Fresh-Cut Vegetable at Supermarkets in Bangladesh: Focus on Customer Perception and Factors Influencing Purchasing Decision

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Authors' contributions

The work was carried out in collaboration among all authors. Author SS designed the study, managed the analysis and controlled the overall study. Author SA performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Author MS managed the literature searches and assisted in the analyses. All authors read and approved the final manuscript.

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ABSTRACT

The concept of fresh-cut vegetables is relatively new and its demand has increased tremendously. The study was designed to assess the customer's perception and to determine the factors influencing customer's decision to purchase fresh-cut vegetables. Both primary and secondary data were used in this study. A total of 103 vegetable customers from eight outlets of SHWAPNO supermarket were selected through random sampling technique and interviewed directly. For measuring perception of the respondents and identifying influential factors, a 5-point Likert scale and multiple logistic regressions were used. The majority of the customers had moderately favorable attitude towards fresh-cut vegetables. They perceived different attributes of fresh-cut vegetable like ready-to-cook and time-saving nature, appearance, quality and hygiene as most appealing. Results of the Log it model reveals that education, family member, occupation, having maid servant, income, perception have significant effect on purchasing of fresh-cut vegetables. Having higher education, larger family and higher income increases the possibility to purchase

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fresh-cut vegetables whereas having maid-servant negatively affect their purchasing decision. One fifth portion of total customers complained about the availability, packaging and supplied volume of fresh-cut vegetables. Therefore, it is possible to expand fresh-cut vegetable market in Bangladesh by taking appropriate measures.

1. INTRODUCTION

Vegetable is an important source of nutrition and food security. There are more than sixty different types of vegetables (both local and exotic) are grown in Bangladesh Sabur et al. [1]. Vegetables can be eaten in both raw and cooked form, and comprise an essential part of human diet as they are the major source of dietary nutrients of great importance. Nowadays, customers are more health concerned and the demand for vegetable products is continuously increasing. Therefore, minimally processed vegetable, e.g, fresh-cut and packed in a convenient way, are introduced into the worldwide market. Customer interest in local and exotic taste of fruits and vegetables is growing continuously which has promoted the growth in the international trade of fresh-cut products. Due to customer demand for healthy, fresh, convenient fruits and vegetables, there has been a rapid growth of fresh-cut produce industry worldwide in recent years. In many developed and developing countries fresh-cut vegetables and fruits are relatively new and rapidly developing parts in the fresh produce industry. "Fresh-cut" indicates to raw vegetables and fruits that have been cut, shredded, peeled, abraded, or otherwise prepared to produce convenient ready-to-eat or ready-to-cook portions Brecht et al. [2]. The International Fresh-cut Produce Association (IFPA) defines fresh-cut produce as 'any fresh fruit or vegetable or any combination thereof that has been physically altered from its original form, but remains in a fresh state' Qadri et al. [3]. Available fresh-cut vegetables at different supermarkets of Bangladesh are: mixed vegetables, carrots (shredded, sticks, peeled), broccoli and cauliflower, capsicum, amaranth stem, onions (sliced, whole peeled), taro root, taro root stems, bitter gourd, green jackfruit, jackfruit seed, bean seed and green pea.

The United States and European fresh-cut industry has shown tremendous growth over the last four decades. Among different European countries, United Kingdom is now in the leading position in Europe based on fresh-cut fruits and vegetable sales (EUR, 1.1 billion), while per capita spending on fresh-cut produces is highest in case of Switzerland and Netherland consumers than the rest of the European consumers FAO, [4]; Rabobank, [5]. Besides, with growing consumer demand for ready-to-eat products in Asia, the markets for fresh-cut products in Thailand and Vietnam are likely to show a continued growth trend FAO, [4]. The concept of fresh-cut vegetables has started in Bangladesh just a few years ago, it is anticipated that it will expand rapidly like many other developing and developed countries. Fresh-cut vegetables and fruits are only available at the supermarkets of Bangladesh, even not all supermarkets. Among them, some largest supermarkets named Shwapno, Agora, Meena Bazar preliminary started to market fresh-cut produces since last few years.

Due to the demographic and socioeconomic changes of population, demand for fresh, healthy, less time consuming and ready-to-cook form of vegetables are increasing day by day. So, there is a lot of opportunity to expand fresh-cut vegetable market if customers are totally satisfied. This satisfaction depends on product varieties, product safety, maintenance of quality and so on. If customers have a good perception that means they believe that fresh-cut produce is safe and having high quality with sufficient shelf-life, the growth trend of fresh-cut produce will be ensured. Although urban customers are like to keep fresh vegetables in their daily diet nowadays, preparation of vegetable (peeling, shredding, cutting, washing, etc.) for cooking is not hassle-free and it consumes time. Moreover, women have less time for cooking purposes due to involvement in outside economic activities like job, business, and so on. They feel fresh-cut vegetable item is very helpful for them because it requires less time, easy to cook, minimize wastage and makes life easier. It's quality as well as freshness and hygiene is always preferred by the people. Due to increasing demand for fresh-cut items, investors/supermarkets have keen interest to know the future prospect, customer's thought and problems regarding fresh-cut vegetables, and find out the way to increase its

demand tremendously. Though few research works on fresh-cut vegetable has been available in many developed and developing countries, no research has yet been done on this topic in Bangladesh as this a recently added form of vegetable at supermarkets. Existing literatures showed major consumers in USA preferred fresh-cut fruits and vegetables (FCFV) commercially available to whole fruits and vegetables due to less preparation time and serving portions Sonti, [6]; Belloso et al. [7]. It is the fastest growing food category in U.S. supermarkets. Ragaert et al. [8] found in their research that search attributes (product appearance and packaging) are significantly more important in buying stage, while experience attributes (taste, odor, and texture) are more important in the consumption phase. Changes in consumer lifestyles (social events, eating alone, breakdown of mealtimes, novelty), time pressure and ready-to-eat nature of FCFV greatly influence the significant increase of FCFV consumption in Mexico and Turkey Kim, [9]; Rico et al. [10]. According to Scholderer et al. *(*2005) the strongest drivers for convenience products consumption are number of children, full-time employment and disposable income. Sa-nguanpuag et al. [11] also identified the same factors behind the growth in the Thai fresh-cut industry. Moreover, some problem of fresh-cut produce like sanitation, freshness, temperature and wash water disinfection has already identified in some European countries Maria et al. [12]; Lamikanra et al. [13]; De Boer & Ryan, [14]. As a solution of these problems improvements in water disinfection and sanitation strategies, including a shower pre-washing step and a final rinse of the produce are advised in these reviews. However, negative perception is also observed by Rabobank [5] where EU consumer's negative attitude for the majority of the fresh-cut attributes, especially for the shelf life of the products has found. This marketing study was administered in the four countries named Greece, Italy, Spain and UK using a unique questionnaire.

Therefore, the present study is a modest attempt to examine all of these issues on the potential fresh-cut vegetable market in Bangladesh and mainly focuses on assessing the customer's perception of fresh-cut vegetables at supermarkets in Bangladesh and determines those factors that influence customer's decision to purchase fresh-cut vegetables. It is expected that this study may play a vital role in the development of fresh-cut vegetable industry in Bangladesh.

2. METHODOLOGY

2.1 Data Sources

Among the top most supermarkets where fresh-cut vegetables are only available to sell (SHWAPNO, Agora and Meena Bazar), SHWAPNO was selected for this study due to its wider availability of fresh-cut items. Total 103 vegetable customers, 10 outlet managers and 1 supplier were interviewed from eight outlets of SHWAPNO supermarket at Dhaka city by using random sampling technique. Among the samples, fresh-cut vegetable and non-fresh-cut vegetable customer numbers were 50 and 53, respectively. Data were collected through a key information interview and questionnaire survey during August 2018 to March 2019. Besides primary data, secondary data were also collected from relevant websites, articles, research papers and journals on E-commerce in Bangladesh, text books of related topics and annual reports.

2.2 Analytical Techniques

Customer perception towards fresh-cut vegetables was investigated using Likert scale. The extents of opinion of the customers against 12 statements including both favor and disfavor were used to evaluate his/her attitude against each statement along a 5-point scale, i.e., strongly agree, agree, neither agree nor disagree, disagree, strongly disagree. Weights assigned to these responses were 5, 4, 3, 2 and 1in favor and 1, 2, 3, 4 and 5 in disfavor. Perception score of a respondent could, thus, range from 12 to 60. Perception score for each statement was calculated by using perception index (PI) and it was calculated by using the following formula:

Perception Index (PI) = 5 × SA + 4 × A + 3 × NAD + 2 × DA + 1 × SDA (In favor)

Perception Index (PI) = 1 × SA + 2 × A + 3 × NAD + 4 × DA + 5 × SDA (In disfavor)

The total score of customer was determined by summing up the weights the responses against all the 12 statements.

Multiple logistic regressions model was applied in this study to identify the influencing factors to purchase fresh-cut vegetables. This model expresses a qualitative dependent variable as a

Table 1. Description of the variables used in the Log it Model

Variables	Type	Measurement
Dependent Variable		
Purchasing Fresh-cut vegetable	Dummy	1 if customer has purchased fresh-cut vegetable; otherwise 0
Explanatory Variables		
Age	Continuous	Age of the customer in years
Education	Categorical	SSC passed=1, HSC passed=2, Graduated=3, Post graduated=4
Family size	Continuous	Number of the customer's family members (no.)
Family pattern	Categorical	Single=1, Nuclear=2, Extended/Joint=3
Occupation	Categorical	Housewife=1, Business=2, Service=3
Having maid-servant	Dummy	1 if customer's family has maid-servant; otherwise 0
Perception toward fresh-cut vegetable	Dummy	1 if customer has favorable perception toward fresh-cut vegetable; otherwise 0
Monthly family income	Categorical	Total monthly income of the customer's family (BDT) Categories: Less than 50,000=1, 50,000-1,00,000=2; 1,00,000-2,00,000=3, More than 2,00,000=4

function of several independent variables – both qualitative and quantitative Fox [15].

In this model, purchasing nature of fresh-cut vegetables is used as the dependent variable and customer's age, education level, family size, family pattern, occupation, availability of maid servant, perception toward fresh-cut vegetables, and monthly household income as independent variables. Description of the used dependent and explanatory variables is presented in Table 1.

As the outcome dependent variable – purchasing nature is dichotomous in nature, with the option of either 'purchasing' or 'not purchasing', therefore, the logistic regression model is considered to be the most suitable analytical tool to use to how much independent variable affects the probability to purchase Raut et al. [16]; Thapa and Rattanasuteerakul [17].

Let, Y_i denotes the dichotomous outcome (dependent) variable for the i-th observation and

$Y_i = y_i = 1$, if the i-th individual purchase fresh-cut vegetables and

= 0, if the i-th individual is not purchasing

In terms of simple notation, we use the quantity $\pi(X) = E(y_i|X)$ to represent the conditional mean Y given X when the logistic distribution is used. The model for estimating customers-response by using the logistic function is given by

$$\pi(X_i) = \frac{e^{\beta_0 + \beta_i X_i}}{1 + e^{\beta_0 + \beta_i X_i}} \qquad (1)$$

Where, X_i is an explanatory variable and $ß_i$'s are the regression coefficients.

$$\therefore E(Y_i = 1 \mid X_i) = \pi(X_i) = \frac{e^{\beta_0 + \beta_i X_i}}{1 + e^{\beta_0 + \beta_i X_i}} \qquad \text{and} \quad (2)$$

$$E(Y_i = 0 \mid X_i) = 1 - \pi(X_i) = \frac{1}{1 + e^{\beta_0 + \beta_i X_i}} \qquad (3)$$

Therefore, we can write

$$\frac{\pi(X_i)}{1 - \pi(X_i)} = e^{\beta_0 + \beta_i X_i} \qquad (4)$$

Now if we take natural logarithm of the equation (4), we get

$$L_i = \log_e \left[\frac{\pi(X_i)}{1 - \pi(X_i)} \right] = \beta_0 + \beta_i X_i \qquad (5)$$

The equation (5) is known as simple logit regression model. Here $\frac{\pi(X_i)}{1 - \pi(X_i)}$ given in (4) is the simple odds ratio and the term L_i given in (5) is known as log-odds.

3. RESULTS AND DISCUSSION

3.1 Customer Perception toward Fresh-Cut Vegetables

Customer's opinion against 12 statements (9 for favorable situation and 3 for unfavorable

situation) regarding fresh-cut vegetables are evaluated by using perception index (PI) which are further ranked according to their calculated score (Table 2). Perception index has found to vary from 128 to 201 for all customers. Customers ranked 8th and 7th statements so positively and these satatements got 1st and 2nd rank holding perception index scores 201 and 200 respectively. This result indicates that customer perceived fresh-cut items as the most appealing, considering its easy-to-cook and time saving characteristics. Belloso et al. (2010) and Kim (2007) also indicated convenience or ready-to-eat nature as the most important driving force behind fresh-cut product purchases in U.S. and Mexico supermarkets. Next important attributes indicated by them are few fresh-cut items, hygiene, staff's attitude at the supermarket, high price and quality. Contrarily, customers are less concerned about the possibility to online purchase and on-time delivery option as this statement got the last position in ranking (Table 2).

In general, customer has a favorable perception towards fresh-cut vegetables according to individual customer perception score over the 12 statements. Fig. 1 implies that about 64% customer possessed favorable perception whereas only 20% customer possessed unfavorable perception about fresh-cut vegetables.

Though majority of the customers had moderately favorable attitude towards fresh-cut vegetables, one fifth portion of total surveyed customers complained about the availability, freshness, quality, packaging and volume of fresh-cut vegetables.

3.2 Factors Influencing Customer Decision to Purchase Fresh-Cut Vegetables

Different variables like age, educational level, family member, family pattern, occupation, perception, income have varying and significant influences on the purchasing decision of fresh-cut vegetables (Table 3). Having higher education, larger family and higher income increases the possibility to purchase fresh-cut vegetables whereas having maid-servant negatively affect their purchasing decision.

Scholderer et al. (2005) also found direct connection of some variables named, number of children, full-time employment and disposable income with the purchase of convenience products like fresh-cut produces. The result shows that the purchasing of fresh-cut vegetables increased as the years of education increase, which implies educated customers are more motivated to purchase fresh-cut vegetables. Besides, exposure to education may increase customers' ability to purchase fresh-cut vegetables for making their life easier. The coefficient of graduated customer education (2.89) shows significant positive relationship at 1% level of significance which indicates that having graduation instead of having secondary education (SSC), increases the log odds of purchasing fresh-cut vegetable by 2.890 units (Table 3). In case of family member, perception towards fresh-cut vegetable; coefficients have showed positive relationship implies that every one unit increase in family member, the log odds of purchasing fresh-cut vegetable increases by 0.869 units. This is may be due to their involvement in economic activities. Though they have more members in the family, all are busy in the professional activities and less time for household activities. In contrast, family having maid servant (0.673) shows negative relationship at 5% level of significance that means having maid servant in the house decrease the log odds of purchasing fresh-cut vegetables by 0.67 units (Table 3). Family without maid-servant have higher tendency to purchase fresh-cut vegetables. As customer's perception strongly drives people in their decision making, it is also proven from the result of fresh-cut vegetable purchasing decision. Sometimes customers are not satisfied due to the quality and color deterioration, unavailability of fresh-cut vegetable items, lack of desired packet size, limited or few items, higher price, shorter shelf-life, hygiene problem, and mixed product placement in the supermarket; which create negative perception toward fresh-cut vegetables. Besides having service persons in the family, higher income (above 2, 00,000) of the household also play a vital positive role in purchasing fresh-cut vegetables at supermarket. Previous studies in different countries also confirmed similar relationships between income and the probability of eating/using fresh-cut produces [6,11] (Scholderer et al., 2005)

Table 2. Customers perception towards fresh-cut vegetable (Statement-wise perception score of the customers)

Statements No.	Statements	Extent of opinion					PI	Rank order	Average PI
		Strongly agree	Agree	Neither agree nor disagree	Dis-agree	Strongly disagree			
1	Price of fresh-cut vegetables item are reasonable	7	30	5	7	1	185	6	3.70
2	Fresh-cut produces are hygienic	13	24	6	6	1	192	4	3.84
3	Fresh-cut vegetable items aren't widely available (-)	0	20	13	17	0	147	9	2.94
4	It is possible to buy fresh-cut vegetables online and get on-time delivery	1	1	23	25	0	128	12	2.56
5	Websites of the supermarkets help to know discount offer and newly arrived items of fresh-cut vegetables	0	3	33	13	1	138	10	2.76
6	Staffs are friendly and helpful to get the items	8	30	3	8	1	186	5	3.72
7	Purchasing of fresh-cut vegetables make life easy by saving time	15	27	2	5	1	200	2	4.00
8	Fresh-cut vegetables are easy to cook	16	25	4	4	1	201	1	4.02
9	Packaging and amount served are not convenient to buy (-)	3	29	7	7	4	130	11	2.60
10	Use of fresh-cut vegetables reduce wastage at household level	16	15	8	7	4	182	7	3.64
11	Quality of the products is at satisfactory level	15	16	5	11	3	179	8	3.58
12	Items of fresh-cut vegetables are not enough(-)	0	5	7	24	14	197	3	3.94

Source: Author's estimation based on field survey, 2018
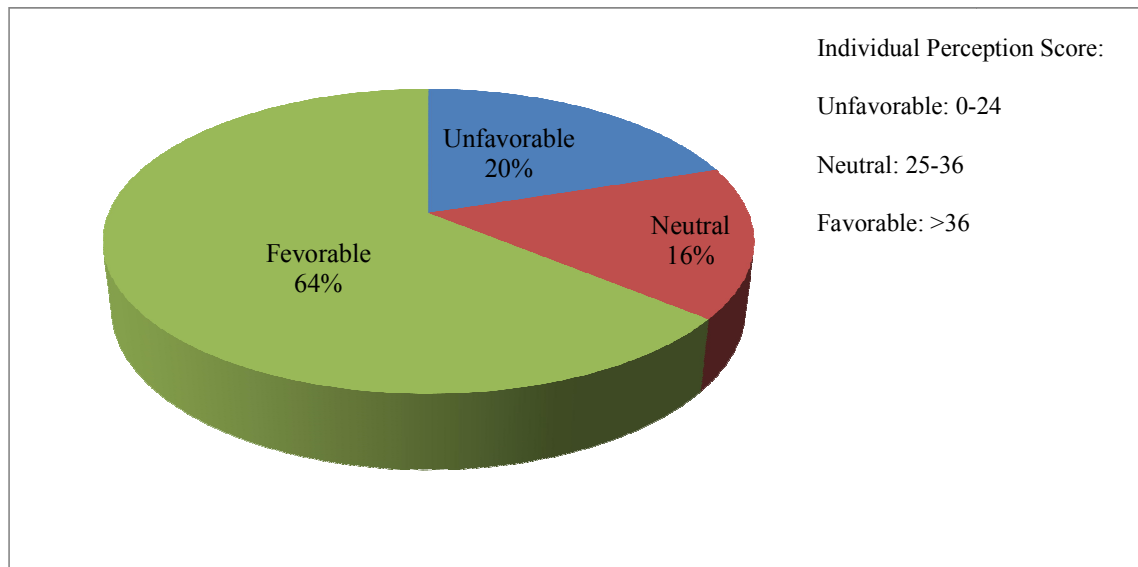*Note: (-) = Disfavor situation*

Fig. 1. Overall customer perception towards fresh-cut vegetables

Table 3. Factors influencing the purchasing of fresh-cut vegetables

Variables	Coefficients	Standard error	P value
Age (years)	-0.0194518	0.0264641	0.462
Education:			
SSC passed*	0	----	----
HSC passed	0.418999	0.9893044	0.672
Graduated	2.890372	0.9789465	0.003
Post graduated	2.135956	1.227668	0.082
Family member	0.8699048	0.452008	0.045
Family pattern (no. of family member):			
Single*	0	----	----
Nuclear	1.118296	1.108489	0.056
Extended	0.1222698	1.481119	0.934
Occupation:			
Housewife*	0	----	----
Business	0.5579123	0.700389	0.426
Service	0.0704304	0.7177301	0.092
Having maid-servant (Δ)	-0.6734924	0.3416076	0.032
Perception toward fresh-cut vegetable(Δ)	1.854661	0.9359492	0.048
Monthly family income (BDT):			
Less than 50,000*	0	----	----
50,000-1,00,000	1.292574	1.017911	0.204
1,00,000-2,00,000	1.501241	0.993591	0.131
More than 2,00,000	1.828689	1.029866	0.076
Constant	-1.237274	1.571414	0.431
Model Summary			
Log likelihood	-31.247016		
LR chi^2 (14)	40.21		
Prob>chi^2	0.0001		
Pseudo R^2	0.2906		
No. of observations	103		

Source: Author's estimation, 2019
*Note: * indicates reference category; (Δ) indicates dummy variable*

4. CONCLUSIONS AND POLICY RECOMMENDATION

Through this study, an approximation of customer perception towards fresh-cut vegetables and the factors that favor or hinder purchasing of fresh-cut vegetables have assessed. As a consequence, significant issues were identified that need to be considered generally to improve choosing of fresh-cut vegetables at the customers' level. In general, customer perceptions were found positive towards fresh-cut vegetables. They perceived fresh-cut items as the most appealing, considering its attributes, like ready-to-cook and time-saving nature, appearance, quality and hygiene, and waste reduction at household level. Higher educated, larger family, job-holder and higher income earning households have greater possibility to buy fresh-cut vegetables, as they are concerned about time, freshness, quality and hygiene. For the better purchasing of fresh-cut vegetables among the customers, more availability, quality maintenance, marketing new items of fresh-cut vegetables are essential and also price has to be kept reasonable. As a result, customers are able to lead their life easily and smoothly.

Adequate measures should be taken by the entrepreneurs and government to expand the fresh-cut vegetable market in Bangladesh. Appropriate management system should be adopted by the supermarkets like, proper management of fresh-cut vegetable's shelf-life, wider availability of items, pricing, etc. Technical and scientific knowledge regarding processing, packaging, and distribution of this produces should be provided by the government. Fresh-cut vegetables related publicity have to be promoted through the mass media like advertising, distributing leaflets, video, newspaper, and awareness of reduce wastage at household level. Only then fresh-cut vegetables will get widespread social and market recognition and the ultimate consumers will enjoy its benefit directly that will give relieve from some regular life hustle and bustle.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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