

Awareness on Dietary Fats among Consumers and the Levels of Total Fat in Selected Foods; in Relation to Proposed Nutrition Labelling in Sri Lanka

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ABSTRACT— *Excessive consumption of dietary fats is one of the principal causes of the prevailing problem of noncommunicable diseases in Sri Lanka. With the intention of combats against the rising levels of noncommunicable diseases, Ministry of Health, Sri Lanka have proposed regulations, for mandatory food labelling and traffic light labeling on processed foods. The effectiveness on nutrition profile labelling is greatly determining by the awareness and attitudes on dietary fats among consumers, and the levels of total fats present in foods available in Sri Lanka. Therefore, a cross sectional study was conducted with 413 shoppers, lives in Colombo district, Sri Lanka. Self-administrated questionnaire was used to assess the consumers' postures on dietary fats. Total fats of seventy four most popular food products were also determined, under seven categories as; fast foods, bakery products, spreadable fats, biscuits, snacks, Sri Lankan sweetmeats and chocolates. According to the findings, respondents have a good basic knowledge of dietary fat-disease relationship. Nevertheless their awareness on different types and terms related with dietary fats were low. Even though the majority were food label users, the use of information on food labels such as; ingredient list, nutrition information and serving size were substantially poor. Therefore to gain the intended outcome of the proposed regulation, consumers need to be educated about dietary fats and use of food labels. According to the total fat analysis, 47 food products out of 74 were segmented under red category, suggesting the need of active regulations to limit the fat present in processed foods available in Sri Lanka. As well as total fat, saturated fat present in food play a significant role in human health and proposed nutrition profile labeling. Hence further studies are needed to assess the amount of saturated fat present in processed foods available in Sri Lanka.*

Keywords— Dietary fats, Noncommunicable diseases, Traffic light labelling, Processed foods

1. INTRODUCTION

There is indubitable evidence that high dietary fat intake by Sri Lankans is related with the rising levels of noncommunicable diseases, which is a leading cause of deaths in Sri Lanka [1]. The Ministry of Health has shown that around 600 individuals succumb to noncommunicable diseases each day in Sri Lanka [2]. Also the proportion of deaths due to circulatory diseases (such as heart disease and stroke) has increased from 3 percent to 40 percent during past half century in Sri Lanka. As well, mortality rates from noncommunicable diseases are currently 20 to 50 percent higher in Sri Lanka than in developed countries [3]. According to the report of World Health Organization's non communicable diseases country profiles 2014, noncommunicable diseases are estimated to account for 75% of total deaths in Sri Lanka [4].

Therefore as an effort to combats against the prevailing problem of noncommunicable diseases, Ministry of Health, Sri Lanka has proposed different strategies for mandatory food labeling and traffic light labelling system for dietary fat, especially on processed foods available in Sri Lanka [1]. Nevertheless the intended outcome of these proposed strategies are greatly determining by the awareness and attitudes towards dietary fats and nutritional labelling among Sri Lankan consumers and the levels of total fat present in processed foods available in Sri Lanka. As reported by many printed versions [5, 6] the hidden fat in processed foods play a major role in this problem of rising levels of noncommunicable diseases. Therefore the purpose of this study was to provide estimates of awareness and attitude towards dietary fats and nutrition labelling among Sri Lankans and to examine the levels of total fat in selected processed foods in Sri Lanka.

2. MATERIALS AND METHODS

2.1 Survey Methodology

2.1.1 Study Design and Survey Instrument

The study design used in this survey was analytical cross-sectional. A self-administrated questionnaire was used to investigate consumers' knowledge of health risks associated with high dietary fat intake, familiarity with types and terms related with dietary fats, attitudes towards the amount of dietary fat present in foods, and its effect on purchasing decision and consumers' comprehension on the amount of dietary fat present in foods available in Sri Lankan market. The questionnaire was validated by conducting a pilot study prior to the survey.

2.1.2 Study Area

The survey was conducted in Colombo District, which is one of the three districts of Western Province with the highest population density; 3438 persons per square kilometer in Sri Lanka [7]. A large part of Colombo District is comprised with Colombo city which is the largest, and the commercial capital of Sri Lanka where there is a concentration of government, and private offices. And also it is characterized by many economic and social activities including: shopping for food items, food selling outlets and various supermarkets. According to the discussion paper of policy options and actions for the prevention and control of selected chronic noncommunicable diseases in Sri Lanka [8], they have revealed that the mortality due to noncommunicable diseases is higher in urban areas comparatively to rural areas. Therefore, Colombo District was specifically selected for this study due to the fact, that it is an area with burden of noncommunicable diseases.

2.1.3 Study Population

The study population was individuals, aged 18 years and above, who were found actively participating in food purchasing activities in selected supermarkets (Arpico, Cargills, Keells and Laughs located in major cities of Colombo District), fairs (Delkanda, Maharagama, Thotalanaga and Kaduwela), economic centers (Narahenpita, Meegoda and Rathmalana), fast food outlets, retail shops and around street vendors within Colombo District. The study excluded non-citizens of Sri Lanka, since they may have different practices with regards to reading and using information on food labels and dietary fats.

2.1.4 Data collection and Analysis

The survey was conducted during the period, September to November in 2014. A stratified random sampling method was used to select a representative sample with 413 respondent consisting of male and female shoppers, age 18 and above. A proportional stratified sample was obtained by formulating stratum fractions according to gender, using census data provided by Department of Census and Statistics, Sri Lanka [9]. Randomly selected shoppers in the stratum were invited to take part in the study by completing the questionnaire. In the case where shoppers declined to participate, the process was repeated by approaching the next passing shopper in the stratum. In few cases verbal assistance was provided on request. Before completing the questionnaires, the respondents were informed about the research aim and the confidential use of all the data gathered.

All data gathered from the survey were analysed using Statistical Package for the Social Sciences (SPSS) version 16.0. Both descriptive and inferential statistics were created and used to define and explain the results. The frequencies of subjects in categorical variables were analyzed using descriptive statistics, and bar charts were used for graphical representation. For inferential statistic representation, Pearson's chi square test (χ^2) was used to determine whether a significant relationship exists between two categorical variables. The p-value of 0.05 was taken as significant. Further, for the determination of strength of association, between variables where a significant difference exists, gamma value was calculated.

2.1.5 Survey Measurements

The survey measurements on consumer knowledge and attitudes toward dietary fat and food labelling were developed (Figure 1) based on the diffusion of innovation theory by Everett Rogers [10] and the manual of guideline for assessing nutrition related knowledge, attitudes, and practices of Food and Drug Administration [11].

Knowledge of Health Risks Associated with High Dietary Fat Intake

To assess the basic knowledge of health risks associated with high dietary fat intake, participants were asked to identify whether they were aware of the relationship between high fat intake and various health complications, by responding 'yes' or 'no'. To further assess the knowledge of dietary fat diseases relationship another question was asked to identify the true statement regarding the diseases related with high consumption of dietary fat. The percentage of respondents who knows the correct answer was used as the indicator to quantify the knowledge on health risks associated

with high dietary fat intake [11]. As well, in order to reveal, the major sources of nutrition information which respondents are highly exposed; nine selected sources (family/friends, family doctor, school, radio, television, newspaper, internet, advertisements and posters/ leaflet) were given to participants to mention all that apply.

Familiarity with Types of Dietary Fats and Terms Related with Dietary Fats

The effectiveness of nutritional labeling on dietary fats depends on the consumer familiarity, and the understanding of different types of dietary fats and terms appear on the food label. Three types of major dietary fats, and four terms related with fat sources were given on the questionnaire to tick the terms that participant have ever heard before. It was a multiple answer question and participants were allowed to tick all that apply. The percentage of responses for each term was used as an indicator of the familiarity of the term [11].

Consumer Attitudes towards Food Labelling and Dietary fat Present in Processed Food

The attitude of consumers on the amount of fat present in a food and its effect on their purchase decision were assessed by using a 3-point scale as ‘very concern’, ‘somewhat concern’ and ‘not at all concern’ on the amount of fat present in food and the scale ‘always’, ‘often’ and ‘not at all’ for the impact on their purchase decision of that food. And also to measure the attitudes of Sri Lankan consumers on food labelling another question was asked using a 3-point scale as; ‘very concern’, ‘somewhat concern’ and ‘not at all concern’ for seven different significant factors which appear on food label such as expiry date, manufacture date, price, weight, ingredient list, nutrition information, and serving size.

Consumer Comprehension on the Amount of Dietary Fat Present in Selected Food Items

In order to determine participants’ ability to make comparisons between food products relating to total fat content [11], participants were presented four food items which were selected by using criteria; two fried products and two highly fat incorporated products which are commonly available in the market and consumed by individuals belongs to all social classes in Sri Lanka. Then participants were asked to rank the given list of foods in ascending order of the total fat content they contain. The food with highest frequency in each rank were selected to obtain the generalized order of fat content of given foods while the results disclosed from the total fat determination were used to recognize the correct order of total fat present in those foods. Finally the orders of food obtained from the analytical results and the respondents were compared to determine the consumer comprehension on the amount of dietary fat present different foods available in local market.

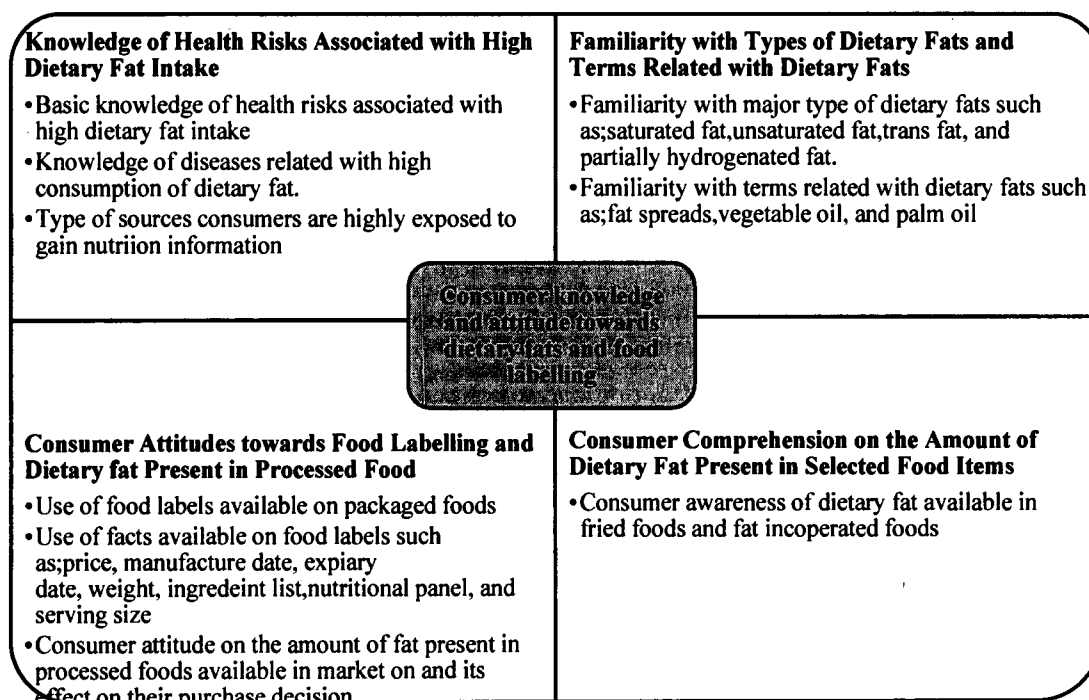


Figure 1: Survey measurements of the study

2.2 Total Fat Analysis of Selected Foods

2.2.1 Selection of Food Samples

Levels of total fat were determined in 27 food products (total of 74 brands), selected under seven categories as; fast foods (rolls, vade, burgers, french fries, fried chicken, and pizza), bakery products (bread, fish bun, pastries and cake), spreadable fats (butter, margarine and fat spreads), biscuits (sweet biscuits, cream biscuits, wafers and cream crackers), snack foods (manioc chips, flour based snacks, fried peanuts and extruded snacks), Sri Lankan sweet meats (kavum, kokis, mung kavum and boondi) and chocolates (milk chocolate and chocolate enrobed wafers). Three brands from each product type were selected for the analysis, except butter, sweet biscuits, cream biscuits, crackers and chocolate coated wafers where only two brands were chosen and margarine with one brand. Market share information was used where available to select the top three brands from each product type. Shops/sellers belong to three levels of social classes (upper, middle and lower) in Sri Lanka were chosen in the case where lack of market information for the selection of brands.

2.2.2 Sampling Area and Sample Collection

All samples were purchased between September to November in 2014, from supermarkets, retail shops, takeaway outlets and street vendors within Colombo District, Sri Lanka.

2.2.3 Sample Storage

All labelled samples (biscuits, wafers and crackers, spreadable fats, chocolates) were stored according to the instructions given by the manufacturer and analysed before their date of expiry. Unlabelled perishable items (fast foods, bakery products, Sri Lankan sweet meats) were packed in sealable plastic storage bags and stored under refrigerated condition as soon as possible. Unlabelled dry food items (snack items) were packed in sealable plastic storage bags and stored under room temperature. All these unlabelled food items were analysed within 1 or 2 days after purchase.

2.2.4 Determination of Total Fat

Total fat determination of food samples were done according to the Association of Official Chemists International (AOAC) method 922.06 [12] and their corresponding color codes as; red (>17.5g of total fat in 100g of food), amber (>3.0g to ≤17.5g of total fat in 100g of food) or green (≤3.0g of total fat in 100g of food) was determined according to the proposed traffic light labelling system by the Ministry of Health, Sri Lanka [13]. As well as the amount of total fat contained in 100g of food; the amount of total fat contained in a single serving of fast food was also calculated in the study. For individual items, the serving size was taken as a one unit of the product, where medium size serving according to the manufacturer, were guided as the serving size for rest of products. For products missing manufacturers' guidance for serving, the reference amounts provided by Food and Drug Administration were used as guide lines for the determination of serving size [14].

3. RESULTS AND DISCUSSION

3.1 Socio Demographic Characteristics of the Study Population

Table 1: Socio demographic characteristics of the sample selected

Characteristic (N=413)	Frequency	Percentage	
Gender	Female	211	51.1
	Male	202	48.9
Civil status	Married	265	64.2
	Unmarried	148	35.8
Age group (years)	18-24	54	13.1
	25-34	85	20.6
	35-44	92	22.3
	45-54	81	19.6
	55-64	67	16.2
	>65	34	8.2
Educational level	Up to O/L	142	34.4
	Up to A/L	138	33.4
	Higher education	133	32.2
Work in Food sector	Yes	35	8.5
	No	378	91.5
Work in Health sector	Yes	44	10.7
	No	369	89.3

As presented in table 1, the age dispersal of the study population was evenly distributed among the age groups of 25 to 34 years, 35 to 44 years, and 45 to 54 years; all together comprised approximately two thirds (62.5%) of respondents of the study population. The prominent group of respondents was the age group, 35 to 44 years (22.3%) with 92 respondents, while the minor group (8.2 %) was 65 years and above (n=34). Majority of respondents engaged in shopping activities were married (64.2%) compared to the number of unmarried respondents (35.8%). Surprisingly the level of education of respondents were evenly distributed among the three levels of education, and approximately two-thirds of respondents have educated up to advanced level. In addition, 35 respondents (8.5%) were employed in food sector while 44 respondents (10.7%) were in health sector.

3.2 Knowledge of Health Risks Associated with High Dietary Fat Intake

According to the results of the survey, all respondent (51.1% females and 48.9% males) were able to identify that high consumption of fats and oils leads to many disease conditions. Among them majority (63.4%) was able to identify, type of diseases related with high consumption of dietary fats as shown in figure 2. The respondents knowledge regarding diseases related with high dietary fat consumption was significantly influenced (Pearson $\chi^2=45.73$, $p < 0.001$) by the educational level of the consumer.

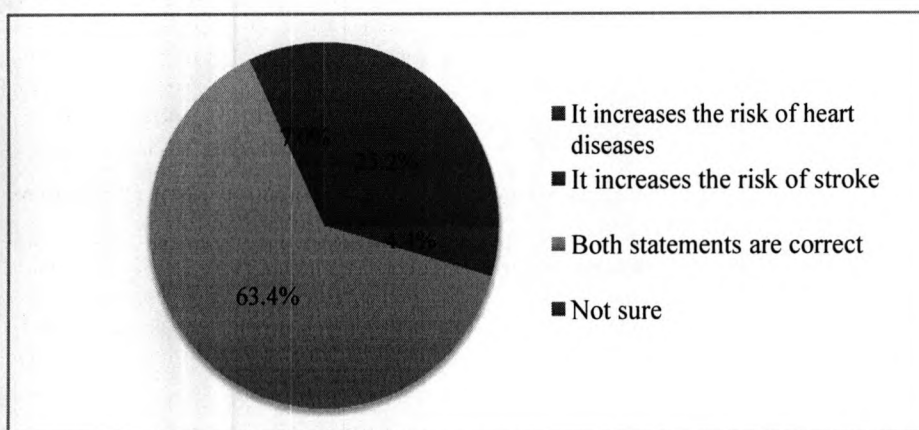


Figure 2: Frequencies of the selecting correct statement regarding dietary fat related diseases

The results from this study confirm the earlier finding [15] that media as the major source of information regarding health and nutrition among general public in Colombo district by exposition the highest exposed levels for television (78.7%). Next, family and friends (73.8%), school education (68.3%), newspapers (66.8%) can be concluded as media which consumers were highly exposed to gain nutrition information (Figure 3). Even though internet is a powerful tool of sharing knowledge nowadays, the frequency of use this powerful resource by Sri Lankan consumers were in a miserable condition, where less than half of the respondents (42.9%) were used it as a source of knowledge on dietary fat and diseases. The study [15] has also noted a similar frequency (41.2%), in their study regarding the use of internet by Sri Lankans as a source of nutrition information.

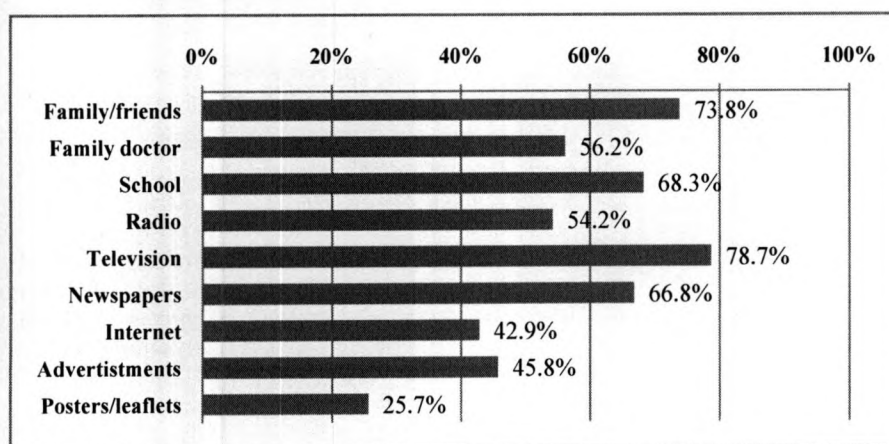


Figure 3: Frequencies of nutrition information sources used by respondents'

3.3 Familiarity with Types of Dietary Fats and Terms Related with Dietary Fats

According to the Figure 4 almost all (96.6%) respondents have heard, both fat spread and vegetable oil where nearly 85% have heard palm oil. With respect to them, the familiarity of respondents with other terms related to dietary fats was considerably poor. Among them saturated fat (39.9%) and unsaturated fat (36.2%) were more familiar than trans fat(20.0%) and partially hydrogenated fat(13.9%).Lack of attention of Sri Lankan consumers on ingredient list and nutritional panel on food labels where available as exhibited in figure 5 under the consumer attitudes towards food labeling and dietary fat present in processed food could be the major cause for the variations of the familiarity on different terms.

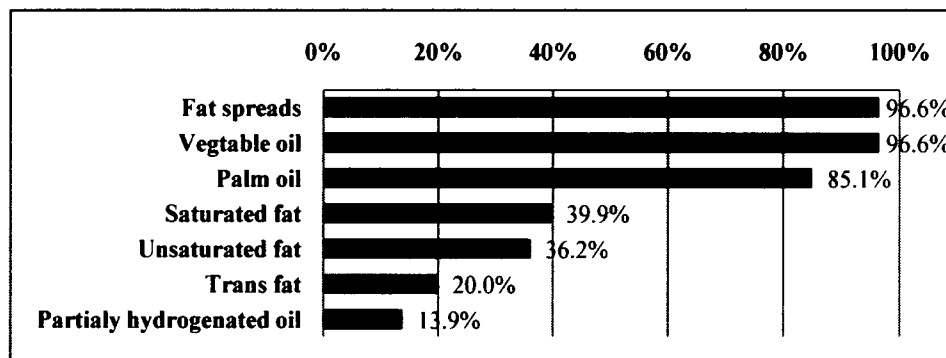


Figure 4: Percentages of respondents' familiar on different terms related with dietary fats

3.4 Consumer Attitudes towards Food Labelling and Dietary Fat Present in Processed Food

The table 2 summarizes the association between social-demographic characteristics of respondents and the extent of being concern about dietary fats in food.

Table 2: Association between socio-demographic characteristics of respondents and the concern on fat present in food

Socio-demographic variable	Extent of concern (n=413)			Pearson chi square χ^2	p value
	Very concern	Somewhat concern	Not at all concern		
Gender					
Female	55 (13.30%)	136 (32.90%)	20 (4.80%)	0.716	0.699
Male	46 (11.10%)	134 (32.40%)	22 (5.30%)		
Age group					
18-24yrs	11 (2.7%)	36 (8.7%)	7 (1.7%)	23.395	0.009
25-34yrs	8 (1.9%)	68 (16.5%)	9 (2.2%)		
35-44yrs	23 (5.6%)	56 (13.6%)	13 (3.1%)		
45-54yrs	27(6.5%)	48(11.6%)	6(1.5%)		
55-64yrs	19 (4.6%)	45 (10.9%)	3 (0.7%)		
>65yrs	13 (3.1%)	17 (4.1%)	4 (1.0%)		
Education					
Up to O/L	28 (6.8%)	94 (22.8%)	20 (4.8%)	8.040	0.090
Up to A/L	43 (10.4%)	84 (20.3%)	11 (2.7%)		
Higher education	30 (7.3%)	92 (22.3%)	11 (2.7%)		

The concern on dietary fats among consumers were considerably high and governed by the age factor of the consumer (Pearson $\chi^2=23.40$, $p =0.009$). The purchase decision of fatty foods showed a positive strong relationship (Pearson $\chi^2=1.83$, $p <0.001$, $\gamma= 0.739$) with consumers' concern on fats. Majority (92%) of respondents were food label users where gender (Pearson $\chi^2=6.23$, $p =0.044$) and the educational level (Pearson $\chi^2=16.17$, $p =0.003$) of the respondents were found significantly associated with use of food label information. As shown in figure 5 the most frequently referred labelling facts were expiry date, manufactured date, and price. Usage of other facts on food labels such as; weight, ingredient list, nutrition information, and serving size were very poor among Sri Lankan consumers.

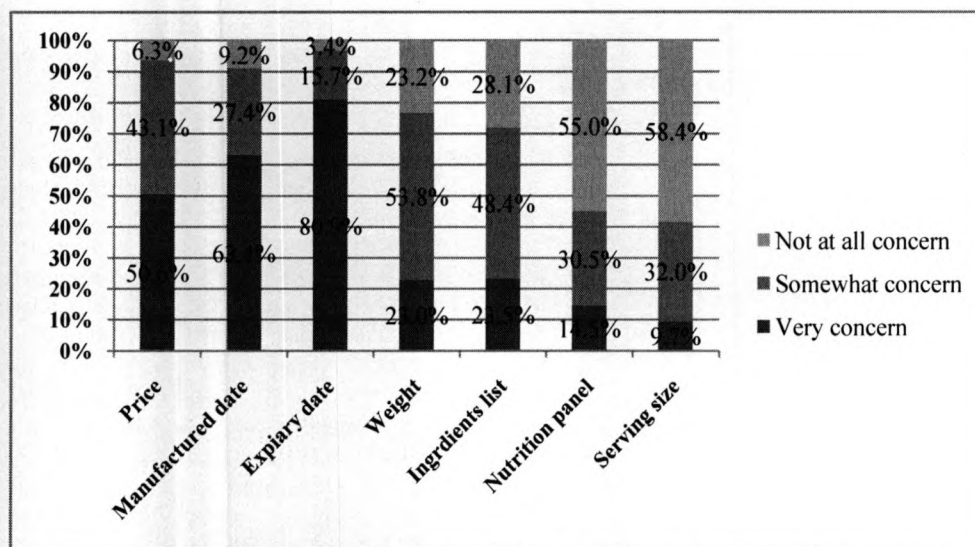


Figure 5: Type of information on food labels sought by respondents

3.5 Consumer Comprehension on the Amount of Dietary Fat Present in Selected Food Items

The study revealed, that consumer are unaware about hidden fats available in fat incorporated foods by holding an opinion, that more fat is available in fried foods than fat incorporated foods. As stated by the consultant medical nutritionist, Dr. Renuka Jayatissa of the Medical Research Institute in Sri Lanka, the hidden fats in foods such as; fast foods, challenge people to count the amount of fat they consume [16].

3.6 Total Fat and the Corresponding Color Code

Colour coding system helps consumer to sort out healthier foods from less healthier ones at a glance. Besides, the level of total fat present in selected food products; determine the positions of the food products in the proposed colour code system respect to total fat is another objective of the study. This was done comparing the limits of total fats in colour coding system proposed by the Ministry of Health, Sri Lanka [17, 18] and the analytical evidences obtained from the study.

Total Fat Content in Fast Foods

Selection of fast foods as a group of concern in the current study was based on the great attention, regarding hidden levels of fat in fast food items available in Sri Lanka [16]. According to the figure 6 the results obtained from the total fat determination of fast foods, the highest total fat content was obtained from french fries, as 24.19g of fat in 100g of food where; the lowest was found in rolls, as 12.70g. All fried food products except rolls showed a higher total fat content compared to fast food made by incorporation of fats.

According to dietary fat guidelines given by World Health Organization and American Heart Association, a healthy adult should intake 20% to 35% of their daily calorie requirement from fats and oils [19,20]. Based on 2000 calories diet it can be expressed as 44g to 78g of total fat. The consultant medical nutritionist Dr. Renuka Jayatissa has also bring up these values on her interview in Sunday times print edition [16] related to total fat requirement of sedentary Sri Lankan men and women. Exceeding these limits of fat intake could be a cause factor of obesity and NCDs which are prevailing problems in Sri Lanka. Many printed editions [17, 21] have mentioned that fast food play a major role of this problem because it is energy dense up to 65% more than an average diet. This statement can be proven up to some extent through this study by the point as we discussed earlier; a medium size serving of French fries, provides 28.31g of fat to the consumer which is approximately fulfill half of their average daily energy requirement from fat.

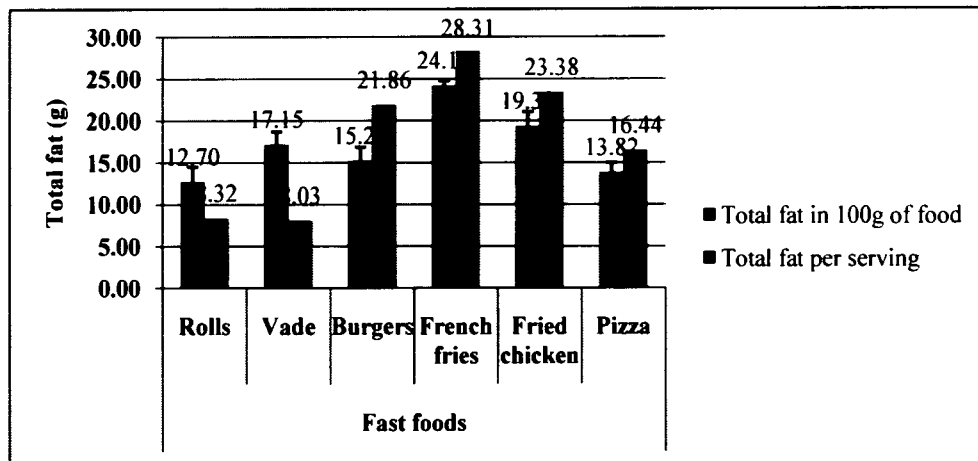


Figure 6: Levels of total fat in fast foods

Total Fat Content in Bakery Products

The results revealed that there is a wide variability of total fat contents among the category of bakery products, which range between the highest total fat in 100g of food; 32.57g in pastries. This finding is reflected in the previous study [22] which reveals the mean fat content in pastries as 32.5g in 100g of food and the lowest total fat in breads as 1.87g. Pastries and cakes showed higher amount of total fat compared to yeast leavened products such as breads and fish buns. The main reason for this variability is the high extent use of fat sources like butter, margarine and other bakery fats, during their production process, compared to yeast leavened products. As shown in Figure 7, the amount of fat present in a single serving of bakery products exhibit the same outline of the total fat in 100g of food.

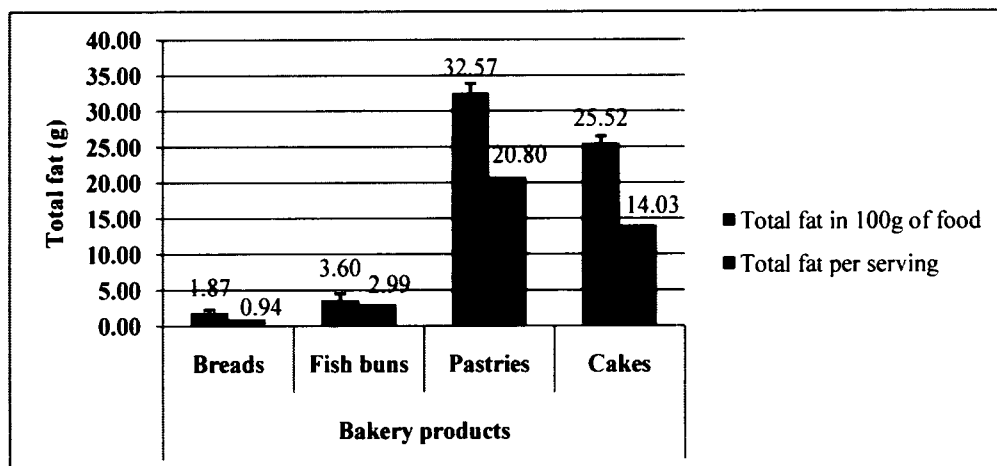


Figure 7: Levels of total fats in bakery products

Total Fat Content in Spreadable fats

Spreadable fats are products with a fat content of at least 10% but less than 90% by weight and which remain solid at a temperature of 20°C. They undergo standard classification according to their fat content and whether they are of dairy/non-dairy origin, vegetable origin or animal origin [23]. In Sri Lanka butter, margarine and fat spreads are the common types of spreadable fats available in supermarket shelves and grocery stores. According to the Food Standard Agency, given guideline [24] and Codex standards [25,26] butter is a product consist of milk fat with a fat content not less than 80% but less than 90%; margarine is a product obtained from vegetable and/or animal fats with a fat content of not less than 80% but less than 90% and fat spread is a product comprise of vegetable and/or animal fats with a fat content more than 60% but not higher than 80%. In the current study, the total fat results (Figure 8) obtained for selected fat spreads were found within the range of standard values. Highest fat content was found in the margarine product as 83.45g in 100g of food and the lowest was obtained from fat spreads.

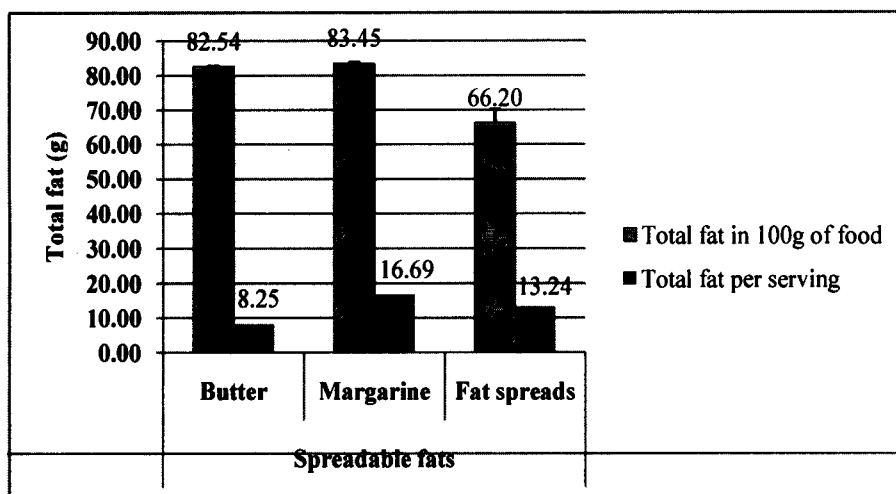


Figure 8: Levels of total fat in spreadable fats

Total Fat Content in Biscuits, Wafers and Crackers

According to the results, the highest fat content was found in wafers as 26.95g in 100g of food, following cream biscuits with 20.80g. Sweet biscuits and crackers resulted lower amount of total fat in 100g of food compared to above products. The main reason for this higher variation of total fat is the application of cream layer, made by incorporating high amount of vegetable fat such as margarine in the middle of biscuits. Wafers contain higher amount of total fat than cream biscuits because of several reasons.

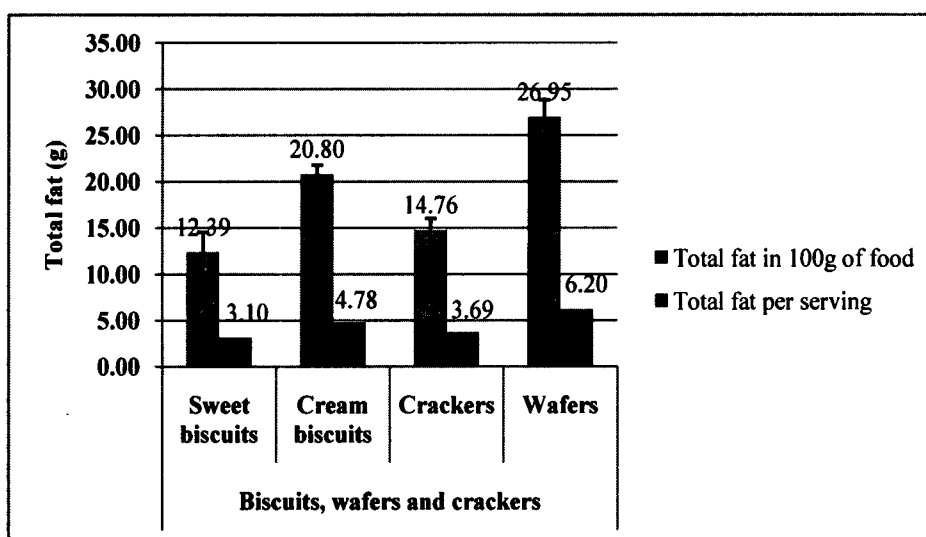


Figure 9: Levels of total fats in biscuits, wafers and crackers

Firstly, wafers contain two or three layers of cream where cream biscuits contain only one. And also the biscuit sheets used in wafers biscuits manufacturing are comparatively thin than biscuits used in cream biscuit manufacturing process. Therefore the cream filling to biscuit ratio is relatively high in wafer biscuit than in cream biscuits; resulting high fat content in 100g of food. As Figure 9 shows, the amount of fat per serving does not indicate a considerable variation from the pattern of total fat in 100g of food.

Total Fat Content in Snack foods

Among snack products, fried peanuts revealed significantly high amount of total fat, 52.89g in 100g of food, compared with other two fried products; manioc chips and flour based fried snack with total fat content of 27.79g and 31.81g respectively (Figure 10) The main reason for this high variation of total fat in fried peanuts is the higher amount

of fats present in peanuts itself [28]. Except spreadable fats, fried peanuts were the product found with highest amount of total fat, among all the products employed.

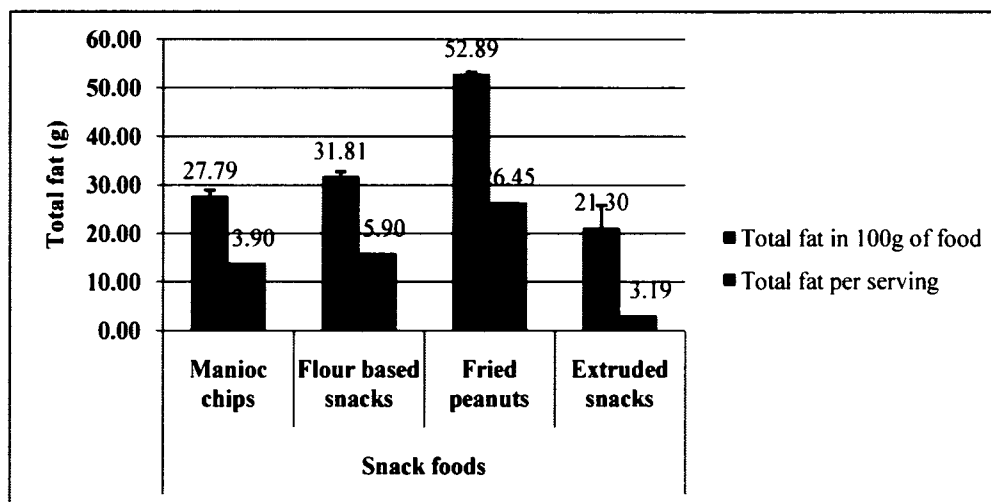


Figure 10: Levels of total fats in snack foods

Total Fat Content in Sri Lankan sweet meats

Surprisingly, compared with other sweets, kokis revealed the highest amount of total fat in 100g of food as 34.56g where the following sweet; boondi as 24.31g in 100g. Mung kavum and kavum exhibited relatively similar amount of mean total fat compared to other two sweets as ; 13.95g and 11.86 grams respectively. Even though kokis found as the highest in total fat in 100g of food it indicated a least fat per serving as 2.88g (Figure 11).

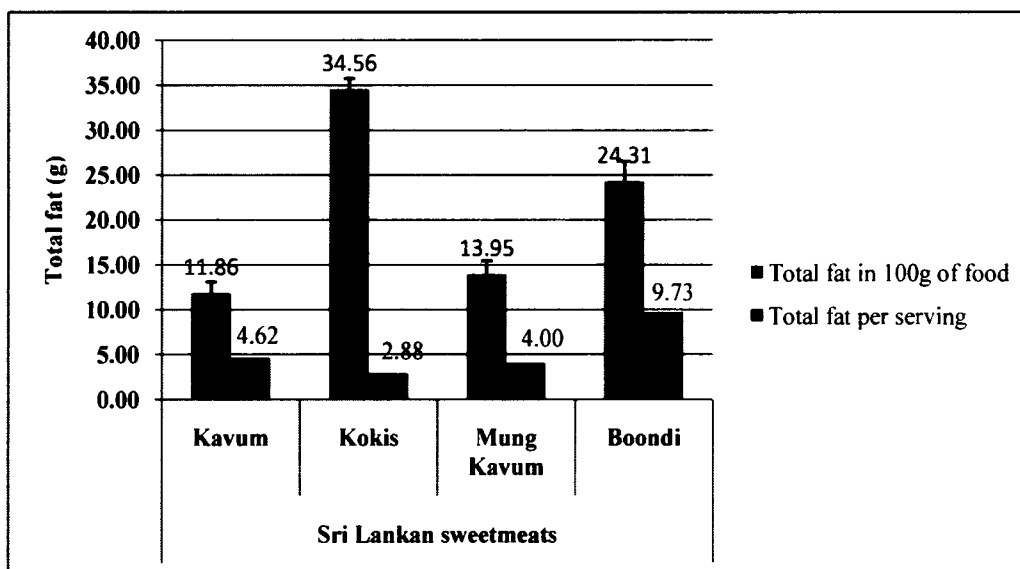


Figure 11: Levels of total fats in Sri Lankan sweetmeats

Total Fat Content in Chocolates

According to the results summed up in the Figure 12, both chocolate products contained approximately similar quantities of total fat in 100g of food. Even though chocolate enrobed biscuits contain less amount of chocolate compared to chocolate slabs; the high amount of fat is contributed by the wafer, as shown earlier under the total fat analysis of biscuit products (Figure 9), may possibly be the reason for this similarity.

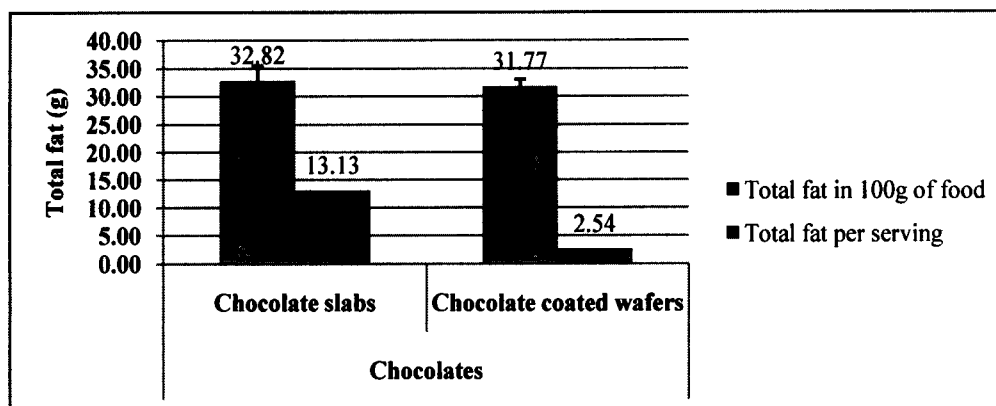


Figure 12: Levels of total fats in chocolates

Proposed colour codes from the analysis

According to the corresponding color codes (Figure 13) on analysed food products (n=27) based on their revealed total fat content, the majority of selected food items (17 products) were found in the red segment with high amounts of total fat in 100g of food. Deplorably, only one product (bread) was detected in the low range of fat with the label of green. The rest 9 products employed were found within the limits of 3g to 17.5g of total fat in 100g of food and attained the color category of amber.

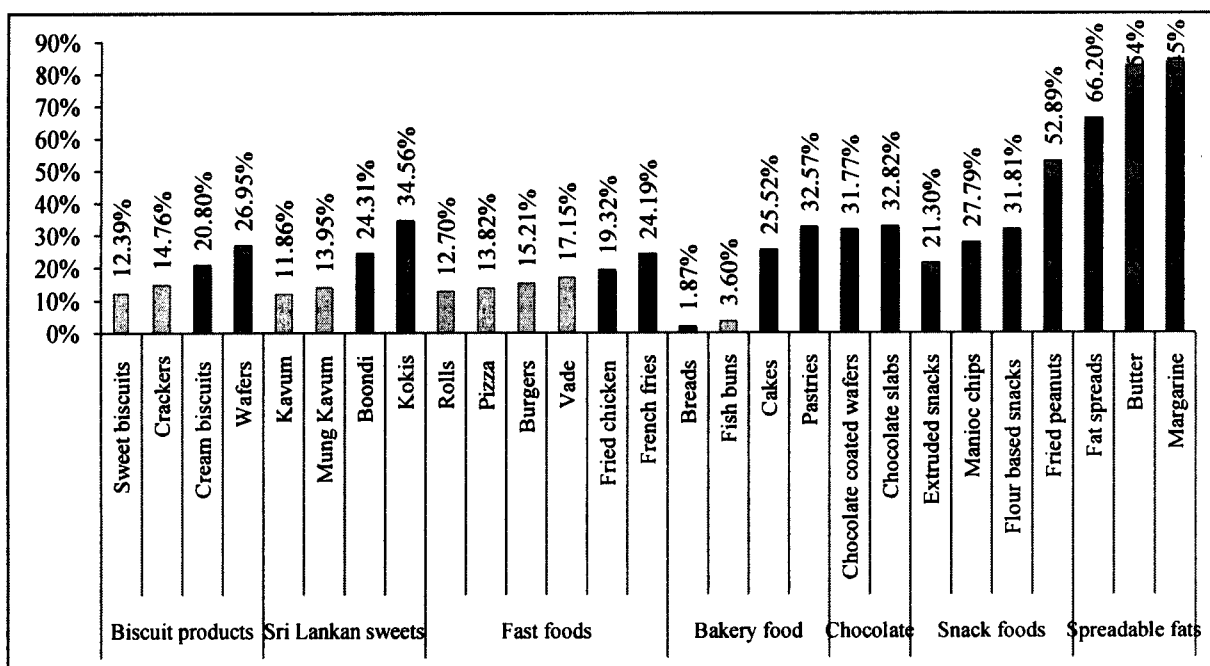


Figure 13: Proposed colour codes on analysed food products

4. CONCLUSION

Based on the results of this study it can be suggested that Sri Lankan consumers have a good basic knowledge about dietary fat- disease relationship. Nevertheless their familiarity with different types and terms related with dietary fats is considerably low. Therefore to obtain the intended outcome of proposed strategies, meanwhile government should conduct awareness campaigns to make consumers aware about different types of dietary fats and the use of information on food labels. Higher levels of total fat revealed in selected processed foods suggestive the need of an active guideline to regulate the limits of total fat present in processed foods available in Sri Lankan market.

5. RECOMMENDATIONS

This study was only able to assess the familiarity of Sri Lankan consumers on different types of dietary fats and term related with dietary fats. Awareness of dietary fats does not automatically translate into understanding of their implications on health. Therefore, further studies should be conducted to recognize the understanding of Sri Lankan consumers on different types of dietary fats. Also, this study could not cover all variations of food items among the same product category (e.g. chocolate with added nuts and raisins, chocolate coated candy bars, and chocolate coated beans like products under the category of chocolate). According to the added ingredients, and manufacturers' specifications, the availability of total fat content in food products can be vary. Thus, determination of total fats in other food products which were not able to cover during this study may be aid to full fill the dearth of literature on total fat contents of food products available in Sri Lanka. As well, saturated fats and trans fats present in foods are in a controversial situation regarding health of the public. Many nutritional studies and regulatory bodies pay their high attention on these particulars present in foods. Therefore further studies should be directed in order to reveal the quantities of saturated fat and trans fats available in these foods.

6. ACKNOWLEDGMENT

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