Tropical Agricultural Research & Extension 26 (4): 2023

RESEARCH ARTICLE

NUTRITIONAL KNOWLEDGE AND CONSUMPTION PATTERN OF FRUITS: A CONTEXT OF SRI LANKAN MOTHERS

Perumpuli PABN[1]*, Silva KNN[2], Darshani MMG[1], Dilrukshi DMN[1], Singharathne SMSJM[1] and Lakmali MGT[2]

[1]Department of Food Science and Technology, Faculty of Agriculture, University of Ruhuna, Mapalana, Kamburupitiya, 81100.
[2]Department of Agricultural Economics and Agribusiness, Faculty of Agriculture, University of Ruhuna, Mapalana, Kamburupitiya, 81100.

Received: 2 July 2023, Accepted: 24 October 2023, Published: 31 December 2023

ABSTRACT

The per capita fruit consumption of Sri Lankans is reported as 100 g per day which lies below the recommendations. Moreover, mothers play a key role in the nutritional status of a family. Thus, the current study was focused on assessing the nutritional knowledge of Sri Lankan mothers in the context of family fruit consumption patterns. The primary data collection tool of this study was the questionnaire survey. The survey was conducted with a representative sample of Sri Lankan mothers (n=140) using self-structured questionnaires. Quantitative and qualitative statistical tools were employed to analyze the collected data of the study. As per the results, majority of the mothers in the sample size were known to have a moderate level of knowledge on fruit consumption (50.7%). Lack of a proper channel to access information was perceived as the major limitation for the poor awareness of the nutritional aspects. Further, the study investigated that the knowledge level of the mothers was significantly associated with the frequency of consuming fruits (p=15.87). The income level is positively correlated with the nutritional knowledge level (0.378) while the occupation has a negative relationship (3.037). The study concludes that the nutritional knowledge of Sri Lankan mothers is higher, and the fruit consumption frequency of their families depends on mothers' nutritional knowledge.

Keywords: Family nutrition, Fruit consumption, Nutritional knowledge, Sri Lankan mothers

INTRODUCTION

Fruit consumption plays a substantial role in human nutrition and health by providing essential nutrients for the human body. Any single fruit hardly provides all the nutrients required by an individual to be healthy. Thus, the inclusion of a variety of fruits in daily meals nourishes and maintains a healthy lifestyle. According to the World Health Organization reports, it is recommended for an individual to consume 400 g of fruits and vegetables or five servings of 80 g per day as an essential element in improving the health of an individual. Fruits are rich sources of nutrients and are naturally low in calories, fat and sodium (Septembre-Malaterre *et al*. 2018). The nutritional value of fruits is attributed to the higher amounts of vitamins and minerals, bioactive compounds and other non-nutrient components present in them. According to the data of United States Department of Agriculture and United States Department of Health and Human Services, fruit and vegetable consumption as a part of the diet contributes to an estimated amount of 91% of vitamin C, 48% of vitamin A, 30% of folate, 27% of vitamin B6, 17% of thiamine and 15% of niacin; and 16% of magnesium, 19% of iron and 9% of the calories required by our body per day (Oguntibeju *et al*. 2013). Other than that, fruit consumption accounts for vitamins such as riboflavin, tocopherol, folate, and minerals such as calcium, copper, iron, manganese, potassium and phosphorus and fiber (Goldman

*Corresponding author: buddhikap@fst.ruh.ac.lk

2003; Cunningham *et al.* 2001; Fazli and Fazli 2014).

Moreover, the bioactive components such as polyphenols, carotenoids, sterols, glucosinolates, and saponins are abundantly available in fruits and vegetables, which are considered to be important for many functional properties associated with fruit consumption (Alothman *et al*. 2009; Lima *et al.* 2014; Swallah *et al.* 2020). Most of the phytochemicals present in fruits exhibit strong antioxidant properties (Kaur and Kapoor 2001; Wargovich 2000). Epidemiologically, fruit consumption is important in reducing the risk factors associated with the occurance of diseases such as cancers, heart problems, and many other health issues related to the abdomen, esophagus, pancreas, bladder and cervix (Giskes *et al.* 2002; Van Gils *et al.* 2005; Alasalvar *et al.* 2020).

Fruit consumption is influenced by different personal factors such as gender, age, level of education, income and family origin (Giskes *et al.* 2002). The knowledge on nutrition is considered as an essential parameter in accessing the nutritional status of an individual which is mainly based on their level of education. Mother's nutrition is a prerequisite for the well-being of children, especially infants, toddlers, preschoolers, school-aged children, and adolescents. Moreover, it may be one of the most influential factors for developing the health and well-being of an individual and the nutritional status of children reflect the nutritional knowledge of the mother.

Undernutrition among Sri Lankan children has become a growing health concern over the past decade (Jayatissa *et al*. 2012). The Department of Census and Statistics, and Ministry of Health, Nutrition and Indigenous Medicine (2017) has reported that in Sri Lanka, the percentage of stunted, wasted and underweight children below 5 years is 17%, 15% and 21% respectively. According to the recommendations of Sri Lankan medical experts, an individual is expected to include 200 g of fruits per day for their diet to prevent many of the health problems throughout their lifetime. However, the consumption of fruits per person is reported as 100 g per day which is below the recommendations of Sri Lankan nutritionists (Udari *et al.* 2019). Among the factors affecting the reduction of fruit consumption, many studies have shown that the impact of mother's nutritional knowledge as a significant factor to be addressed as a solution to increase the level of fruit consumption. Many of these studies have highlighted the importance of accessing maternal education in alleviating child health-related issues and malnutrition (Sirasa *et al.* 2020). Nevertheless, the significance of the mother as a key to improving the nutritional status of children and family is under limited consideration, and some findings need to be nurtured with recent facts and information. Therefore, the present study was focused on accessing the nutritional knowledge and the consumption patterns of fruits by mothers as a study in selected areas of Sri Lanka.

MATERIALS AND METHODS

Purposive sampling technique was employed for the sample selection. Here the mothers who having toldlers are the target sample and, it was assumed that the sample is homogeneous in psychological nature; where the perceptions and behaviors towards food consumption can be considered independent of geographical differences. Therefore, data were collected purposively from three districts of Sri Lanka; Colombo, Matara and Galle to represent Sri Lankan mothers. The main data collection tool of this study was the questionnaire survey. The primary methods of data collection was using a structured questionnaire distributed among the sample in printed version and as a Google-form based questionnaire along with some face to face interviews. The sample of the study consisted of 140 mothers and the response rate was 93%. The variables used to measure the research objectives were assessed using a five-point likert scale that ranged from "Strongly agree" (5) to "Strongly disagree" (1). Multiple items were used to measure all the constructs, and the answers to the given questions were taken from the respondents, based on their fruit and vegetable consumption pattern and the respective knowledge of it. In this research, collection of the primary data was done using a structured type questionnaire distributed among the aimed sample and secondary data were col-

lected by research articles, research journals, books and websites dealing with the fruit and vegetable consumption of mothers. Descriptive statistical tools were employed to elaborate the fruit consumption pattern of the Sri Lankan family, the nutritional knowledge of Sri Lankan mothers and to present the constraints on the fruit consumption pattern of Sri Lankan families. Moreover, chi-square test and multiple regression analysis were carried out to analyze the impact of nutritional knowledge of mothers on their family fruit consumption pattern and to analyze the impact of socio-economic attributes of mothers on their nutritional knowledge and fruit consumption pattern respectively.

RESULTS AND DISCUSSION

Demographic and Fruit Consumption Behavior of the Study Sample

Table 1 shows the summarized demographic factors of the study sample. As per the results, the highest percentage of the mothers who represent the study was within the age range of 41-50 years (57.1%). The majority of mothers who responded to the study were graduates (41.4%). Furthermore, 59.3% of the respondents were found to be government employees. Moreover, the majority of mothers receive a monthly income of LKR 41,000-50,000.

Even though Sri Lanka is a self-sufficient country in respect to the availability of fruits, only a small amount of fruits are traded in Sri Lanka from the total fruit production of the country. (Weerahewa *et al.* 2013). Thus, different types of fruits consumed by the respondents were examined. The results revealed that apples and grapes are eaten by less than 10% of the respondents. In contrast, the majority of the consumers were found to be consuming banana (97%), followed by papaya (80.71%), guava (56.43%), mango (42.86%) and pineapple (25%). As a whole, the majority of the mothers who participated in the current evaluation tended to consume local fruits compared to the consumption of imported fruits. According to Wasala *et al.* (2014) banana was found to be the main fruit that is grown and consumed in Sri Lanka and thus, the results of the present study are also in accordance with that.

Thereafter, the perception of mothers towards the form of fruits they consumed were analyzed, and the gained results were summarized in Figure 1. As per the obtained results, 94.3% of the respondents consume fresh fruits rather than processed fruits. Moreover, the frequency of consuming fruits by mothers was also analyzed (Figure 2), and according to the obtained results, the majority of the respondents (40%) were found to be fruit consumers on daily basis, and 32% of the respondents consume fruits at least two to four times per week indicating a sufficient fruit consumption. Nevertheless, as it is stated by Udari *et al.* (2019) compared to the recommended per capita fruit consumption by the World Health Organization, the per capita fruit consumption in Sri Lanka (100 g of fruits/day) is at a lower level.

Secondarily, the study was aimed at analyzing the fruit purchasing behaviour of mothers. The obtained results are summarized in Figure 3. As per the results, majority of the respondents (33%) purchase fruits and vegetables mainly from the fair (*Pola*). The possible explanation for this buying behavior may be due to the freshness and low prices of the fruits and vegetables (Rambukwella and Samantha 2013). In addition, 25.7% of the respondents consume fruits and vegetables grown in their home gardens (Figure 3). This led to conclude that those who consume their own home garden products may prefer organic products. According to Rajapaksha *et al*. (2021), a considerable amount of banana and papaya are grown at the home garden level in Sri Lanka and even they are engaged in commercializing their products. Moreover, the results revealed that 15% of the participants are buying their fruits requirement from supermarkets and only 6.4% of the respondents are directly buying fruits from producers (Figure 3). Kumari *et al*. (2009) also observed that 73% of the people in suburban areas obtain fresh products from markets and the majority of them tend to buy fruits from local fruit markets that are located near to them and held daily or weekly.

Table 1: Demographic profile of the respondents participated for the survey

	Criteria	Frequency	Percentage (%)
Age	20-30	17	12.1
	31-40	38	27.2
	41-50	80	57.1
	50<	5	3.6
Education	Grade 8 passed	2	1.5
	Up to O/L	23	16.4
	up to A/L	23	16.4
	Diploma	14	10
	Graduate	58	41.4
	Postgraduate	22	14.3
Income levels	20000>	26	18.6
	21000-30000	12	8.6
	31000-40000	22	15.7
	41000-50000	37	26.4
	51000-100000	24	17.1
	100000<	19	13.6
Marital status	Married	136	97.1
	Divorced	1	0.7
	Widow	3	2.1
Occupation	Govt	83	59.3
	Private	30	21.4
	Self-employed	3	2.1
	Jobless	24	17.1
Partner's job	Government	53	37.9
	Private	57	40.7
	Self-employed	21	15
	Jobless	9	6.4
Family size	2-4	92	65.7
	5-7	47	33.6
	8-10	1	0.7
No. of children	1	38	27.1
	2	61	43.6
	3	30	21.4
	4	8	5.7
	5	3	2.1

Organic products are produced using either organic farming practices or organic production processes (Piyasiri and Ariyawardana 2002). The figure 4 shows the concerns of the respondents towards the organic nature of fruits that they consume. As per the results, majority of the respondents consume both organic and non-organic fruits (68.3%), while a significantly low amount of people tend to consume only organic fruits (13.6%). Further, when considering the reasons for the less consumption of organic fruits, the participants mentioned that the limited availability (57.89%) followed by the high cost (21.05%) as the major constraints in consumption of fruits. These constraining factors are also been revealed by Piyasiri and Ariyawardana (2002) and they have elaborated that the poorly developed market for organic products in Sri Lanka further limits the fruit consumption among people. Moreover, it has shown that the lack of specific retail outlets for organic products, issues with certifications, variations in supply, quality issues in the country are

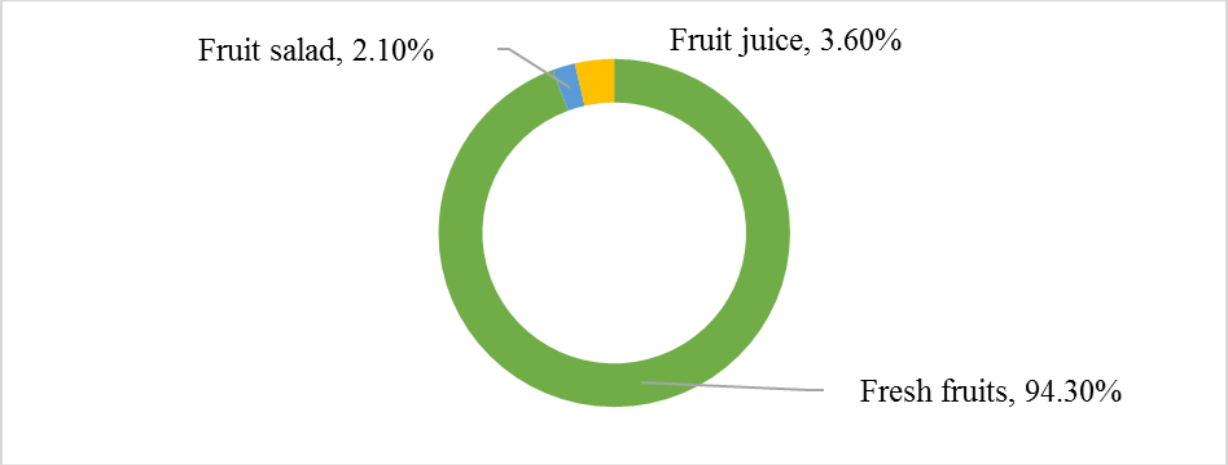

Figure 1: Forms of consuming fruits by the respondents

(*Source: Survey data, 2022*)

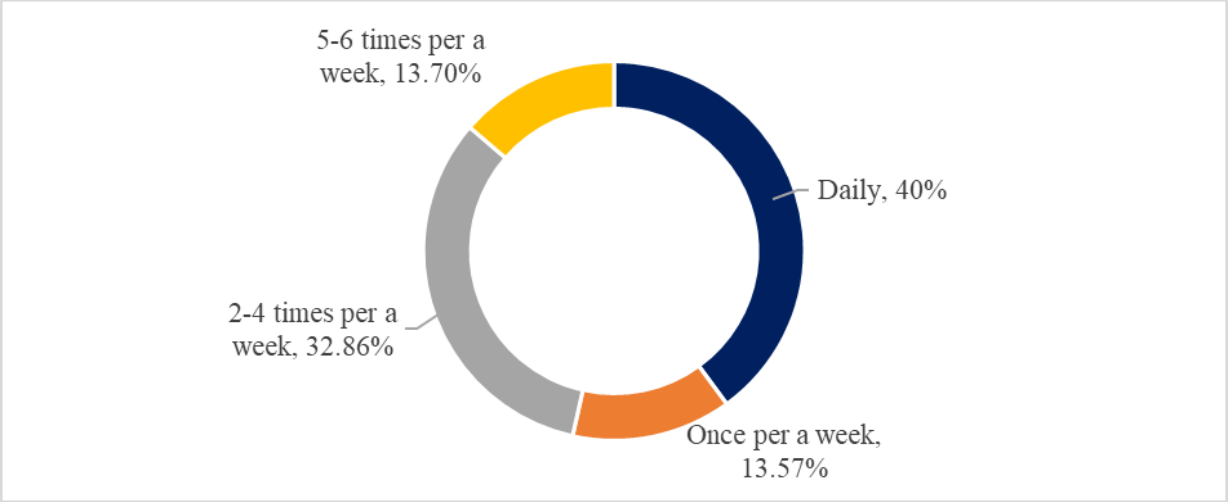

Figure 2: Frequency of fruit consumption by the respondents

(*Source: Survey data, 2022*)

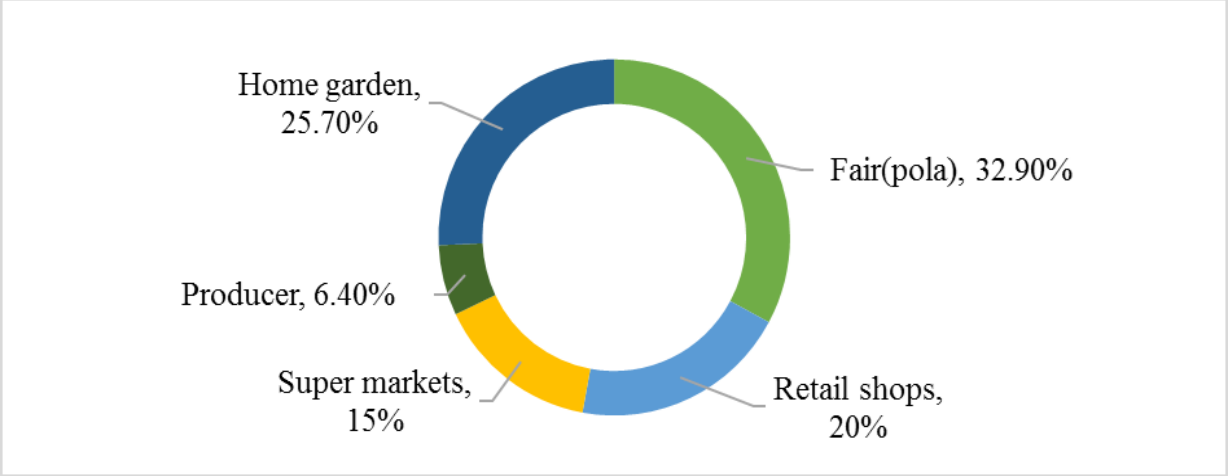

Figure 3: Places of purchasing fruits by the respondents

(*Source: Survey data,2022*)

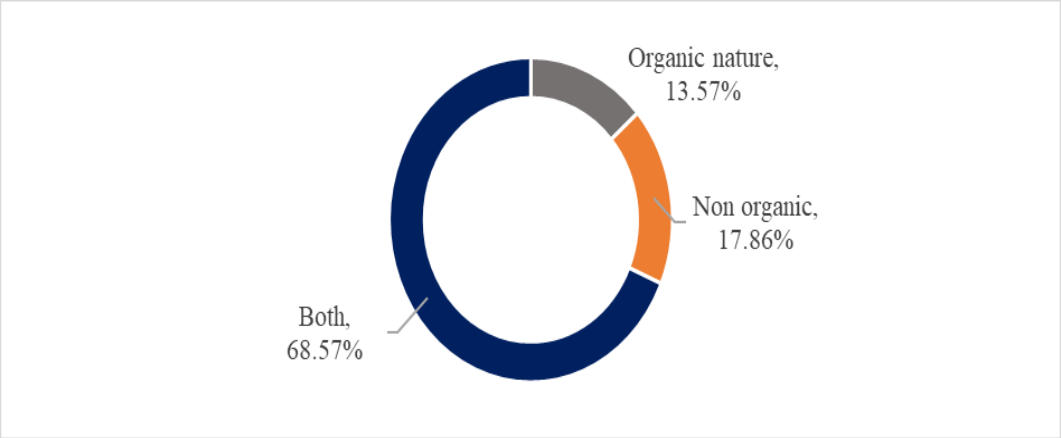

Figure 4: Organic and inorganic nature of the fruits consumed by the respondents

(*Source: Survey data,2022*)

also limiting the consumption of organic fruits among Sri Lankans. The results of the present study are further backed by the fact that organic commodities are still lying in the introduction phase in Sri Lanka.

Knowledge of Nutritional Facts of Fruits

According to the WHO, women plays a major role in ensuring the health status of family and the society as a whole. Furthermore, the nutritional knowledge of mothers has a large impact on the health and nutritional status of their children and future generations (Weerasekara *et al.* 2020). As one of the main objective of this study, the nutritional knowledge of mothers was measured using a Likert scale between (-2) to 2. The respondents were asked to self-assess their nutritional knowledge based on the questions provided to them on criterias such as nutrients in fruits (calcium, iron (Fe), vitamin C, fiber), nutritional benefits of fruit consumption (as anti-carcinogenic, anti-diabetic, anti-aging effects), etc. with using their level of knowledge about fruit consumption. The mean knowledge of each individual on nutritional aspects of fruit consumption was assessed based on this self-evaluated scale on each variable. Three Knowledge level categories as low, medium and high were developed for the purpose of data analysis. The mean knowledge between (-2) to 0 was defined as low knowledge category while mean knowledge between 0.001-1 is defined as medium knowledge (Table 2). The highest knowledge level defines the means between 1.001-2. Accordingly, half of the mothers (50%) were found to be having a medium knowledge about the nutritional composition of fruits while 30% of the respondents are having a higher knowledge level. Further, according to the results in Table 2, only 18 % of the respondents are having a low knowledge about the nutritional aspects of fruits.

The knowledge on recommended dietary intake values plays an important role in safeguarding the children's health, by ensuring they receive adequate nutrition without any deficiencies. Based on the WHO recommendation, the required fruits and vegetable consumption must be 400 g for a person per day (FAO *et al.* 2020). Importantly, this study revealed that the majority (74%) of the mothers who participated in this study are well aware of the recommended fruit consumption facts. Moreover, we investigated the sources of information they obtained the nutritional knowledge and facts. Figure 5 shows that the highest percentage of mothers has obtained this knowledge from their school education (51.43%) followed by internet searching (11.43%). However, Ekanayake *et al*. 2003 has stated in their study, that the radio and television as the as the main source of information helped mothers to improve their awareness on nutrition and health of children. It is worth noting that the majority of our study's respondents are graduates, thus the school education has become a good source of information for them. Further, nowadays mothers spent more time searching for infor-

Table 2: Nutritional knowledge levels of the mothers on fruit consumption

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Low knowledge	26	18.6%	18.6%	18.6%
	Medium knowledge	71	50.7%	50.7%	69.3%
	High knowledge	43	30.7%	30.7%	100.0%
	Total	140	100.0%	100.0%	

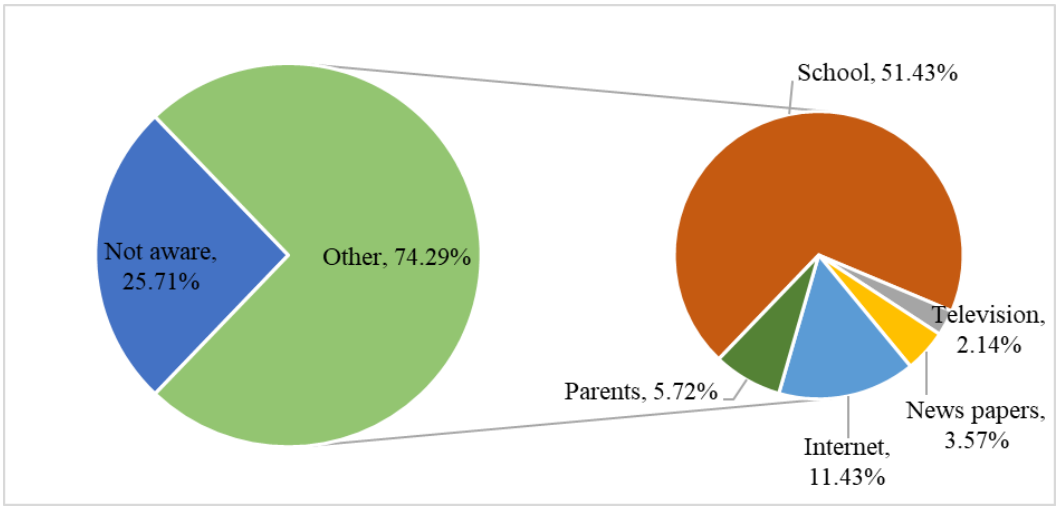

Figure 5: **Methods of awareness on recommended fruit consumption by the fraction of respondents who aware of the recommended fruit consumption levels**

(*Source- Survey data, 2022*)

mation on the internet rather than relying on television and radio.

Furthermore, we investigated the reasons behind the respondents with poor awareness of nutritional aspects of the consumption of fruits. As it is summarized in Figure 6, the majority of the respondents that are not aware of the recommended level of fruit consumption, do not have a proper way to get relevant information (11.4%) and they are not having any interest in getting this information and knowledge (9.29%). Interestingly, five percent of the respondents haven't heard anything on nutritional aspects before.

Impact of Nutritional Knowledge of Mothers on Fruit Consumption Pattern of their Families

Knowledge is the decisive factor in actions. Nutritional knowledge of mothers decides the eating habits of the families (Mardhiah *et al.* 2018). Therefore, the present study explored the relationship between the mothers' knowledge level and their fruit consumption behavior.

Results of the study indicate that the knowledge status of the mothers was significantly associated with the frequency of consuming fruits (p=15.872). Results of the Chi-square that used to find the association are shown in Table 3, 4, 5 and 6. This led to conclude that mothers who have a higher knowledge level tend to consume fruits frequently. In line with the present study, Yabanc *et al.* (2014) also stated that the mothers with a higher level of nutritional knowledge tend to feed their children more fruits. Moreover, it has been stated that the mothers' nutritional knowledge having a positive relation on the children's nutritional hab-

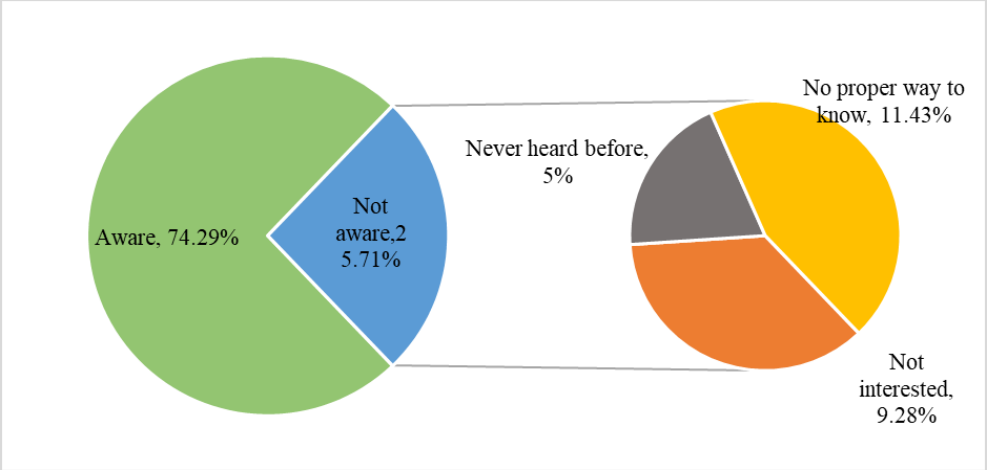

Figure 6: **Reasons for not aware of fruit consumption recommendations by the respondents who do not aware of the fruit consumption recommendations**

(*Source- Survey data, 2022*)

its (Ozdogan *et al.* 2012). However, in contrast, Mardhiah *et al.* (2018) found to have no significant association between mothers' nutritional knowledge and the nutritional status of children.

Thereafter, the relationship between the mothers' nutritional knowledge and the place of purchase and organic/inorganic nature of fruits was analysed. The obtained results revealed that the knowledge level is not either associated with the place of purchase (27.632) or the organic/inorganic nature of the fruits (2.694). Similarly, Gotschi *et al.* (2009) also reveal that there is no significant association between the knowledge level of consumers and buying of organic products. These findings could be explained based on the lack of development in the organic market in the country and thus knowledge level is not affecting the consumption behavior of organic products. Moreover, the results of the present study can be supported by the past literature. Jayathillake and Mahalianaarachchi (2007) revealed that most of the consumers are having a view that the fruits bought from the direct markets (*pola*) and from villages are fresher (80%) and cheaper (72%) than the fruits bought from other market places. On the other hand, people prefer markets close to them (Kumari *et al.* 2009). Thus, the places of purchase might be independent from the knowledge level of the consumers.

Impact of Socio-economic Attributes of Mothers on their Nutritional Knowledge and Fruit Consumption Pattern

The influence of socio-economic factors on nutritional knowledge of mothers and the fruit consumption pattern of the family was evaluated and the obtained results are concise in Table 7 and 8 as the model summary and regression coefficient respectively.

Numerous studies have shown that the children of working mothers have a lower health and nutritional status compared to those whose mothers remain at home (Abbi *et al.* 1991). While some other studies

Table 3: Case processing summary chi-square test that applied to the relationship between mothers' nutritional knowledge and frequency of fruit consumption

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Grouped knowledge Frequency	140	100.0%	0	0.0%	140	100.0%

Table 4: Frequency of Chi-square test that applied to test the relationship between mothers' nutritional knowledge and frequency of fruit consumption

			Frequency				Total
			Daily	Once per week	2-4 times per week	5-6 times per week	
Grouped knowledge	**low knowledge**	Count	6	9	8	3	26
		Expected Count	10.4	3.5	8.5	3.5	26.0
	medium knowledge	Count	27	7	27	10	71
		Expected Count	28.4	9.6	23.3	9.6	71.0
	high knowledge	Count	23	3	11	6	43
		Expected Count	17.2	5.8	14.1	5.8	43.0
Total		Count	56	19	46	19	140
		Expected Count	56.0	19.0	46.0	19.0	140.0

Table 5: Results of Chi-square test that applies to test the relationship between mothers' nutritional knowledge and frequency of fruit consumption

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	15.872[a]	6	.014
Likelihood Ratio	13.861	6	.031
Linear-by-Linear Association	1.565	1	.211
N of Valid Cases	140		

a. Two cells (16.7%) have an expected count less than five. The minimum expected count is 3.53.

Table 6: Symmetrical measures of the Chi-square test that applied to test the relationship between mothers' nutritional knowledge and frequency of fruit consumption

		Value	Approximate Significance
Nominal by Nominal	Phi	.337	.014
	Cramer's V	.238	.014
N of Valid Cases		140	

Table 7: Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.378[a]	.143	.137	.70615
2	.444[b]	.197	.186	.68600

a. Predictors: (Constant), Income

b. Predictors: (Constant), Income, Occupation

highlight the maternal employment status to have a positive relationship on children's nutrition status (Corkins *et al.* 2016). This can occur with the improvement of the family's income status, enabling mothers to provide their children with more nutritious food in

Table 8: Regression coefficient

Coefficients													
Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**	**95.0% Confidence Interval for B**		**Correlations**			**Collinearity Statistics**	
		B	**Std. Error**	**Beta**			**Lower Bound**	**Upper Bound**	**Zero-order**	**Partial**	**Part**	**Tolerance**	**VIF**
1	(Constant)	.17	.14		1.23	.22	.10	.45					
	Income	.17	.03	.37	4.80	.00	.10	.24	.37	.37	.37	1.0	1.00
2	(Constant)	.59	.19		3.03	.00	.20	.97					
	Income	.14	.03	.30	3.78	.00	.06	.21	.37	.30	.29	.90	1.10
	Occupation	-.16	.05	-.24	-3.03	.00	.27	-.05	-33	-.25	-.23	.90	1.10

a. Dependent Variable: mean knowledge

recommended quantities. However, on the other hand, some mothers may suffer with lack of time to childcare leading to poor nutrition. Results of the multiple regression analysis of our study indicate, the income level of the mothers is positively correlated with their knowledge level (0.378) while their occupation has a negative relationship (-3.03). Further, Gibson *et al*. (1998) and Ozdogan *et al.* (2012) has stated that the nutritional knowledge of mothers is mainly determined by their education level and age. However, in contrast, all the socio-economic indicators considered in the current study (age, education level, marital status, partner's job, family size and number of children) were found to be insignificant in determining the nutritional knowledge level of mothers. The findings of our study are further supported by the results of Ekanayake *et al.* (2003), showing the negative correlation between age of the mother and child malnutrition.

Consequently, the results revealed that the fruit consumption pattern of mothers is independent of their socio-economic attributes such as age, education, marital status, partner's job, family size and number of children. Moreover, regardless of the nutritional knowledge level of the people, most of the Sri Lankans used to grow fruits in their home gardens. As it is mentioned by FAO *et al.* (2020), the fruit availability in the Asian region is found to be at a considerably higher level compared to the other regions where it is sufficient to meet FAO recommendations for daily fruit consumption. In align with that, the results of the current study also reveals that fruit consumption pattern in Sri Lankans is at a significant level.

Constraining Factors and Suggestions to Improve Fruit Consumption

Moreover, the current study intended to explore any barriers affecting to adopt better fruit consumption behaviour, and the major constraints in fruit consumption are summarized in Figure 7. Accordingly, the mothers mentioned that the main constraint on fruit consumption of their families is due to the issues of fruit availability (46.4%) followed by the cost of fruits (31.4%). This led to conclude that the price of fruits is a main consideration when buying fruits by consumers. According to Rambukwella and Samantha (2013) majority of the consumers used in their study were found to prefer organic products. However, they further stated that the undeveloped market for organic products has given rise to their availability issues. Moreover, according to them, seasonality of some fruit crops has intensified the issue.

Suggestions to Improve Fruit Consumption

The possible suggestions on increasing the family fruit consumption have been questioned from the participants and their responses are summarized in Figure 8. According to the obtained results, 46.4% of the mothers suggest that home gardening is the best solution for increasing fruit consumption in their families.

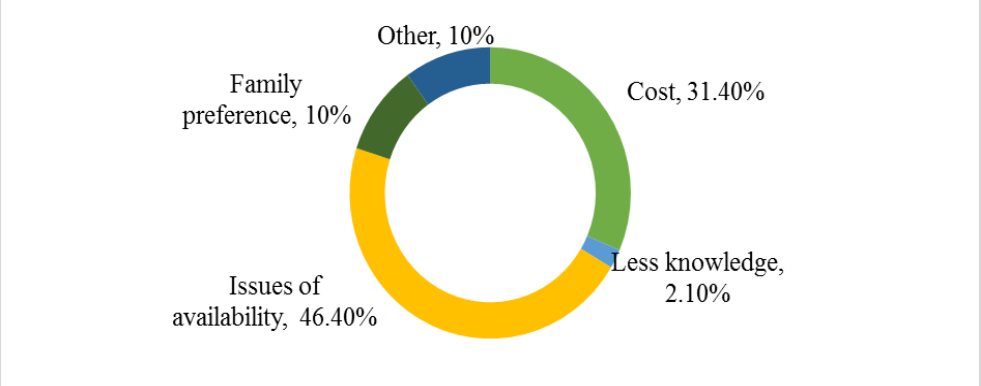

Figure 7: **Constrains on the consumption of fruits**

(*Source: Survey data, 2022*)

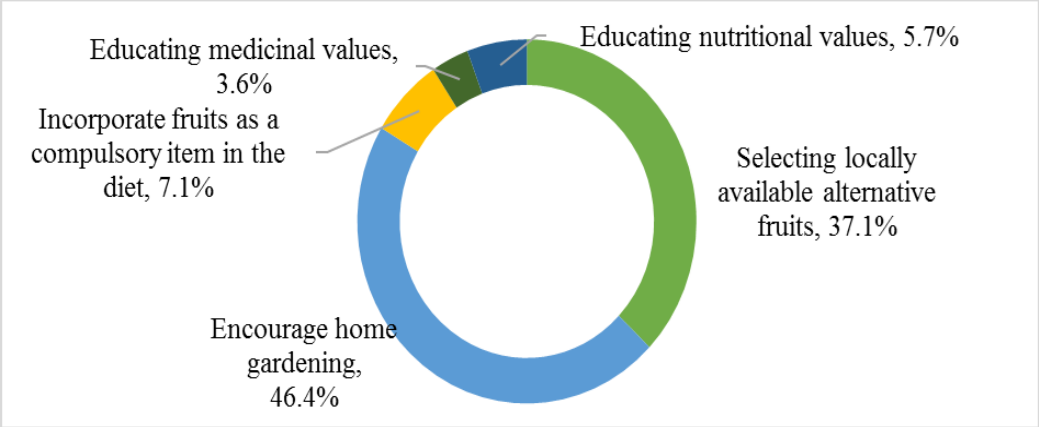

Figure 8: Suggestions made by the respondents to improve fruit consumption among Sri Lankan mothers

(*Source: Survey data, 2022)*

Moreover, instead of consuming regularly available fruits (banana, papaya, apple, mango, grapes, pineapple, orange, watermelon, etc.), 37.1% of the mothers suggest popularizing locally available alternative fruit varieties such as (*katuanoda*, *madan*, *nelli*, *lavalu*, *beli*, *veralu*, *uguressa*, Batoko plums-*lovi*, local citrus varieties, etc.) in the market to improve their fruit consumption. According to Fonseka *et al.* (2010) giving government incentives for home gardening also can considerably increase fruit consumption among people. Further, they reveal that awareness programs will make them use of organic farming practices and traditional methods. Since a considerably low amount of consumers use organic fruits and the major constraints for their fruit consumption is availability issues. Thus, control of the cost and government intervention is a must to make available organic products at low price.

CONCLUSION

This research basically focused to explore the existing nutritional knowledge of the mothers who located in selected districts in Sri Lanka on fruit consumption while identifying the fruit consumption behaviour of their families. The research has revealed a few important research findings. According to this study, the nutritional knowledge level of the mothers on fruits consumption is at a considerably good level in the studied sample. This finding symbolizes healthy fruit consumption behaviour among the mothers based on their knowledge level of the food consumption pattern. Moreover, it has been found that the income level and occupation of mothers have a significant impact on their nutritional knowledge level. Further, other socio-economic factors such as age, marital status, education level, partner's job, family size and number of children did not have any significant impacts on the nutritional knowledge of mothers'. Anyhow, as this study expected, the nutritional knowledge of the mothers' has a significant impact on the fruit consumption frequency of their family members. However, the nutritional knowledge level of mothers did not influence the decision of the fruit purchasing places and the organic/ inorganic nature of fruit they consumed. In the context of the major constraints for fruit consumption, issues of fruit availability and the cost of many of the fruit items were the major constraining factors. Therefore, the majority of the mothers in this study suggested encouraging home gardening to obtain their own fruit requirement with minimum cost. Moreover, the adoption and use of locally available nutritious fruits varieties rather than the high cost of imported fruit was another important suggestion raised to fulfil their fruit requirement.

AUTHOR CONTRIBUTION

PABNP and SKNN devised the main conceptual ideas of the research and critically evaluated and revised the manuscript. MMGD,

DMND, SMSJMS, and MGTL contributed in collecting, analyzing and interpreting data, and summarising the manuscript.

REFERENCES

Abbi R, Christian P, Gujral S and Gopaldas T 1991 The impact of maternal work status on the nutrition and health status of children. Food and Nutrition Bulletin, 13 (1):1-6, https:// doi.org/10.1177/156482659101300128>

Alasalvar C, Salvado JS and Ros E 2020 Bioactives and health benefits of nuts and dried fruits. Food Chemistry, 314:126-192,<https: //doi.org/10.1016/ j.foodchem. 2020.126192>

Alothman M, Rajeev B and Karim A 2009 Antioxidant Capacity and Phenolic Content of Selected Tropical Fruits from Malaysia, Extracted with Different Solvents. Food Chemistry, 115(3):785–88, <https://doi.org/10.1016/ J.FOODCHEM.2008.12.005>

Corkins MR, Daniels SR, de Ferranti SD, Golden NH, Kim JH, Magge SN and Schwarzenberg SJ 2016 Nutrition in children and adolescents. Medical Clinics, 100(6):1217-1235, < 10.1016/ j.mcna.2016.06.005>

Cunningham JH, Milligan G and Trevisan L 2001 Minerals in Australian Fruits and Vegetables - a Comparison of Levels between the 1980s and 2000. Food Standards Australia New Zealand, viewed 20 December 2022, <https:// www. foodstandards. gov.au/ publications/ documents/minerals_ report.pdf>

Department of Census and Statistics and Ministry of Health Nutrition and Indigenous Medicine 2017 Sri Lanka Demographic and Health Survey 2016, viewed 23 January 2023, social/SLDHS%202016%20Report% 20Final%20Full% 2010 %20Oct% 202017.pdf>

Ekanayake S, Weerahewa J and Ariyawardana A 2003 Role of mothers in alleviating child malnutrition: evidence from Sri Lanka. Poverty and Economic Policy Network, viewed 11 October 2023, < https://www.semanticscholar.org/paper/ Role-of-mothers-in-alleviating-child-malnutrition%3A-Ekanayake-Weerahewa/130b22a1a2f3758b f96a26572933b232cb 31fc5b>

FAO IFAD UNICEF WFP and WHO 2020 The State of Food Security and Nutrition in the World 2020 Transforming food systems for affordable healthy diets. Rome, FAO, viewed 7 December 2022, <https://doi.org/10.4060/ca9692en>

Fazli FA and Fazli NA 2014 Evaluation and determination of minerals content in fruits. International Journal of Plant, Animal and Environmental Sciences, 4 (2):160-166, <http:// www.ijpaes.com/.../497_pdf.pdf>

Fonseka RMF, Pathmaraja S and Kodiweera NKAC 2010 Status of home gardening in Mahaweli system H area as influenced by the government food production drive- ''Let us cultivate and uplift the nation''. Sri Lankan Journal of Agricultural Science, 47:62-73, viewed 5 December 2022, <https ://www. researchgate.net/ publication/237061618 _Status_of_home_gardening_in_Mahaweli_system_H_area_as_influenced_by_the _government_food_production_drive__Let_us_cultivate_and_uplift_the_nation>

Gibson EL, Wardle J and Watts CJ 1998 Fruit and vegetable consumption, nutritional knowledge and beliefs in mothers and children. Appetite, 31(2):205-228, <https://doi.org/10.1006/ appe.1998.0180>

Giskes K, Turrell G, Patterson C and Newman B 2002 Socio-economic differences in fruit and vegetable consumption among Australian adolescents and adults. Public health nutrition, 5(5):663-669,<https:// doi.org/10.1079/PHN2002339>

Goldman IL 2003 Recognition of fruit and vegetables as healthful: vitamins and phytonutrients. HortTechnology, 13 (2):252-258, <https://doi.org/10.21273/ HORTTECH. 13.2.0252>

Gotschi E, Vogel S, Lindenthal T and Larcher M 2009 The role of knowledge, social norms, and attitudes toward organic products and shopping behavior: Survey results from high school students in Vien-

na. The Journal of Environmental Education, 41(2):88-100,<https://doi.org/10.1080/00958960903295225>

Jayathillake PJ and Mahalianaarachchi RP 2007 Behavioral pattern of fruit & vegetable consumers in the 'pola' (fair) system in monaragala district in Sri Lanka. The Journal of Agricultural Sciences, 3 (1): 33–42,<http:// repo.lib.sab.ac.lk :8080/ xmlui/ handle/ 123456789/838>

Jayatissa R, Bekele A, Kethiswaran A and De Silva AH 2012 Community-based management of severe and moderate acute malnutrition during emergencies in Sri Lanka: challenges of implementation. Food and nutrition bulletin, 33(4): 251-260, < https://doi.org/10.1177/156482651203300405>

Kaur C and Kapoor HC 2001 Antioxidants in fruits and vegetables–the millennium's health. International journal of food science & technology, 36(7):703-725, <https://doi.org/10.1111/J.1365-2621.2001.00513.X>

Kumari MS, Kansuntisukmongkol K and Brockelman WY 2009 Plant diversity in home gardens and its contribution to household economy in suburban areas in Sri Lanka. Environment and Natural Resources Journal, 7(2):12-29, <https://ph02.tci-thaijo.org/index.php/ennrj/article/view/82565>

Lima GPP, Vianello F, Correa CR, Campos RADS and Borguini MG 2014 Polyphenols in fruits and vegetables and its effect on human health. Food and Nutrition sciences, 5:1065–1082,<http://dx.doi.org/10.4236/fns.2014.511117>

Mardhiah D, Ekayanti I and Setiawan B 2018 The Relationship Between Mother's Nutritional Knowledge Towards Fruits Vegetables Consumption and Nutritional Status of Pre School Children Kindergarten Salman Jakarta. KnE Life Sciences, 47-52, <https://doi.org/10.18502/KLS.V4I10.3706 >

Oguntibeju OO, Truter EJ and Esterhuyse AJ 2013 The role of fruit and vegetable consumption in human health and disease prevention. Diabetes Mellitus-Insights and Perspectives, 3(2):172-180, < https://dx.doi.org/10.5772.50109>

Ozdogan Y, Ucar A, Akan LS, Yılmaz MV, Surucuoglu MS, Pınar F and Ozcelik AO 2012 Nutritional knowledge of mothers with children aged between 0-24 months. Journal of Food, Agriculture & Environment, 10(1): 173-175, <https://www.researchgate.net/profile/Yahya-Ozdogan/publication/295826606>_

Piyasiri AGSA and Ariyawardana A 2002 Market Potentials and Willingness to Pay for Selected Organic Vegetables in Kandy. Sri Lankan Journal of Agricultural Economics, 4(1): 107–19,<https://doi.org/10.22004/AG.ECON.20592>

Rajapaksha L, Gunathilake DC, Pathirana SM and Fernando T 2021 Reducing post-harvest losses in fruits and vegetables for ensuring food security—Case of Sri Lanka. MOJ Food Process Technologies, 9(1):7-16,<https://doi.org/10.15406/mojfpt.2021.09.00255>

Rambukwella R and Samantha NPG 2013 Pattern of Consumption of Fruits and Factors Affecting Consumption in the Western Province of Sri Lanka. Hector Kobbekaduwa Agrarian Research and Training Institute, viewed 21 January 2023, <https://harti.gov.lk/images/download/reasearch_report/24283-Full_report.pdf >

Septembre-Malaterre A, Remize F and Poucheret P 2018 Fruits and vegetables, as a source of nutritional compounds and phytochemicals: Changes in bioactive compounds during lactic fermentation. Food Research International, 104:86-99, < https://doi.org/10.1016/j.foodres.2017.09.031>

Sirasa F, Mitchell L, Silva R and Harris N 2020 Factors influencing the food choices of urban Sri Lankan preschool children: Focus groups with parents and caregivers. Appetite, 150:104-649,<https://doi.org/10.1016/J.APPET.2020.104649 >

Udari UR, Perera MDD and Wickramasinghe WR 2019 Home garden fruit cultivation in Sri Lanka: determinants and the role of government intervention. Hector Kobbekaduwa Agrarian Research and Training Institute, viewed 22 January

2023, <http:// www. harti. gov. lk/ images /download /reasearch_report/ new1/report_no_221.pdf>

Van Gils CH, Peeters PH, Bueno-de-Mesquita HB, Boshuizen HC, Lahmann PH, Clavel-Chapelon F, Thiébaut A, Kesse E, Sieri S, Palli D and Tumino R 2005 Consumption of vegetables and fruits and risk of breast cancer. Journal of the American Medical Association, 293(2):183-193,<https:// doi.org/10.1001/JAMA.293.2.183>

Wargovich MJ 2000 Anticancer properties of fruits and vegetables. HortScience, 35 (4):573-575,<https://doi.org/10.21273/ hortsci.35.4.573>

Wasala WMCB, Dissanayake CAK, Dharmasena DAN, Gunawardane CR and Dissanayake TMR 2014 Postharvest losses, current issues and demand for postharvest technologies for loss management in the main banana supply chains in Sri Lanka. Journal of Postharvest Technology, 2(1):80-87, viewed 20 January 2023, <https:// www.researchgate.net/profile/Wasala-Mudiyanselage-Wasala/ publication /305113202_Postharvest_Losses_Current_Issues_ and_ Demand_for_Postharvest_ Technologies_for_Loss_Management_in_the_Main_Banana_Supply_Chains_in_Sri_Lanka/links/57824f9e08ae5f367d3b59>

Weerahewa J, Rajapakse C and Pushpakumara G 2013 An analysis of consumer demand for fruits in Sri Lanka, 1981–2010. Appetite, 60:252-258, <https:// doi.org/10.1016/j.appet.2012.09.017 >

Weerasekara PC, Withanachchi CR, Ginigaddara GAS and Ploeger A 2020 Food and nutrition-related knowledge, attitudes, and practices among reproductive-age women in marginalized areas in Sri Lanka. International journal of environmental research and public health, 17 (11):3985, <https://doi.org/10.3390/ ijerph17113985>

Yabanc N, Ksac I and Karakus SS 2014 The effects of mother's nutritional knowledge on attitudes and behaviors of children about nutrition. Procedia-Social and Behavioral Sciences, 116:4477-4481, <https://doi.org/10.1016/ j.sbspro.2014.01.970>