiary education give the first place to price when they purchase a cooking oil. Both these group shows nearly equal concern on brand name than purchasing women who have completed only their ordinary level as the highest educational qualification. In contrast 76% of the ordinary level educated people look at manufacture and expiry date. As per the results from a study done by (Wu, 2022) it has been proved that educational level positively matters on the purchasing intention.

How working status affects consumer purchasing behavior

Table 4. How working status affects consumer purchasing behavior.

Parameter	Working women	%	Non-working women	%
Oil type	0	0	0	0
Nutritional Facts	21	23	7	4
Quality of the container	0	0	0	0
Price	72	78	118	71
Brand name	55	60	34	20
Manufacture and expiry	76	83	57	34
Color	2	2	12	7

Equally for both groups highest concern is price and it is 71% for non-working and 78% for working women. 83% of working women look at manufacture and expiry as a major concern while only34% of non-working women cares for manufacture and expiry.

Using same type of oil for stir frying and deep frying

Table 5. Using same type of oil for stir frying and deep frying.

Using same oil	Use two different oils
149	99

Among 258 of respondents 10 are not doing stir frying or deep frying for their daily cooking. 58%of respondents use same oil type for deep frying and stir frying while 38% keep two different oils for deep frying specially. In general, most of the house wives use coconut oil for deep frying.

Table 6. How educational status affects usage of oil for stir frying and deep frying.

	O/L	%	A/L	%	T/E	%
Same oil type	16	55	76	54	57	65

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Different oil type	10	34	62	44	27	31

(O/L-ordinary Level, A/L Advance Level, T/E- Tertiary Education).

Regardless of educational level, nearly 55% to 65% of purchasing women in Kandy use the same oil for both deep frying and stir frying. And most of them use coconut oil for deep frying. Only 30% to 45% of women keep two different types of oils for stir frying and deep frying. There is no any visible effect from educational status for selecting oil for different type of cooking.

Table 7. How working status affects usage of oil for stir frying and deep frying.

	Working women	**%**	**Non-working women**	**%**
Using same oil type	49	53	100	60
Different oil type	40	43	60	36

Even though working women search for most convenient way in cooking 53% of working women use same oil for both deep and stir frying while 60% of non-working women does the same.

Oil types use for deep frying and stir frying

Table 8. Using same type of oil for stir frying and deep frying.

for normal cooking										**for deep frying**									
Virgin coconut oil	RBD coconut oil	White Coconut oil	Sunflower oil	Cooking oil/vegetable	Olive oil	Sesame oil	Soya bean oil	Ghee	Corn oil	Virgin coconut oil	RBD coconut oil	White Coconut oil	Sunflower oil	Cooking oil/vegetable	Olive oil	Sesame oil	Soya bean oil	Ghee	Corn oil
13	22	4	18	13	4	2	3	0	1	1	24	8	4	8	11	0	0	0	0

This data was collected from 99 respondent who mentioned that they are using two different type of oil separately for deep frying and stir frying. Still RBD coconut oil is the most used type for both stir and deep frying. Next to coconut oil, olive oil users tend to use olive oil for their normal cooking and for deep frying as well.

Repeatedly oil usage

Table 9. Usage of repeatedly fried oil.

	using more than one time	**one time**
Frequency	215	43
%	83	17

83% of the respondents use oil more than one time after first cooking while only 17% use oil for just only one time. According to comments written by respondents, one time used oil is normally used by one or two times for cooking. As a summary they are normally reusing oils, which use for "*papadam*" frying, or any deep frying process but one or two more times after first frying. In this case people are having satisfactory idea about re-usage of oil. They know repeated using is bad for health and it may cause cancers(Kalan, 2019). Re-usage of oil becomes more natural when it comes to deducting kitchen budget. Not even in home scale, in restaurants, and in snack trucks oil is reused to cut down their cost and to increase more profit. It is advisable not to use frying oil more than twice(Deshmukh, 2019). It depend on oil type, temperature of cooking and also storage. If the oil

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smokes upon heating or if the oil has turned dark and thick it may be good to replace it(Abujazia *et al.*, 2012).

Purchasing of butter and margarine

Table 10. Purchase of butter and margarine from supermarkets.

Margarine	%	Butter	%
76	29.5	161	62.4

According to the results consumption of animal fats and oil are very limited in Kandy district. In comments most of women mentioned that they normally purchase two type of oils. One healthy oil type (especially sunflower oil or olive oil) along with coconut oil. As the reason for these two purchases they mention that she, her husband or one of their family member is having hyper cholesterol. Therefore they tend to use healthy oil for them and coconut oil for frying foods for kids or for special occasions.

From 258 of total respondents, 161 purchase butter and its percentage is 62% while only 76 of tit (26%) purchase or select margarine for their daily consumption. There is one set of purchasing women who do not purchase butter or margarine for their home consumption. Nearly the percentage is 5%. And at the same time only 17 respondents from 258 of total (7%), do not know that there is a difference in between butter and margarine. All other 93% of respondents know that there is a difference. A survey done by (Graulet *et al.*, 2004) has shown that consumption of butter has a smaller or neutral association with Cardiovascular diseases and diabetes. But still the quantity has to be within the acceptable range.

How educational status affects selection of butter or margarine from supermarket

Table 11. How educational status affects selection of butter or margarine from supermarket.

Ordinary level				Advance level				Tertiary education			
Margarine	%	Butter	%	Margarine	%	Butter	%	Margarine	%	Butter	%
9	31	14	48	44	31	87	62	23	26	60	68

When consider educational level and selection of fat products, in all three educational levels people go for butter purchasing than margarine. 68% from total of purchasing women who have tertiary education goes for butter than margarine (26%). Equally 62% purchase butter and only 31% purchase margarine in the group who are having advance level as their highest educational level. And 48% purchase butter and 31% purchase margarine in the group who are having ordinary level as their highest educational level.

How working status affects purchasing of butter or margarine from supermarket

Table 12. Working status affects fat purchasing behavior.

Working women				Non working women			
Margarine		Butter		Margarine		Butter	
Frequency	%	Frequency	%	Frequency	%	Frequency	%
35	38	55	60	41	25	106	64

Among working women Butter (60%) is highest purchased than margarine (38%). Same manner can be seen in the group of non working women. Butter purchasing percentage is little higher than in working women and its 64% while only 25% go for margarine purchasing.

Sources where people get food related information

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Table 13. Different food related information gathering resources among purchasing women.

	Frequency	%
Newspapers	77	30
through friends	7	3
TV advertisements	14	5
Face book pages and internet	72	28
Women's magazines	47	18
TV programs about food & health	37	14
Through experience and family practices	52	20
Books	8	3

Highest number of respondents (as a percentage 30%) marked newspapers as their major food related information gathering method. Second most popular information gathering method is facebook and internet. It might be through youtube videos, pages, or articles in internet. As a percentage it's 28%. Third main group is basically respondents who get facts through past experiences and from family practices. 18% of respondents refer women's magazines to find food and health related information, while 15% of purchasing women get information through television programs. According to gathered results, least popular food relation information searching methods are TV advertisements, books and through friends. All three are below 5%. At the same time, most of the house wives and mothers told that they still believe what their parents, grandparents about fats and oil.

How educational level affects on usage of different food related information gathering resources

With the educational level of purchasing women, type of information search shows different percentages. Significantly women who have tertiary education will use internet or facebook as their major food related information gathering method. And it is 64% while only 11% of purchasing women in the group of advance level and 3% in the group of ordinary level use internet or face book as their food related information searching source. 38% of women who is in level two education (advance level) use newspapers as their major food related information searching method. But, only 17% in level three and 21% from level one use news papers for food related information search. Women magazines are the most popular food related information searching method among purchasing women who are in level one education. But only 10% of level three respondents and 18% of respondents in level two use women's magazines as their food related information searching method. Least popular method is through friends. And still there is a high percentage for information or knowledge coming through families and past experiences among people who had their education up to advance level.

How working status affects on usage of different food related information gathering resources

As per the results, working women prefer internet and facebook in searching food related information. From total number of working women (92), 35 of respondents use this method and as a percentage its 35%. Among non-working women the percentage is about 22%. Newspapers are the main information seeking resource among non working women. Usage of women's magazines and TV programs about food and health shows similar percentage in both working and non-working groups.

Conclusion

As a summary, lowering the price as much as possible in healthy oils may encourage more number of consumers to buy them even without limiting to a certain group of the society. Health and nutritional benefits should be penetrated more in to general public in an effective manner and it will be a responsibility of all researchers, media and respective authorities. Hence mothers and all the purchasing women are the responsible ones who does the selection of fat and oil type which need to

be consumed at home, we need to find more powerful and effective methods to deliver correct, actual and novel knowledge about food and food health related information.

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