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ORIGINAL RESEARCH ARTICLE

Consumer's preferences for healthy food consumption: An empirical analysis from Mymensingh city in Bangladesh

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ABSTRACT

Numerous non-communicable diseases are being caused by changes in food and lifestyle choices. However, the global trend of eating more healthful food is growing as people become more aware of their personal health. Nonetheless, not much scholarly work has been done on the perplexing purchasing habits of customers, especially in developing nations like Bangladesh. Hence, the purpose of this study was to determine the preference for healthy food consumption and the factors associated with consuming healthy food. The study was conducted on 140 participants selected by a purposive sampling technique from Mymensingh city. Data were collected through both face-to-face surveys and via email with the help of an e-questionnaire from May 2022 to August 2022. A five-point Likert scale was applied to assess the consumer's preference for healthy food products. The internal consistency of the items on the scale was examined by Cronbach's alpha. In addition, binary logistic regression was used to identify the factors that affect consumers' decisions to consume healthy food products. The study findings provide evidence of the highly disfavored attitudes (82.86%) toward healthy food consumption among people in the study area. The analysis also reveals that factors like gender, age, education, and monthly income have a positive impact on consumption decisions, while distance from the market, occupation, family size, and credit negatively affect consumption decisions.

INTRODUCTION

To survive, one must consume food. However, they are also intended to promote the physical and emotional well-being of the consumer, as well as to satiate hunger and taste (Menrad, 2003; Roberfroid, 2002). Unhealthy eating patterns can result in issues like undernutrition (wasting, stunting, and underweight), obesity, and micronutrient deficiencies. According to research by Afshin *et al.* (2019), one of the main causes of 22% of deaths and 15% of disability-adjusted life among adults globally in 2017 was high sodium intake, along with insufficient intake of whole grains and fruits. Therefore, by 2050, the global consumption of unhealthy foods must drop by more than half, while the global

consumption of nutrient-dense foods must rise by more than double the level of current consumption (Willet *et al.*, 2019). People are now consuming more nutritious foods as a result of the negative impacts of contaminated unhealthy food products (Sulaiman *et al.*, 2017, Baker *et al.*, 2007) with excessive fat and sugar content. They are currently attempting to stay away from refined cereals, sugary drinks, red meat, cheese, and other processed meat. Whole grains, such as whole-wheat bread, brown rice, and brown flour, as well as a variety of fruits, vegetables, fish, chicken, legumes, nuts, olive oil, mustard oil, tea, and coffee with little to no additives seen to be healthier alternatives to these goods (Hasan *et al.*, 2021). People have recently started to pay more attention to their lifestyle and diet

as a result of growing health concerns. Going forward, these items are increasingly likely to be preferred globally. Not an exception is Bangladesh. Bangladeshi consumers have started becoming aware of healthy food options overall. This will have an impact on all sectors of food processing and manufacturing, and also on the supporting industries. Already innovations are taking place in the agri-food industry to offer new and healthy products.

Although many people prefer healthier, safer, and higher-quality foods (Abdul, 2009; Rezai *et al.*, 2012), the prices can make these foods unaffordable to many consumers. Hence, a study on consumers, regarding their food preference and their consumption behavior is a prime need to identify along with the price, what other factor influences their consumption decisions. Habibie *et al.* (2019) studied the eating behavior of young female workers with low socioeconomic status in Malang City, East Java. Kabir *et al.* (2018) examined the influencing factors of eating behavior and dietary intake among resident students in a public university in Bangladesh. The result found that resident students have a poor dietary intake that might have a harmful impact on their health, well-being, and academic performance. Ljubicic *et al.* (2017) conducted a study on consumer knowledge and attitudes toward healthy eating in Croatia. They found out that women and urban residents consumed larger amounts of fruit, vegetables, and whole grains than men. Higher education correlated positively with the consumption of fiber-rich food. Lee *et al.* (2011) found that low socioeconomic status and cost as an additional factor in the choice of unhealthy foods. Carrilo *et al.* (2011) investigated the factors that underlie consumers' food choices toward healthy eating. Their result showed that foods with specific health-promoting ingredients exhibited low consumption frequency due the low interest or knowledge about their health benefits.

The aforementioned literature reviews revealed that several studies have been conducted to assess consumer preferences and behaviors toward healthy eating in many countries. However, in developing countries specifically Bangladesh, the number of studies regarding healthy food consumption preference and the probable determining factors is significantly very low. Moreover, there is no evidence in the literature focused on the consumer's preferences and factors influencing their healthy food consumption in Mymensingh, Bangladesh. So, there remains an extensive research gap. By keeping this in mind, this study intends to fill the vacuum and make a modest attempt to provide a better understanding of consumer preferences for healthy food products and also determine the significant influential factors that influence consumers' decisions to consume these products.

MATERIALS AND METHODS

Study design and data sources

A total of 140 consumers (Male 71 and Female 69) between 18 and 60 years old, from Mymensingh city were surveyed through a purposive sampling approach. For conducting this research, primary data were collected from May 2022 to August 2022. A structured interview schedule (hardcopy) and a Google form (e-questionnaire) both were prepared and used as survey instruments to collect all the required information needed to address the overall research questions and hypotheses. Candra *et al.* (2018), and Tarigan *et al.* (2020) also used this type of e-questionnaire for conducting their research. Open-ended, close-ended, and Likert scale questions were included to fulfill the objectives of the study. In this survey 50% of the data was collected through face-to-face interviews and, the other 50% was collected via email with the help of an e-questionnaire.

Item selection

For the purpose of data analysis, the 17 food and beverage items were classified into six food groups (Annexure 1).

Data analysis and analytical techniques

Consumer preference for healthy food products

By using a Likert scale (five-point) analysis, the preference of consumers for healthy food products was evaluated. The Likert scale is founded on the notion that an experience's strength or intensity is linear. Therefore, according to McLeod, 2019, Jamieson, 2004, and Likert (1932), it falls between the extremes of strongly agree and strongly disagree. Every item on the Likert scale that expressed a wide range of attitudes, from extremely positive to extremely negative, has been taken into consideration. On a 5-point Likert scale, favorableness (positive statement) was given a weight of 5, 4, 3, 2, 1 while unfavourability (negative statement) was given a weight of 1, 2, 3, 4, 5. For the positive statement, the number was assigned as $5 \times SA + 4 \times A + 3 \times N + 2 \times DA + 1 \times SDA$ (favorable), and for the negative statement it was $1 \times SA + 2 \times A + 3 \times N + 4 \times DA + 5 \times SDA$ (unfavorable). Table 1 lists the statements that were subjected to the Likert scale analysis.

Annexure 1. Food and beverage items.

Food grain	Cooking oil	Vegetables	Meat and fish	Drinks and beverages	Nut and fruits
Brown Rice	Mustard oil	Organic vegetables	Indigenous/ Native chicken	Green tea	Nut (Almond, Cashew, peanuts)
Brown flour	Olive oil	Unprocessed fresh vegetables	Sea fish	Tea or coffee without additives	Fruits
Brown bread			River fish	Low-fat or fat-free milk	
Oats				Diet drink	

Table 1. Fourteen statements for Likert scale analysis.

Positive/Favorable statement	Negative/Unfavorable statement
• It is essential to consume healthy food items to maintain good health.	• When I consider buying a product, at first, I look for products that are reasonable and cheap more than their nutritious value.
• When I have a choice between two products, I purchase the product that has a less harmful effect on my health.	• Healthy food is always expensive.
• Healthy eating habits have long time positive impact on the body.	• Healthy food items aren't widely available.
• I buy healthy products after watching my friends or knowing from television, newspaper, or other social media about their importance.	• It is difficult to practice healthy eating in the Bangladesh context.
• Changing eating behavior can help in protecting health from different diseases.	• When I eat, I concentrate on enjoying the taste of the food, not concentrate on the nutrition and healthiness of that food.
• Fat and sugar-free food is better than food with high proportions of fat and sugar.	• The healthiness of food has little impact on my food choices.
• I always follow a healthy and balanced diet.	• These issues are none of my business.

The internal consistency of the statements was examined using Cronbach's alpha (Cronbach, 1951; Pontes and Griffiths, 2015). The coefficient has a range of 0 to 1. The scale's items have a higher level of internal consistency when Cronbach's alpha coefficient is close to 1. Each statement's mean value was computed, and the statements were then divided into groups by lowest and highest means. The highest groups included the top 25 percent (Q1) and the lowest groups included the low 25 percent (Q2). Each statement's weighted mean and weighted total are as follows:

Weighted total = Score * Number who checked the score

$$\text{Weighted mean} = \frac{\text{Weighted total}}{\text{Total number in group}}$$

The DP (Discriminative Power) value for each of the 14 scale items was determined by subtracting the lowest weighted mean value from the highest weighted mean value. Nevertheless, it should be noted that, in item analysis, each item's ability to separate the highest from the lowest is measured. This is called discriminative power (DP). According to the DP value, statements were ordered in descending order. Statements are based on the value of the weighted mean of quartile one, Q1 if two or more statements have the same DP value. A greater DP value suggests that the highest 25% of the summated scores are more strongly agreed upon than the lowest 25% of the values. Finally, the favorableness and unfavorableness of eating healthy foods were determined based on each person's overall score value. Respondents were divided into two categories based on their responses to the study's 14 statements on a five-point Likert scale: unfavorable (14-42) and favorable (43-70).

Factors affecting consumers' decision to consume healthy food products

The binary logistic regression was used to identify the factors that affect consumers' decisions to consume healthy food products. The logit model was used by Pulina (2010), Christopher *et al.* (2011), Moser and Raffaelli (2012), and Aprile *et al.* (2012). A binomial logistic regression also referred to as logistic regres-

sion, predicts the probability that an observation falls into one of two categories of a dichotomous dependent variable based on one or more independent variables that can be either continuous or categorical.

This following binary logistic model was used to identify the factors that are responsible for choosing healthy food products:

Logit $[\Pi(X)] = \ln [(\Pi(X))/(1-\Pi(X))]$

$\Pi(X)$ is the probability of an event that depends on k covariates or independent variables. The probability can be expressed by following the model:

$\Pi(X) = (e\beta_0+\beta_1X_1+\beta_2X_2+...+\beta_kX_K)/(1+e\beta_0+\beta_1X_1+\beta_2X_2+...+\beta_kX_K)$
So, using the logistic formulation, the binary logistic regression model:
$\ln [(\Pi(X))/(1-\Pi(X))] = [(e\beta_0+\beta_1X_1+\beta_2X_2+...+\beta_kX_K)/$
$(1+e\beta_0+\beta_1X_1+\beta_2X_2+...+\beta_kX_K)/(1-$
$\{e\beta0+\beta1X1+\beta2X2+...+\beta kXK /1+e\beta0+\beta1X1+\beta2X2+...+\beta kXK\})]$
$\qquad = e\beta0+\beta1X1+\beta2X2+...+\beta kXK$

Here the logit of the probability of an event given X is a simple linear function. The probability of the dependent variable equaling a case is equal to the value of the logistic function of the linear regression expression. This is important because it shows that the value of the linear regression expression can vary from negative to positive infinity and yet, after transformation, the resulting expression for the probability ranges between 0 and 1.

RESULTS AND DISCUSSION

The reliability test was measured with Cronbach's alpha (Griffith, 2015). Higher values indicate higher agreement between items and Values above 0.7 are usually considered acceptable. In this study, each statement had almost equal consistency, and even after adding or deleting an item, the reliability value ranged from 0.716 – 0.749 (Table 2). Moreover, Cronbach's alpha value is 0.755, meaning that there is no internal inconsistency among the fourteen statements. So, all the statements that had been used here independently

Table 2. Cronbach's Alpha and reliability statistics.

Item-Total statistics

Statement no	Sign	Item-test correlation	Item-rest Correlation	Average interitem Correlation	Cronbach's Alpha
1	+	0.481	0.355	0.173	0.732
2	+	0.519	0.398	0.170	0.727
3	+	0.493	0.368	0.172	0.730
4	+	0.558	0.443	0.167	0.722
5	+	0.520	0.399	0.170	0.727
6	+	0.610	0.503	0.162	0.716
7	+	0.380	0.243	0.182	0.743
8	+	0.401	0.267	0.180	0.741
9	+	0.517	0.395	0.170	0.727
10	+	0.549	0.432	0.168	0.724
11	+	0.562	0.448	0.166	0.722
12	+	0.454	0.324	0.176	0.735
1	+	0.377	0.240	0.182	0.744
14	+	0.328	0.187	0.187	0.749
Test scale				0.173	0.746

Reliability statistics

Average inter-item covariance	0.218	Scale reliability coefficient (Cronbach's alpha) based on unstandardized items 0.755	Number of items in the scale	14
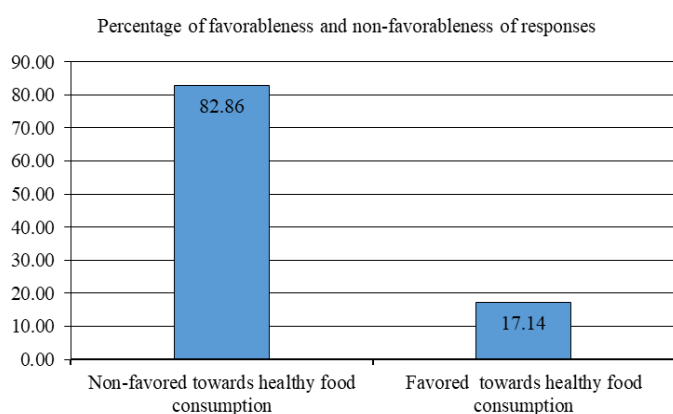
Figure 1. *Percentage of favorableness and un-favorableness towards healthy food consumption on the basis of the individual score value.*

reflected consumers' responses and therefore, were reliable to estimate the actual situation accurately.

Consumers' opinion against 14 statements regarding healthy food consumption is evaluated by using the item analysis which is further ranked according to their score value (Table 3). The top 25 percent and bottom 25 percent scorers, of the total respondents were included for item analysis. Since the middle 50 percent of the test scores behave in a similar pattern and contribute insignificantly to discriminating the performance of respondents, they were excluded. All the statements were arranged according to their DP values in descending order. These were the items that had a greater ability to separate the highest 25% from the lowest 25%. These statements showed larger bipolar results with strongly agree and strongly disagree endpoints. Statement 13 which is "The healthiness of food has little impact on my food choices" carried the highest DP value of 1.4. So, this statement was much more influential than the other and the difference between the two endpoints "strongly agree" and "strongly disagree" was greater. It is noteworthy to mention that, a higher DP value of course indicates more strongly agreed weights in the highest 25% than the lowest 25% summated scores. On the contrary, statement 5 "Healthy eating habits have a long-term positive impact on the body" got the lowest DP

value of 0.02, indicating the lowest separability between the highest 25% and the lowest 25% summated scores of consumer responses. It represents that consumers do not believe or find reality through this statement.

Favorableness and un-favorableness of consumers' preference for healthy food consumption

In this study, the range of consumer responses for the total 14 statements was from 14-70. It indicates that the lower responses were 14*1=14 and higher responses were 14*5=70. These ranges were measured by calculating the total score value of the individual. The respondents were divided into two categories i) non-favored (14-42) and favored (43-70). It was found that most of the consumer's (82.86%) attitudes towards healthy food consumption were highly un-favored while only 17.14% of consumers were found to have favorable attitudes in this regard (Figure 1). This finding indicated that most of the consumers have disfavored attitudes toward healthy food consumption in the study areas.

Factors influence consumers' decision for healthy food consumption

The binary logistic regression was utilized to identify the factors that affect consumers' decisions to consume healthy food products. In addition, multicollinearity among the independent variables was checked and found negligible (VIF<10). Numerous variables, like gender, age, education, occupation, monthly income, distance from the market, credit, and family size, have been found significant impacts on the consumption of healthy food products in Mymensingh city (Table 4). To find out the factors that may influence consumer attitudes, gender is considered to be one of the vital factors. We took male respondents' consumption as the base or reference category to explain female respondents' consumption patterns. The co-efficient of females has a positive influence on choosing food grains, vegetables, cooking oil, and; drinks and beverages and they are all

Table 3. Best selected statements.

Statement No.	Statement	DP value	Ranked by DP Value
13	The healthiness of food has little impact on my food choices	1.4	1
12	When I eat, I concentrate on enjoying the taste of the food, not concentrate on the nutrition and healthiness of that food	1.31	2
14	These issues are none of my business	1.31	3
8	When I consider buying a product, at first, I look for products that are reasonable and cheap more than their nutritious value	1.29	4
4	Fat and sugar-free food is better than food with high proportions of fat and sugar	0.49	5
3	When I have a choice between two products, I purchase the product that has a less harmful effect on my health	0.46	6
2	I buy healthy products after watching my friends or knowing from television, newspaper, or other social media	0.26	7
10	Healthy food items aren't widely available	0.17	8
9	Healthy food is always expensive	0.14	9
11	It is difficult to practice healthy eating	0.11	10
6	Changing eating behavior can help in protecting health from different diseases	0.06	11
1	It is essential to consume healthy food items for maintaining the health	0.03	12
7	I always follow a healthy and balanced diet	0.03	13
5	Healthy eating habits have long time positive impact on the body	0.02	14

Table 4. Factors influencing consumer decision to healthy food consumption.

Variables	Food grain	Meat and fish	Vegetables	Cooking oil	Nuts and fruits	Drinks and beverages
Gender Female	1.202* (0.453)	1.541 (0.874)	1.398* (1.034)	1.894* (0.490)	1.058 (0.657)	1.625* (0.646))
Age	0.857 (0.456)	1.058 (0.788)	0.0015 (0.049)	0.655* (0.294)	0.214 (0.118)	0.105* (0.085)
Education	2.270**(0.894)	1.873***(0.754)	2.479 (1.334)	1.645** (0.577)	1.885 (0.706)	1.056 (0.768)
Family size	-0.708*(0.301)	-1.384**(0.383)	-1.150 (0.677)	-0.798 (0.500)	-1.008* (0.655)	0.794 (0.495)
Occupation Private employee	-1.560* (0.700)	-1.854 (0.087)	-2.070 (1.696)	-1.705 (0.955)	-1.987*(0.777)	-2.103* (0.984)
Student	-2.103* (0.954)	-1.900 (0.101)	-1.592 (0.883)	-1.550 (0.802)	-2.232 (1.156)	2.568 (1.890)
Monthly Income	1.745* (0.347)	1.102**(0.265)	0.745 (0.405)	1.552*(0.605)	2.025**(1.087)	1.909* (0.665)
Credit	-1.303* (0.477)	-1.027 (0.587)	1.447 (1.032)	0.902 (0.499)	1.207 (0.727)	-1.110* (0.354)
Purchased Market distance	1.580 (0.850)	-1.205*(0.402)	-1.385** (0.353)	-1.290 (0.768)	-2.102 (1.356)	-1.005 (0.780)
Prob>chi^2	0.045	0.018	0.073	0.038	0.097	0.084
Observation	133	130	133	135	129	135

Standard errors in parentheses; *** $p<0.01$, ** $p<0.05$, * $p<0.1$

statistically significant at the 10% level, indicating female respondents are more conscious about healthy food choices. Women are more likely to make dietary changes in order to lose weight and feel guilt related to eating (Beardsworth *et al.*, 2002). In addition, females tend to prefer more vegetables, lower rate of animal product consumption, and have a stronger tendency to avoid fat than males (Cooke and Wardle, 2005; Wądołowska *et al.*, 2008; Kubberød *et al.*, 2002; Goldberg and Strycker, 2002; Johansen *et al.*, 2011). Ares and Gambaro, 2007; Carillo *et al.*, 2011; Wądołowska *et al.*, 2008 in their study also revealed that gender and age groups have different preference patterns as well as different healthy food habits in general. It could simply be that men are not as driven or passionate about eating healthily as women are (Wardle *et al.*, 2004, Vabø and Hansen, 2014). While considering age, the co-efficient of age was found to have a positive impact on the consumption of cooking oil and drinks and beverages, and it was statistically significant at a 10% level of significance. This might be explained by the fact that, as age increases, people want to consume safe and healthy food.

Hence, the utilization and consumption of mustard oil, olive oil, green tea, additives-free tea or coffee, etc. also increase. Goldberg and Strycker (2002) also found that elder consumers prefer to eat more fiber-rich foods than younger ones. Moreover, having higher education and income increases the probability of consuming healthier food items. As this food habit is largely dependent on awareness and knowledge about the benefits of consumption of the stated food products, it's obvious that as education level increases, people's interest in consuming these food items will eventually increase. Consumption of food grains, meat and fish, and cooking oil, shows a significant positive relationship with education. The key reason might be that food habits are closely associated with educational and social distribution patterns (Reddy and Anitha, 2015). Family income is another prime factor determining consumers' consumption attitudes. We found that monthly family income positively and significantly affects food grains, meat and fish, cooking oil, nuts, different colors and varieties of fruits, and drink and beverage consumption decisions. Since these food products are a little bit

more expensive than traditional food items, a higher income will trigger an increase in consumption.

On the contrary, distance from the market, occupation, family size, and credit negatively affect the consumption decision. There exists a negative association between healthy food consumption and family size. Food grain, meat and fish, and nuts and fruits all have adverse yet significant relationships with family size. That means brown bread and rice, oats, meat and fish, nuts, and different varieties of fruit consumption decrease with the increase in family size. In contrast, in terms of occupation, a government employee was considered a reference category. This study revealed that students and private employees both had a negative but statistically significant association in terms of consumption of food grains, whereas consumption of nuts and fruits; and drinks and beverages had a negative association for private employees. Apart from food grain consumption, students had a negative but statistically insignificant coefficient for the rest of the five food categories. The reason behind this might be that, as students do not have income and are mainly dependent on their guardians for their monthly expenses, their guardian's preference and attitude may influence their consumption patterns. Again, in the case of the private employee, as they may sometimes face unstable income, this can largely affect their consumption decisions too. On the other hand, this study also shows that credit had an adverse effect on respondents' food grain; meat and fish; and drinks and beverages consumption. In the case of the distance of the market, the decision towards consumption of indigenous chicken, river fish, and sea fish, which means meat and fish; unprocessed and organic vegetables showed a statistically significant negative relation. This could be the case since product availability (market distance) is an important measure of dietary choices and preferences. Previous studies also confirmed similar relationships between food availability and food choices (Vabø and Hansen, 2014; Reddy and Anitha, 2015).

Conclusion and recommendations

Due to changes in consumer tastes and preferences, as well as changes in their lifestyles, consumers are constantly looking for new varieties of food. This study examined the respondent's attitudes toward healthy food consumption and factors associated with consuming healthy food in Mymensingh City, Bangladesh. In general, most of the respondents' attitudes towards healthy food consumption were found unfavorable. They perceived, that healthy food consumption has little influence on their health and also, concentrated more on the taste of the food rather than the nutritional value. In fact, price is another issue of concern for them. Most of the customers pay great attention to the reasonable price than the quality of the product. Moreover, our food preferences influence the food decisions we make, while a lot of other factors also play a role. The results of the study further show that some important factors like gender, age, education, and monthly income positively influence consumers to buy healthy food, whereas distance from the market,

occupation, family size, and credit negatively affect the consumption decision in the study area. In this scenario, different governmental organizations and different agencies in Bangladesh must make an effort to educate the public about the advantages of eating a healthy diet. Besides that, reasonable price setting, lucrative and informative packaging, and nutritional education spreading through the mass media like advertising, distributing leaflets, videos, and newspapers will attract many consumers and contribute to the development of confidence and trust regarding the veracity of the health benefits of eating a balanced diet.

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