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Fruit consumption, its determinants and attitudes among undergraduates

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Abstract

Fruits, being a good source of nutrients, can be used to fulfil the daily requirement of nutrients. However, the statistics of Food and Agriculture Organization and World Health Organization state that the worldwide per capita consumption of fruits and vegetables is estimated to be less than 20 to 50 percent of the minimum daily recommended intake. The health and well-being of the future generation of a country are critical in preventing malnutrition and chronic diseases. A study was carried out to find out the daily intake of fruits, barriers for consumption and other patterns in consumption among undergraduates. Moreover, the study focused on identifying knowledge on nutrition and opinions of undergraduates on fruit production. 50 students from the Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka were randomly selected and given a self- administered questionnaire. The daily intake of a majority of students existed between 50-100g and most consumed fruits in fresh form. Unavailability in the market or the limited access was the major barrier for the intake of sufficient amount of fruits. The study concluded that the daily intake of fruits of undergraduates is less than the recommended level. Extension services and constant market prices can overcome the problems in fruit production.

Keywords: Fruits, Undergraduates, Fruit consumption, Barriers to fruit intake

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Introduction

Fruits contain numerous nutrients including vitamins, carbohydrates, and minerals that are essential for the well-being of humans. Consumption of fruits permits the intake of rich sources of ascorbic acid, thiamine, niacin, vitamin B6 as well as minerals such as potassium, magnesium, and calcium. Both glycaemic and non-glycaemic carbohydrates are found in fruits, however, they do not contain cholesterol, a point that can be used to classify fruits as a healthy source of food. Presence of dietary fibers that are vital for the maintenance of a healthy circulatory and digestive system enhances the importance of fruits as a non-nutritive food constituent. Studies regarding the link between the consumption of vegetables and fruits and chronic diseases show that prevention of these diseases while promotion of health can be a result of an increase in consumption of vegetables and fruits (Boirng et al, 2012). World Health Organization (WHO) and Food and Agriculture Organization (FAO) recommend a minimum daily intake of 400g or five portions of 80-grams of vegetables and fruits a day, excluding starchy tubers. This helps to prevent chronic diseases including heart diseases, cancer, diabetes, obesity and deficiencies in micronutrients. The low consumption of fruits and vegetables is responsible for approximately 1% of disability-adjusted life years, 14% of gastrointestinal cancer deaths, 11% of ischaemic heart diseases and 9% of stroke deaths worldwide (WHO/FAO, 2005). Even though consumption of fruits and vegetables is promoted, the world per capita consumption is less than 20 to 50 percent of the minimum daily recommended intake (Food and Agriculture Organization, 2015).

The future generation of any country are the adolescents and their nutritional needs are critical for the well-being of society and to break the intergenerational cycle of malnutrition, chronic diseases, and poverty (World Health Organization, 2016). In a study carried out among university students in Saudi Arabia, it was found that the fruit and vegetable consumption is far less than the WHO recommended level (Alsunni and Badar, 2015).

Taste preferences, costs, availability and knowledge of nutrition influence the fruit and vegetable intake of adolescents (Liming, 2004; Corwin et al., 1999). Contrary to this, during an investigation, Schroeter et al. (2007), discovered that self-rated health knowledge had little impact on the consumption of fruits and the green salad of college students. When compared between male and female students, females were more likely to eat fruit and vegetables (Unusan, 2004). Perera and Madhujith (2012), used a Food Frequency Questionnaire to study the fruit and vegetable consumption pattern of university students and concluded that the mean fruit and vegetable consumption per day is far

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less than the WHO recommendations and gender, income and taboos had a significant effect on this. They also state that most of the students have a fair knowledge on some of the basic aspects of nutrition such as health benefits of fruits and vegetable. This study found banana and papaya to be the most frequently consumed fruits by undergraduates.

Crops with an unrealized potential to contribute to the human welfare through ensuring food security and nutrition and reducing hidden hunger caused micronutrient deficiencies are considered as underutilized crops. In Sri Lanka, a number of underutilized fruits that can be effectively developed into promising crops to fulfil the nutritional requirements are present. The perspective of undergraduates on the use of underutilized fruits as healthy food to promote access to better nutrition for communities is helpful in determining future crops.

It is clear that fulfilling the nutritional needs of undergraduates is critical as adolescents are the future of a country. However, previous studies have identified that there is a considerable gap between the daily recommended intake and the actual consumption of fruits and vegetables by students. This has given rise to a need to inquire the daily intake of fruits of undergraduates and to identify the barriers and limitations for consumption that are faced by them. Therefore, this study was carried out in order to determine the patterns of consumption of fruits by undergraduates of the Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka. Moreover, it is expected to identify the barriers to fruit consumption, solutions to overcome the barriers, perspective of undergraduates on underutilized fruit crops and fruit cultivation in Sri Lanka.

Materials and Methods

Collection of Data

A self-administered questionnaire was distributed among 50 randomly selected students of the Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka. This questionnaire collected information on the consumption, preferences and barriers to consumptions, probable solutions to overcome the barriers. Moreover, respondents self-rated themselves according to the knowledge in nutritional aspects. The questionnaire contained questions regarding the opinion of respondents regarding the underutilized fruits in Sri Lanka and fruit cultivation. Respondents ranked the method of intake, factors considered when selecting fruits, type of fruits consumed, barriers and remedies to increase production and consumption in order of preference. Rank 1 was given to the most common choice, barrier or the best solution according to their opinion while the value the rank increased with the decreasing importance.

Data Analysis

Descriptive statistical analysis to calculate frequencies was carried out using IBM SPSS software version 24. Data were graphically illustrated using MS EXCEL (2013). Bar charts were used in order to clearly compare the percentages of different ranks allocated by the respondents.

Results and Discussion

Age and gender distribution and spending on food

Among the respondents, 36% were between the ages of 20-23 years while the remaining 64% belonged to the age group 23-26 years. Female respondents exceeded the percentage of males with a value of 68%. Only 14% spend less than Rs.2000 per month on food. Expenses for food of 40% stood between Rs.2000-5000 and 46% it exceeded Rs.5000.

Intake of fruits

Grams of fruits consumed per day by a respondent varied as follows. 40% of respondents consumed between 50-100g of fruits daily and the intake of 36% was less than 50g. Only 2% consumed above 200g of per day. Therefore, the daily intake of a majority of respondents was less than the daily recommended level.

Table 1. Daily intake of fruits.

Grams	Percentage
Less than 50g	36%
Between 50-100g	40%
Between 100-150g	16%
Between 150-200g	6%
Above 200g	2%

Among the fruits that were mentioned as commonly consumed, 92% of respondents mentioned that they consumed banana at least once during a week and it was determined as the most commonly consumed fruit. Papaya was the next common fruit with a percentage of 50%. These results are similar to those discovered by Perera and Madhujith (2012).

Table 2. Commonly consumed fruits.

Fruit	Percentage (%)
Banana	92%
Papaya	50%

Consumption of fresh fruits was the common mean of intake of fruits as it was ranked as 1 by a majority of respondents. Fruit salads and juices were less popular than fresh fruits. The least common mean of intake of a large number of respondents was the consumption of value added products with 68% ranking it 4.

Table 3. Common mean of intake of fruits.

		Percentage (%)			
		Rank 1	Rank 2	Rank 3	Rank 4
Common method of intake	Fresh fruits	46	20	18	16
	Salads	30	48	18	04
	Juices	22	28	40	10
	Value added products	04	04	24	68

Factors affecting the selection specific fruits for consumption by respondents are given in Figure 1.

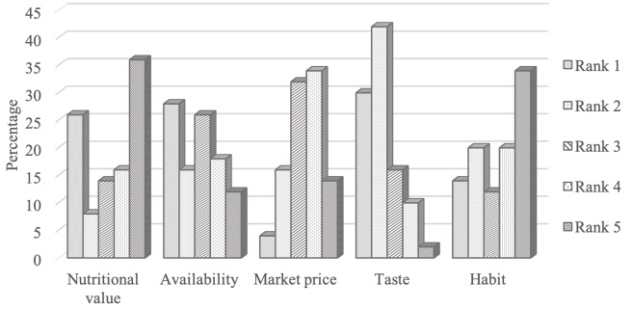

Figure 1. Factors that affect the selection of fruits.

30% of respondents ranked taste as the common factor that affects the selection of fruits for consumption. This result is similar to the findings by Perera and Madhujith (2012). Market price was considered as the most important factor by only 4%. Even though 26% considered the nutritional value as the most common factor considered when selecting a fruit, it was also ranked 5 by 36% of respondents making it the least considered factor by a majority.

Table 4. Types of fruits preferred.

Preference	Percentage (%)		
	Rank 1	Rank 2	Rank 3
Any fruits that were grown locally	68	26	06
Any fruits that were imported	22	26	52
Underutilized fruits	10	42	48

Fruits in the can be divided as fruits that are grown locally and fruits that are imported. There are underutilized fruits as well. 68% of the respondents preferred they would like to consume any type of fruit that is grown locally.

Table 5. Respondent's attitude on consumption of sufficient amount of fruits.

Consume sufficient amount of fruits	Percentage (%)
Yes	28%
No	72%

72% of respondents do not believe that they intake the sufficient amount of fruits daily. They identified the barriers for consumption of a sufficient amount as below. Some respondents pointed out more than one reason.

Table 6. Barriers for fruit consumption.

Barrier	Percentage (%)
High prices of fruits	54
Unavailability in the market	84
Pesticide residues on fruits	46
Health issues	22
Personal factors	46

Unavailability of fruits in the market or limited access to the marketed fruits is the major barrier for the respondents. Similar findings were revealed by Perera and Madhujith (2012). Moreover, 46% of respondents do not wish to consume fruits due to the fear of pesticide residues on them.

Knowledge on nutrition and suggestions to enhance the consumption

A majority of respondents had a fair knowledge of nutrients presence in fruit, fulfilment of the daily nutrient requirement by fruits and the recommended daily intake of fruits.

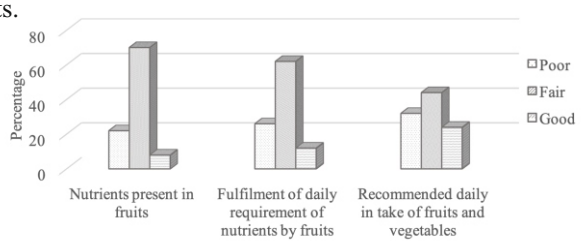

Figure 2. Knowledge on nutritional aspects.

Respondents marked more than one suggestions to improve fruit consumption. 82% of respondents cited the increase in convenience of obtaining fruits or availability as one of the remedies to overcome the barriers to fruit consumption. Also, a considerable percentage of respondents suggested value addition to produce new products as an option.

Table 7. Suggestions to increase the fruit consumption.

Suggestion	Percentage (%)
Decreasing prices	60
Convenience / Increasing availability	82
Growing fruits organically	44
Value addition to produce new products	72

Barriers to fruit production

26% of respondents identified the inconsistency of market prices in the major barrier for fruit production in Sri Lanka. Overcoming this barrier in production can have an effect on increasing the availability of fruits in the market.

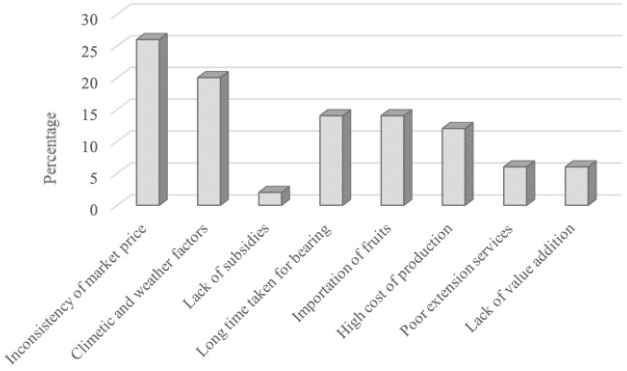

Figure 3. Barriers to the fruit production.

Cultivation of underutilized fruits

Other than fruits that are commonly available in the market, underutilized fruits can be used as a promising source of nutrients. Respondents stated their opinion on promotion of cultivation and consumption of underutilized fruits.

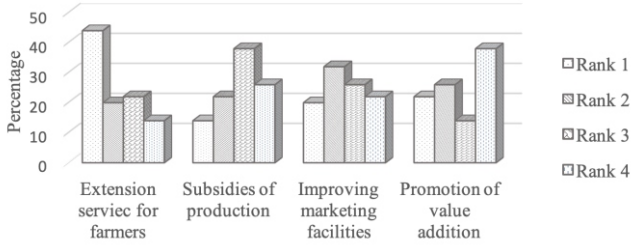

Figure 4. Remedies to overcome barriers in underutilized fruit production.

Improvement in extension services for farmers was ranked 1 as the most important remedy to overcome constraints in production of underutilized fruits by respondents with a percentage of 44%.

Consumption of underutilized fruits

Increasing awareness on nutrition among people was identified as the best option to promote the consumption of underutilized fruits.

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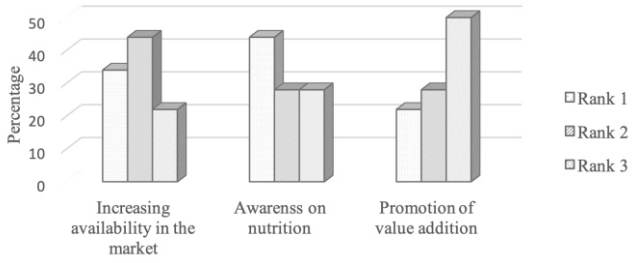

Figure 5. Suggestions to promote the consumption of underutilized fruits.

Among the respondents, Indian Plum (*Flacourtia indica*) (Uguressa in Sinhala) was the most popular underutilized fruit and the fruit with the higher potential to be produced and marketed. This was selected by 42% of the respondents. Therefore, there is a good potential to use underutilized fruit crops to fulfill the nutrient requirements through improvement of extension services to farmers and increasing awareness among the consumers.

Fruit cultivation in the home garden

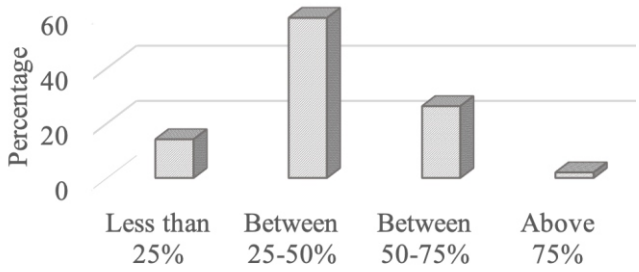

Figure 6. Fulfilment of fruit requirement from the home garden.

Cultivation of fruit crops in the home garden allows consumers to readily access to fruits. Fruit crops grown organically in own home garden is a good solution to overcome the barrier of not consuming fruits due to chemical residues on them. All the respondents had fruit crops cultivated in their home gardens. 58% of respondents fulfilled between 50-75% of their fruit requirement from their home gardens.

Respondents were asked their opinion on cultivation of fruit crops in the home garden organically.

Table 8. Cultivation of fruit crops in home garden.

	Organically managed (%)	Synthetic agrochemicals (%)
Present cultivation in the home garden	84	16
How respondents prefer to grow in the future	94	6

84% of respondents had their home gardens managed organically. Despite their present cultivation 94% prefer to grow fruits organically in the future.

Banana was identified as the common fruit crop grown in home gardens with 62% and the next was papaya with a percentage of 52%.

Table 9. Commonly grown fruit crops in home garden.

Fruit	Percentage (%)
Banana	62%
Papaya	52%

Conclusion

Despite having a fair knowledge on nutritional aspects, the daily fruit consumption of a majority of undergraduates of the Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka lies at a very lower value. Banana claims to be the commonly consumed and grown fruit. Overcoming the barriers of unavailability in the market and price fluctuations while promoting extension services and creating awareness can be used to increase the fruit consumption and production. Underutilized fruits have a good potential to be used to fulfill nutrient requirement and home gardens can play a crucial role in determining the fruit consumption.

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