



# Association of BMI and socio-demographic status of children with food purchasing behavior among mothers in Bangladesh: A cross-sectional study

Nasima Akter Mukta <sup>1</sup>, Syed Billal Hossain <sup>2</sup>, Md Minhazul Abedin Sujon <sup>1\*</sup> , Rukaiya Islam Tazin <sup>1</sup>

<sup>1</sup> Department of Nutrition and Food Engineering, Daffodil International University

<sup>2</sup> Department of Public Health, University of Science and Technology Chittagong (USTC), Chattogram

Corresponding author\*

**Md Minhazul Abedin  
Sujon**

Department of Nutrition and Food  
Engineering, Daffodil International  
University.

Email: [minhazul726@gmail.com](mailto:minhazul726@gmail.com)

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## ABSTRACT

Children from socioeconomically disadvantaged and racial minorities were found to be disproportionately exposed to advertisements for less healthy meals. In Bangladesh, there are very a small number of research that has been done to find out children's food purchasing behavior in relationship with socio-demographic status. It was a cross-sectional survey among the mothers of 277 children. A pre-tested semi-structured questionnaire was used to collect data, and informed consent was received from all the participants. This study found that mothers play a significant role (91.3%) in purchasing food for their children. Socio-demographic status, especially monthly family income ( $p < 0.000$ ), age of the children ( $p < 0.000$ ), and level of education ( $p < 0.000$ ) of mothers significantly associated with food purchasing behavior. As well as BMI of the children ( $p < 0.000$ ) was also found to be significantly associated with food-purchasing behaviors. Therefore, BMI should be examined periodically and is one of the primary considerations when choosing appropriate foods.

## INTRODUCTION

Food product innovation and development are still viewed as essential tactics for surviving and succeeding in a cutthroat global market (Stewart-Knox & Mitchell, 2003). Consumers anticipate good taste from products because it is part of their design. Food retailers are dealing with a situation that is rather difficult since the expense of marketing is rising, and it is getting harder to retain sales for brands that aren't the number one household name (Peters, 1994). Additionally, consumers are continuously looking for a product that is customized to meet all of their wants and needs and are getting more demanding in terms of quality and choice (Mintel, 2003). The fact that consumers are increasingly making their initial choice is therefore not surprising.

Consumer behavior is defined as the decision-making process used by people who buy goods for their own consumption (Šrédil & Soukup, 2011). The majority of factors that affect a consumer's decision to purchase a product are product qualities (such as cost, quality, brand, discounts, and packaging), habits, advertising, word-of-mouth recommendations, innovations, etc. (Stávková et al., 2007). Marketing professionals intentionally design product packaging with children rather than parents in mind in order to sustain children's attention and influence parents' purchasing decisions (Turner, Kelly, & McKenna, 2006).

Children and adolescents learn by imitating their parents' actions (Nicholls & Cullen,



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2004), but they also exert pressure in the opposite direction to change how parents behave while making purchases in the three major categories of toys, clothing, and food (Ogba & Johnson, 2010). Having increased purchasing capacity enables people to select food goods of higher quality and greater safety. However, there was a decline in the consumption of cereals, tubers, vegetables, and legumes (Cao et al., 2013). Changes in parental food purchases and decreased availability of unhealthy meals at home are two fundamental elements of family-based behavioral treatment (Raynor et al., 2002). Teaching kids the value of money in terms of buying nutritious and unhealthy foods is one method parents can influence their offspring's healthy behavior. Research has looked at variables that affect the amount of money given to adolescents (Feather, 1991).

Over the past few decades, there has been a significant rise in the prevalence of overweight and obesity among children and adolescents around the world, making it a global health issue that is placing an increasing financial strain on public healthcare. There are significant health and disease consequences of childhood obesity, including hypertension, dyslipidemia, insulin resistance, dysglycemia, fatty liver disease, and psychosocial difficulties, and these consequences are likely to persist into adulthood (Shin, 2017). The consumption of meat (Raynor et al., 2002), fast meals (Zhao et al., 2017), and beverages with added sugar has been linked favorably (Grimes et al., 2013). Meanwhile, eating fruit, vegetables, legumes, and nuts has been found to be negatively correlated with weight status (Wall et al., 2018).

The possible impact of marketing and advertising of less nutritious foods and beverages, such as those high in fat, salt, and sugar (HFSS), on public diet and diet-related diseases has come under growing scrutiny in recent years (World Health Organization, 2012-2013). Widespread marketing and advertising of less healthful foods and beverages to kids are linked to their choices, requests for purchases, and consumption (World Health Organization, 2019). Therefore, exposure to advertising may have a plausible impact on non-communicable diseases linked to nutrition and obesity (OECD, 2017). Children from socioeconomically disadvantaged and racial minorities were found to be disproportionately exposed to advertisements for less healthful meals, according to a comprehensive review (Backholer et al., 2021). Lower socioeconomic groups may be more susceptible to obesity and diet-related non-communicable diseases due to uneven exposure to less healthy advertising (Steel et al., 2014). Obesity and diet quality are socially patterned, with a greater prevalence of obesity and poorer diet quality associated with a lower socioeconomic position (Conolly, Craig, & Gebert, 2019). In Bangladesh, there is very less number of research that has been done to find out children's food purchasing behavior in relationship with socio-demographic status. Therefore, this study was conducted to determine the association of food purchasing behavior with socio-demographic status and BMI of children, residing in Dhaka city.

## **MATERIALS AND METHODS**

### *Study Design & Setting*

A Cross-sectional survey among the mothers of 277 children was conducted to acquire quantitative data. The study included mothers with children who lived in Dhaka City Corporation. In the selected area of DNCC (Dhaka North City Corporation), we performed a brief enumeration survey to compile a list of children's food purchasing behavior, which served as our sampling frame, and probability proportional sampling (PPS) was used to reach the target sample participants. Data were gathered from the parents and guardians of children (aged 3 to 12) in various Dhaka locations.

### *Data Collection*

Data from the survey were gathered using a pre-tested semi-structured questionnaire. The questionnaire was reviewed by an interdisciplinary team of epidemiologists and public health experts, and the Bengali version was pre-tested among 15 mothers of young children in the targeted demographics who were not part of a sample to get feedback on the acceptability, appropriateness, and sequencing of the questions. A weight-measuring device, a height-measuring tape, and a BMI calculator were used to determine BMI (Body Mass Index). Participants were selected at random from various parts of Dhaka's north and south city corporations. The majority of the respondents to this study were parents who shop with their kids. This study was conducted at many supermarkets and big-box stores that parents commonly visit to buy their daily necessities.

### *Data Analysis*

IBM SPSS software version 22 was used to encode and analyze the collected data. The study objectives and indicators were the focus of the analysis. We used statistical analyses such as the Chi-Square test to determine the relationship between variables

### *Ethical Considerations*

Ethical approval was obtained from the Ethical Review Committee (ERC) of the Faculty of Allied Health Sciences, Daffodil International University. All the study participants were informed about the principal objective and data privacy policy of the study. Written consent was obtained from every participant. The confidentiality of the information collected from the respondents was well maintained.

## **RESULTS**

In the present study, data were collected from 277 mothers with children aged less than 12 years old. Among them around half (45.5%) of them had children of less than 6 years old, while other 31% were with 7 to 9 years old and 23.3% were with 10 to 12 years old. Half of them (50.2%) were with boy children and the other half (49.8%) with Girls. Respondents also noted their kid's BMI. Half (50.2%) of the respondent's children were of normal weight, while 26.4% were underweight and 23.5% of their kids were overweight (Table 1).

Among the respondents, most of them and their husbands were educated more than or equal to secondary education. Only 13.4% of respondents' and their husbands' education level was "can only read and write" without institutional degrees. Around half of the respondents were self-employed (48%) in occupation and 31% were housewives, other respondent's' professions were mainly labor-based work (13.4%) and Service (7.6%). Although husband of the respondents were mainly Servicemen (77.3%) and few (9.4%) were self-employed businessmen. The monthly family income of over half of the (52.3%) respondents was in between 25000 to 50000 Bangladeshi Taka (BDT), while only 13.4% were with less than 25000 BDT and 34.3% were with income of more than 50000 BDT (Table 1).

**Table 1:** Distribution of Socio-demographic Information

Variables	Frequency n=277	Percent (%)
<b>Age of the Child</b>		
03 to 06 years	126	45.5
07 to 09 years	86	31.0
10 to 12 years	65	23.3
<b>Gender of the Child</b>		
Boy	139	50.2
Girl	138	49.8
<b>BMI of the Child</b>		
Normal Weight	139	50.2
Overweight	65	23.5
Underweight	73	26.4
<b>Mother's Education Level</b>		
Can read and write	37	13.4
Higher Secondary	104	37.5
Graduation	127	45.8
More than Graduation	9	3.2
<b>Father's Education Level</b>		
Primary	37	13.4
Higher Secondary	6	2.2
Graduation	180	65.0
More than Graduation	54	19.5
<b>Mother's Occupation</b>		
Business/Self-employed	133	48.0
Housewife	86	31.0
Labor based work	37	13.4
Job/Service	21	7.6
<b>Father's Occupation</b>		
Business/Self-employed	26	9.4
Labor based work	37	13.4
Job/Service	214	77.3
<b>Monthly Income of Child's Family</b>		
Less than 25000 BDT	37	13.4
25000 to 50000 BDT	145	52.3
More than 50000 BDT	95	34.3

Table 2 presents the distribution of food purchasing behavior among the respondents for their children. 91.3% of respondents said that they (mothers) bought food products for their children, while only in 5.4% of cases the fathers, and in 3.2% of cases another family member usually bought food products for their children. Factors like Brand value (26.4%), Food taste (10.8%), Packaging design (15.2%), Nutritional information (34.3%) and Product Price (13.4%) influenced mothers to choose foods to buy for their kids. On the other hand, Packaging design (83.0%) and Nutritional information (14.8%) mainly influence children to choose any food product. Among the respondents' children, half (50.9%) of their kids demanded purchased food often in a week, while 32.1% demanded a few times a day and 17% demanded in a day. 74% of respondents said that, the main type of food products available in the nearest market are nutritionally rich foods and other 26% thought that packaged junk foods were found mainly in the nearest market for their children.

The main reason for the continuation of purchasing any food products mentioned by 73.6% of participants was the nutritional benefits and another 26.4% opined the main reason for continuity was purchasing ability. Mostly (53.8%) the respondents got to know about food products and brands from Television advertisements and from their friends and family (31.8%). Street advertisements also help some of them (13.4%) in this regard. Around 80% of respondents mentioned that children's food products should be advertised on television and online while other 20% opposed that. 72.2% of respondents opined that advertised food products increase children's appetite and 27.8% thought these are not recommended for children's appetite (Table 2).

**Table 2:** Distribution of food purchasing behavior

Variables	Frequency n=277	Percent (%)
Who makes the initial decision to buy food products?		
Father	15	5.4
Mother	253	91.3
Another family member	9	3.2
Usually know the Brand of a food category from		
Friends and Family	88	31.8
Street advertising	37	13.4
Television advertising	149	53.8
Online advertising	3	1.1
Factors influence mothers choosing food products		
Brand value	73	26.4
Food taste	30	10.8
Packaging design	42	15.2
Nutritional information	95	34.3
Product Price	37	13.4
Factors influence children choosing food products		
Food taste	6	2.2
Packaging design	230	83.0
Nutritional information	41	14.8
Children demand the purchased food		
A few times a day	89	32.1
Once every day	47	17.0
Often in a week	141	50.9
Advertised food products increase children's appetite		
Yes	200	72.2
No	77	27.8
The main type of food products available in the nearest market		
Nutritionally rich foods	205	74.0
Interestingly packaged junk foods	72	26.0
Children's food products should advertise on television and online		
Yes	219	79.1
No	58	20.9
<b>The main reason for the continuation of purchasing of any food product</b>		
Nutritional benefit	204	73.6
Purchasing ability	73	26.4

Several Factors influence children to choose food products likely, food taste (2.2%),

packaging design (83%), and nutritional information (14.8%). Factors that influence mothers to choose food products are brand value (26.4%), food taste (10.8%), packaging design (15.2%), nutritional information (34.3%) and product prices (13.4%) The association of food purchasing behavior (who makes the initial decision to purchase foods, brand awareness, factors influence's both mothers and children, children demand, evidence of advertisement increase children appetite, availability of food varieties in the nearest market, respondents opinion about advertisements and the main reason for the continuation of purchasing of any food product) with mother's education revealed that demographic variable like education is very significantly associated ( $p < 0.000$ ) with all the factors related to purchasing behavior (Table 3).

**Table 3:** Association between food purchasing behavior and mother's education

Variables	Mother's Education n=277				Total n=277	Percent (%)	P-Value
	Can read and write n=37	Higher Secondary n=104	Graduation n=127	More than Graduation n=9			
<b>Who makes the initial decision to buy food products</b>							0.000
Father	0	6	6	3	15	5.4	
Mother	37	95	121	0	253	91.3	
Another family member	0	3	0	6	9	3.2	
<b>Usually know the Brand of a food category from</b>							0.000
Friends and Family	0	47	38	3	88	31.8	
Street advertising	37	0	0	0	37	13.4	
Television advertising	0	54	89	6	149	53.8	
Online advertising	0	3	0	0	3	1.1	
<b>Factors influence mothers choosing food products</b>							0.000
Brand value	0	50	23	0	73	26.4	
Food taste	0	30	0	0	30	10.8	
Packaging design	0	18	21	3	42	15.2	
Nutritional information	0	6	83	6	95	34.3	
Product Price	37	0	0	0	37	13.4	
<b>Factors influence children choosing food products</b>							0.000
Food taste	0	3	0	3	6	2.2	
Packaging design	37	101	86	6	230	83.0	
Nutritional information	0	0	41	0	41	14.8	
<b>Children demand the purchased food</b>							0.000
A few times a day	0	3	80	6	89	32.1	
Once every day	0	3	44	0	47	17.0	
Often in a week	37	98	3	3	141	50.9	
<b>Advertised food products increase children's appetite</b>							0.000
Yes	37	33	83	9	200	72.2	
No	0	71	44	0	77	27.8	
<b>Type of food products available in the nearest market</b>							0.000
Nutritionally rich foods	37	80	82	6	205	74.0	
Packaged junk foods	0	24	45	3	72	26.0	

<b>Children's food products should advertise on television and online</b>							0.000
Yes	0	101	109	9	219	79.1	
No	37	3	18	0	58	20.9	
<b>The main reason for the continuation of purchasing of any food product</b>							0.000
Nutritional benefit	0	71	124	9	204	73.6	
Purchasing ability	37	33	3	0	73	26.4	

The association between food purchasing behavior and family monthly income revealed that demographic variable like monthly family income is found very significantly associated with usual knowledge of the brand of a food category ( $P<0.000$ ), factors influence mothers and children to choose food products ( $P<0.000$ ), children demand the purchased food ( $P<0.000$ ), advertised food products increase children's appetite ( $P<0.000$ ), type of food products available in the nearest market ( $P<0.000$ ), opinion about children's food products should advertise on television and online ( $P<0.000$ ) and the main reason for the continuation of purchasing of any food product ( $P<0.000$ ). The person who makes the initial decision to buy food products was found to be a statistically significant correlation ( $p=0.029$ ) with monthly family income (Table 4).

**Table 4:** Association between food purchasing behavior and family monthly income

Variables	Family Income n=277			Total n=277	Percent (%)	P-Value	
	<25000 BDT n=37	25000 to 50000 BDT n=145	>50000 BDT n=95				
<b>Who makes the initial decision to buy food products</b>							0.029
Father	0	6	9	15	5.4		
Mother	37	136	80	253	91.3		
Another family member	0	3	6	9	3.2		
<b>Usually know the Brand of a food category from</b>							0.000
Friends and Family	0	47	41	88	31.8		
Street advertising	37	0	0	37	13.4		
Television advertising	0	98	51	149	53.8		
Online advertising	0	0	3	3	1.1		
<b>Factors influence mothers choosing food products</b>							0.000
Brand value	0	50	23	73	26.4		
Food taste	0	30	0	30	10.8		
Packaging design	0	21	21	42	15.2		
Nutritional information	0	44	51	95	34.3		
Product Price	37	0	0	37	13.4		
<b>Factors influence children choosing food products</b>							0.000
Food taste	0	0	6	6	2.2		
Packaging design	37	104	89	230	83.0		
Nutritional information	0	41	0	41	14.8		
<b>Children demand the purchased food</b>							0.000
A few times a day	0	6	83	89	32.1		
Once every day	0	44	3	47	17.0		
Often in a week	37	95	9	141	50.9		
<b>Advertised food products increase children's appetite</b>							0.000
Yes	0	71	6	200	72.2		
No	37	74	89	77	27.8		
<b>Type of food products available in the nearest market</b>							0.000

Nutritionally rich foods	37	124	44	205	74.0	
Interestingly packaged junk foods	0	21	51	72	26.0	
<b>Children's food products should advertise on television and online</b>						0.000
Yes	37	3	18	219	79.1	
No	0	142	77	58	20.9	
<b>The main reason for the continuation of purchasing of any food product</b>						0.000
Nutritional benefit	0	112	92	204	73.6	
Purchasing ability	37	33	3	73	26.4	

In the study, 50.2% of the respondent's children had normal BMI (BMI =18.5-24.9), 23.5% of the respondent's children were over-weight (BMI>24.9) and 26.4% of the respondent's children were underweight (BMI<18.5). While the person who makes the initial decision was found to be associated ( $p=0.006$ ) with Children's BMI. The association between several variables of food purchasing behavior and children's BMI (Body Mass Index) indicated that the nutritional status of a child is found very significantly associated ( $p<0.000$ ) with all the other factors related to purchasing behavior in the study (Table 5).

**Table 5:** Association between food purchasing behavior and children's BMI

Variables	Children's BMI n=277			Total n=277	Percent (%)	P- Value
	Normal weight n=139	Over Weight n=65	Underweight n=73			
<b>Who makes the initial decision to buy food products</b>						0.006
Father	9	0	6	15	5.4	
Mother	121	65	67	253	91.3	
Another family member	9	0	0	9	3.2	
<b>Usually know the Brand of a food category from</b>						0.000
Friends and Family	26	62	0	88	31.8	
Street advertising	0	0	37	37	13.4	
Television advertising	113	3	33	149	53.8	
Online advertising	0	0	3	3	1.1	
<b>Factors influence mothers choosing food products</b>						0.000
Brand value	23	44	6	73	26.4	
Food taste	0	0	30	30	10.8	
Packaging design	24	18	0	42	15.2	
Nutritional information	92	3	0	95	34.3	
Product Price	0	0	37	37	13.4	
<b>Factors influence children choosing food products</b>						0.000
Food taste	6	0	0	6	2.2	
Packaging design	92	65	73	230	83.0	
Nutritional information	41	0	0	41	14.8	
<b>Children demand the purchased food</b>						0.000
A few times a day	71	18	0	89	32.1	
Once every day	44	0	3	47	17.0	
Often in a week	24	47	70	141	50.9	
<b>Advertised food products increase children's appetite</b>						0.000
Yes	95	65	40	200	72.2	



No	44	0	33	77	27.8	
<b>Type of food products available in the nearest market</b>						0.000
Nutritionally rich foods	70	65	70	205	74.0	
Interestingly packaged junk foods	69	0	3	72	26.0	
<b>Children's food products should advertise on television and online</b>						0.000
Yes	139	44	36	219	79.1	
No	0	21	37	58	20.9	
<b>The main reason for the continuation of purchasing of any food product</b>						0.000
Nutritional benefit	136	62	6	204	73.6	
Purchasing ability	3	3	67	73	26.4	

## DISCUSSION

According to this research, the principal justification for continuing to buy any food product is strongly associated with monthly household income ( $P=0.000$ ) and BMI of the participant's children ( $P=0.000$ ). Nearly half of the youngsters in this group were overweight or obese, and increased consumption of sugar-sweetened beverages, potato chips, and meals from restaurants is connected to childhood obesity and poor diet quality (Gillis & Bar-Or, 2003). This study suggests that the majority of the mothers whose children's BMI is normally influenced by the nutritional value of the products (66.2%), whereas over-weight and under-weight children mother influenced by the brand value and product price respectively. Additionally, higher youth food expenditures were linked to higher total purchases, suggesting that children supplemented their diets with unhealthy items rather than switching to healthier options, which are frequently more expensive (Jetter & Cassady, 2006). Regardless of how healthy the foods are, when young people are given a set amount of money, they prefer to buy more expensive items less frequently (Epstein et al., 2006). This study's finding evidences a similar trend as the frequency of purchasing decreases with increases in household income and children's demand for purchasing frequency is strongly correlated with monthly family income ( $P=0.000$ ) and BMI of children ( $P=0.000$ ). Environmental changes that increase corner store availability of nutritious foods may help low-income adolescents make better food choices, yet these strategies face difficulties because healthy foods are frequently perishable and difficult for small businesses to supply (Song et al., 2009).

Almost three-quarters of the parents preferred foods that are rich in nutrition and an equal number of respondents claimed that nutrition-rich food (50.4%) and packaged junk food (49.6%) are available in the nearest market. Advertising for sugary snacks and advertising on transportation networks were more likely to be exposed by participants who worked full-time, according to their self-reported odds<sup>27</sup>. This study indicates that around two-thirds of the mothers are self-employed and usually know the Brand of a food category from least street advertising (13.4%). Numerous researchers have discovered links between selective eating and certain factors, including sex<sup>28</sup>, household income<sup>29</sup>, and mother's age<sup>30</sup>. Whereas in this study, food purchasing behavior is strongly associated with certain socioeconomic factors likely the mother's educational qualification and monthly family income. The larger cognitive burden of daily pressures may potentially exacerbate the impact of advertising on food choices in low socioeconomic groups. Age may also result in a decline in receptivity to advertising<sup>31</sup>. 72.2% of the mother opined that advertised food products increase children's appetite and there's been a strong correlation between mother education and family income with the effect of children's appetite through advertising ( $P=0.000$ ). Picky eaters were more likely to be raised by moms with lower educational levels, who often have less knowledge of nutrition<sup>32</sup>. 91.3% of the mothers took the initial decision to purchase things in this study and

most of them are graduates (43.7%). Children with authoritative and permissive fathers or girls with authoritative mothers were more likely to consume fruits and vegetables in late childhood, according to a longitudinal study of about 5000 kids<sup>33</sup>. However, this study doesn't indicate any child-parent relationship in which children showed their preference other than their father or mother.

## CONCLUSION

Our study showed that mothers play a significant role in purchasing food for their children. Various socio-demographic factors especially monthly family income, age of the children, and level of education of mothers significantly associated with food purchasing behavior. As well as BMI of the children was also found to be significantly associated with food-purchasing behaviors. Hence, Children's meals should be carefully selected by caretakers. Instead of choosing food based on its packaging, parents and kids should consider its nutritional value. BMI should be examined periodically and is one of the primary considerations when choosing appropriate foods. This comprehensive approach to food selection will ensure that children receive the nutrition they need for healthy growth and development. In conclusion, providing children with nutritious food is not just a matter of individual well-being but a critical investment in a country's future development and prosperity. It is a foundational step toward building a healthier, more productive, and sustainable nation.

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