Ice cream consumption in a selected area of Bangladesh: Effect of demographic, psychometric and product factors

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ABSTRACT

Ice cream is an emerging sector in today's business world. This paper aims to explore the most significant demographic, psychometric and product factors and their strength of relationship with households' ice cream consumption. Based on a field survey of 120 consumers, descriptive statistics and regression analysis were performed to achieve the desired goals. This study revealed four demographic factors, four product features and two psychometric factors that were the most influential to ice cream consumption. Consumers' gender, family type, monthly food expenditure and food buying decision maker were found to be influential factors of purchasing ice cream. Female consumers were more likely to consume more ice cream than their male counterparts. Similarly, the female decision maker was likely to purchase more ice cream than the male decision maker. The most influential psychometric motive of ice cream consumption was consuming a tasty dessert and not delivering calories. In addition, ice cream price, brand loyalty, packaging attractiveness and taste were the substantial product factors behind consumption. This work adds value to the literature by expanding our knowledge on consumers' ice cream consumption and it also provides important product feature related information for the marketers that drive consumer ice cream preference.

Introduction

Hot summers and extreme heat waves always pushed people to find some salvation and a way to cool themselves. This quest enabled creation of many innovative technical devices and traditions, but only one item of them captured our imagination and wishes, giving everyone time to enjoy their moments in the sun and cool themselves like never. This is a story of ice cream. Ice cream is a frozen dairy product made by suitable blending and processing of cream and other milk products (Saha *et al*., 2012). It is a nutritionally enriched food item consumed by all age groups, particularly children during summer (Sharif *et al*., 2006). Ice cream production has become a profitable industry because of its recent advancement. About 240 different items ice cream are available in the world market (Guven and Karaca, 2002). Many under nourished individual who are suffering from lactose intolerance can easily consume yoghurt ice cream (Guner *et al*., 2007). For instance, ice cream contains two to three times as much fat and slightly more protein than milk. Ice cream is also a good source of calcium, phosphorus and other minerals of vital importance in building bones and teeth (De, 2005). Addition of fruit can help to increase fruit consumption among individuals who otherwise dislike consuming fruits but like ice creams. Adding nuts to ice cream can increase the fat and energy content.

The ice cream industry has started its journey in Bangladesh since the 1950s (Humayun, 2018) and now it is worth over BDT 65 Million (Laskar, 2017). Market leader is Igloo and other brands are Polar, Kwality, Bellissimo, Savoy, Lovello, Mi Amore, Za 'n Zee, etc. The industry is getting more competitive day by day because of the attributes such as increasing growth rate, growing middle-class, changing tastes of younger people, improving electricity conditions, prolonging summer season and so on. The ice cream market of Bangladesh is an oligopoly where Igloo is the market leader. Euro Monitor International identifies Bangladesh as one of the 20 markets that will offer the most opportunities for consumer goods companies globally (Laskar, 2017). The country is one of the fastest growing and most promising economies in the Asia-Pacific region. However, the economy of Bangladesh is quick growing. With the fast growing RMG (Readymade Garment), Pharmaceuticals and steel industries, there are some new industries too which can be considered

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industries of the future. Among them, the ice cream industry is most important. The first branded ice cream, Igloo, was introduced in 1964 in the national region, which was later nationalized right after the liberation of Bangladesh (Laskar, 2017). Later, during the early 1980s, it was gained by Abdul Monem Ltd. This is when Polar entered the market creating the first rivalry. After 10 years since privatization, Igloo became the market leader after conducting heavy promotional campaigns. Since then, it has kept its position among all major domestic and foreign brands in the market. New players are making a foray into the growing market for ice cream, industry operators said. Poultry sector giant Kazi Farms already launched its ice cream early this year and Golden Harvest now plans to enter the business, encouraged by the growing buying power of people.

In Bangladesh, ice-cream is produced by two ways; locally and the industrial production (Saha *et al.*, 2012). Locally means production of ice cream in small scales which follow less proper standard procedure for production. Quality of ice cream depends on the manufacture procedure as well as the proportion of ingredients is used for ice cream manufacture (Ahmed *et al.,* 2009). The company (Igloo) is now the market leader since 1997. Polar came into being in 1987 from parent company Dhaka Ice Cream Industries Ltd. (Ahmed *et al.,* 2009). They are pioneers in the hygienically produced and packaged ice cream section of Bangladesh. Branded ice cream occupies nearly 85 percent of the country's annual market of BDT 650 crore, of which 85 percent constitutes the branded ice cream makers and the rest of the 15 percent are the non-branded producers according to the annual report of Golden Harvest Agro Industries for 2012 (Laskar, 2017). Igloo is the market leader followed by Polar, according to industry insiders. Regional and seasonal brands control the rest of the market.

Ice cream is a popular food across the world and recently due to climate change and diversification of taste among young people; ice cream industry is going to gain a significant market share. Several studies conducted scientific research on ice cream consumption and its market situation. Most of them are mainly conducted in the USA and Europe. Only few studies are conducted in India and Bangladesh. All the relevant literatures are reviewed here to find out research gap and contribution. Many studies conducted research on the microbial quality, nutritive value, factors influencing purchasing, developing newly flavored, enriched ice cream (Kocak *et al.*, 1998; Ahmed *et al.*, 2009; Malik *et al.*, 2013; Bisla *et al.*, 2012). Some researchers did sensory analysis and tried to develop new kinds of ice cream product (Junior, 2010; Lima *et al.*, 2016; Guner *et al.*, 2007; Guven and Karaca, 2002).

The main focus of the study was to observe, understand and scrutinize consumer behavior and to explore most influential factors behind purchasing ice cream. The results will help manufacturers understand what consumers in different segments of the market prefer and how to best accommodate these market segments. Since, it is not the task of an economist to analyze a product's chemical characteristics, only qualitative factors as mentioned were emphasized. This study will try to show how these product characteristics combined with consumer's age and gender influence consumers buying and eating behavior of ice cream. At present, ice cream industry is facing market sensitive and dynamic consumer in this. Therefore, this research is designed to investigate the key factors which consumers considered most while choosing an ice cream.

Materials and Methods

Sample selection and statistical analysis

This study is based on a quantitative survey of 120 (Male = 60, Female = 60) ice cream consumers as well as their household information. The equal number (20 samples) of male and female respondents was selected from three distinct age groups such as child group (below 18 years), youth group (19-40 years) and adult group (above 40 years) arbitrarily. Sample consumers were selected from Sadar upazila of Mymensingh district considering their age and gender, because age and gender were used as two explanatory variables in the regression model.

A linear regression model was applied by using SPSS 25 to demonstrate the effect of eight demographic factors; consumer's age, gender of the consumer, education level of the consumer, family type, total family member, education of the household's head, monthly family food expenditure, and food buying decision maker. The simple linear regression model is;

$$Y = a + b_1x_1 + b_2x_2 + b3x3 + b4x4 + b_5x_5 + b_6x_6 + b_7x_7 + b_8x_8 + u_i$$

Where, Y = Ice cream consumption (L/household/day);
a = Intercept;
$b_1, b_2, b_3, b_4, b_5, b_6, b_7, b_8$ = Coefficients;

x_1 = Consumers' age (years),

x_2 = Gender of the consumer (male = 1, female = 0);

x_3 = Education level of the consumer (years);

x_4 = Family type (nucleus = 1, extended = 2);

x_5 = Total family member (nos.);

x_6 = Education of the household's head (years);

x_7 = Monthly family food expenditure (BDT);

x_8 = Food buying decision maker (male = 0, female = 1, both = 2); and

u_i = Error term.

Two psychometric factors such as 'frequency of buying' and 'motive of consumption' were identified by using a structured questionnaire. The significant effect of these two factors was analyzed by using a frequency distribution table. Four product features, namely ice cream price, brand loyalty, packaging attractiveness and taste were analyzed through frequency distribution. In order to understand the perception of consumer for different statement about ice cream a 5-point likert (Itemized rating) scale was used. A Likert scale is a psychometric scale commonly involved in consumer research that uses questionnaires (Jhansi, 2015). It is one of the most fundamental and frequently used psychometric tools in educational and social science research (Joshi *et al.*, 2015). The scale is named after its inventor, psychologist Rensis Likert (Likert, 1932).

Results and Discussion

Respondent profile

Consumer behavior varies between individual to individual based on several aspects. Socio- economic background is one of the driving forces of consumer buying behavior. The majority (56 percent) of consumers had higher education while the second largest group (38 percent) was belonging to a secondary education group. But the finding of the greater percentage of higher education of this study was because of the existence of the Bangladesh Agricultural University. Some consumers are residing in *Kewatkhali* and *Sesh Mour* village temporarily who are the students of Bangladesh Agricultural University. Thus, most of the sampled consumers' occupation was a student and unemployed (50 percent and 29 percent). The unemployed were mainly fresh graduate and post-graduate of Bangladesh Agricultural University campus. The study consumers' age ranged between 10-65 years old, whereas their mean age was 22 years old. There was

no consumer above 65 years old due to either diabetics or high blood pressure. This does not mean that no person over 65 years old consumes ice cream. Rather, this old group wants to take ice cream like children. But they try to avoid it due to physical problems of either high blood pressure or diabetes. When their son, daughter and other relatives offer ice cream to them, they cannot deny taking it. No data were collected from this age group because they were not regular buyer and consumer of ice cream.

In the consumer household, 49 percent households composed of average 5.79 members, of whom average male and female members were 2.58 and 3.21, respectively. About 4 percent consumer households composed of average 9 members of whom average male members were 3.67 and female were 5.33. Only about 3 percent consumer household was composed of average 13 members of whom average male members were 6 and average female members were 7. This is because the Mymensingh district still containing 21 percent traditional extended type of family and 79 percent nuclear of type family. And about 83 percent families were male headed and only 17 percent were female headed family.

Product and psychometric factors

Brand preferences of the consumer

Igloo, polar, savoy, bellisimo, kwality, bloop, lovello, za 'n zee, mi amore and other less popular brands are now competing in ice cream market. Still igloo is the major player occupying 51 percent consumer liking as shown by many studies (Babu and Shams, 2015). The second most liked brands are polar (33 percent) and kwality is another rising brand (7 percent liking). Among other bloop gained 3 percent consumer preference.
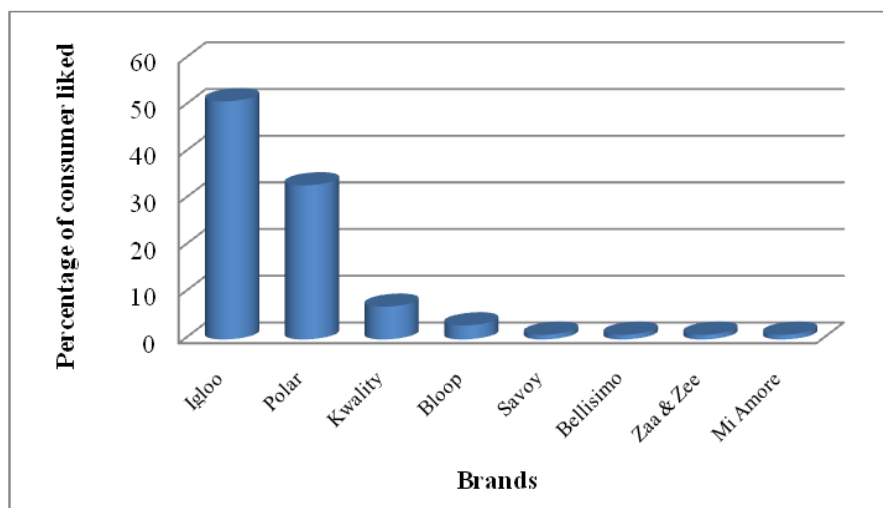

Fig. 1. Consumers' liking difference across different brands

Frequency of buying

Frequency of buying is another important determinant of liking. About 41 percent consumers buy ice cream once a week. Most of them were children.

Table 1. Consumers' buying pattern of ice cream

Buying intensity	No. of consumers	Percentage
Once a week	29	41
Occasionally	25	36
Only in a hot day	11	16
Every day	4	6
Never	1	1

Source: Field Survey, 2018.

It was found that the second largest group of consumers (36 percent) buys ice cream occasionally and the name on occasion was hanging with friends. About 16 percent consumers like to eat ice cream only in a hot day. A few (6 percent) consumers said that they eat ice cream every day (Table 1). They are mainly children (10-16 years old) of the nuclear type family. Their parent either both or one does job either private or government sector. These children take money every day to buy ice cream. They consider ice cream like chocolate or chips. Only one respondent said that she dislikes ice cream, so she never buys it.

Motive of consumption

Several physical, psychological, socioeconomic and behavioral factors influence consumer buying behavior. Only psychological factors are presented in Table 2.

About 41 percent consumers said that they eat ice cream as a tasty dessert and not for delivering calorie or to reduce discomfort during hot weather. About 33 percent said they consume to cool during hot weather. And about 24 percent said that they consume to improve or change their mood. Most of them were a teenager and younger child. Only one percent conscious consumer said that they consume to increase their calorie intake.

Table 2. Influential factors of buying ice cream

Factors	No. of consumers	Percentage
Consuming as tasty dessert	29	41
Reducing hot weather discomfort	23	33
Improving wellbeing	17	24
Increasing calorie intake	1	1

Source: Field Survey, 2018.

Ice cream package size

Length or size of product has a significant influence upon consumer liking. It is found that about 77 percent consumer liked the mini pack of ice cream. Mini pack of ice cream includes cup, cone, chocobar, lolly etc. Price range of mini pack varies from BDT 10 to BDT 50. On the other hand, a 0.5 liter ice cream box costs about BDT 120. So, it was convenient and affordable for the consumer to buy and consume a mini ice cream either lolly or cup. Consumer's liking/preference was decreasing with the increasing size of ice cream pack. Only 1 percent consumer liked 1.5 liter box.
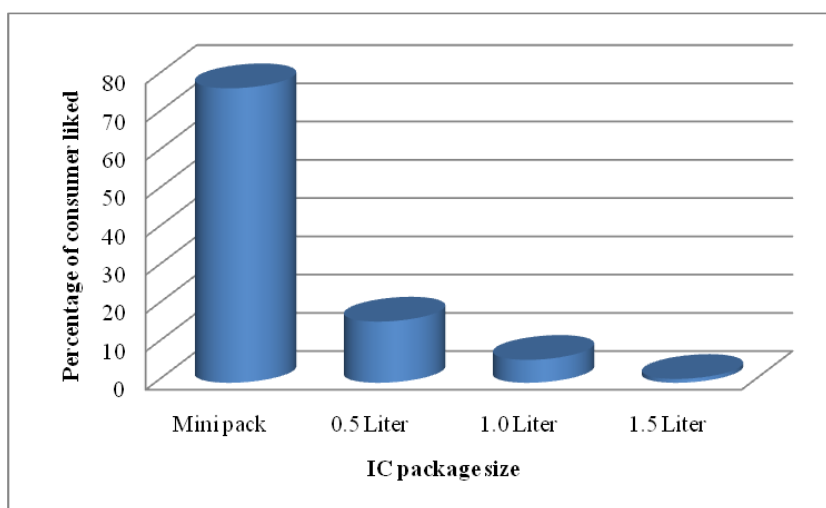

Fig. 2. Comparative presentation of four types IC packages' consumer liking

Ice cream attributes

About 66 percent respondent liked the taste of ice cream other than color, flavor, mouth feel and appearance. About 31 percent respondent appreciates flavor of ice cream. About 3 percent respondent liked mouth feel of ice cream.

Price of ice cream

Price is the most important factor which influences consumer's buying. About 46 percent consumers' thinking about price was moderate. They showed no dissatisfaction towards current market price. This is not a generalized finding because a maximum of 46 percent respondent were students who didn't earn money. They

had no headache about the high price of ice cream. Maximum (21 percent) consumer who earn money said that the price is high. Other (20 percent) consumer thought ice cream price as low. This group was children who didn't know about affordability and service quality. About 13 percent neutral respondent gave no opinion about the price.

Demographic factors affecting on consumption of ice cream

Today's highly informed, competitive and saturated market, a key to success depends on knowing consumers and their consumption patterns and recognizing factors influencing their decision-making for the purpose of developing an attractive offer, supporting services, communication means and other marketing tools that would fit like a glue to the consumer's needs. Demographic factors are one of the driving forces of consumer buying behavior. Multiple regression analysis was performed to determine the strength of the relationship between the dependent and independent variables. The model summary of the regression analysis is shown in the Table 3.

Table 3. Regression model summary

R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
.505[a]	.254	.200	0.02953	1.925

a. Predictors: (Constant), consumer's age, gender of the consumer, education level of the consumer, family type, total family member, education of the household's head, monthly family food expenditure, and food buying decision maker

The value of R square is 0.254 which is a statistical measure of how close the data are to the fitted regression line given the R square, 25.4% of the variability of the dependent variable ice cream consumption/ household/day (Liter) is explained by the 8 explanatory variables. Such contribution is a lower one, because there are a lot of other situational, social, economic, psychological factors, complexity of decisions, product attributes along with demographic profile that influence ice cream consumption (Babu and Shams, 2015). Only eight demographic factors were considered to run a regression model to avoid massive autocorrelation problems.

The Durbin-Watson statistic value ranges between 0 and 4. The value of 1.897 indicates a positive autocorrelation and hence a possibility to reject the null hypothesis. Therefore, the regression model is significant by Durbin-Watson statistic.

Table 4. Analysis of variance (ANOVA) for the overall regression model

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	0.03306	8	0.00413	4.737	5.08668E-05[b]
Residual	0.09681	111	0.00087		
Total	0.12988	119			

a. Dependent Variable: Ice cream consumption/household/day (Liter.)
b. Predictors: (Constant), consumer's age, gender of the consumer, education level of the consumer, family type, total family member, education of the household's head, monthly family food expenditure, and food buying decision maker

From the above table (Table 4) it is found that the significance level of the F value (5.08668E-05) is below $\alpha = 0.05$ with an F distribution. The calculated value of F is 4.737 is also greater than the table value. These indicate that the independent variables have a significant relationship with the dependent variables. So, the null hypothesis (H_0) that the coefficient of multiple determination in the population is rejected. Therefore, it indicates that the regression equation is significant, and the independent variables have a significant relationship with the dependent variable.

It is shown in Table 5 that the multicollinearity statistics for all the eight predictor variables are satisfactory. So, it can be said that the p-value in the regression model is enough stable and significant. Therefore, the results of regression coefficients suggest that the unstandardized beta coefficient of 0.032 suggests that the households' daily ice cream consumption goes up about 3.2 percent without the influence of some other demographic factors as estimated through regression analysis. On the other hand, consumer age, gender of the consumer, education level of the consumer, family type, family member, household heads' education level, monthly food expenditure and food buying decision influence ice cream consumption by 25.4 percent.

Table 5. Regression model of factors influencing of buying ice cream

Variables	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	.032	.018		1.825	0.029		
Consumer's age	.000	.000	.103	.942	.348	.580	1.72
Gender of the consumer	.012	.006	-.184	2.114	**0.062**	.916	1.09
Education level of the consumer	.000	.001	.043	.356	0.256	.478	2.09
Family type	-.019	.010	-.241	-1.929	**0.098**	.446	2.24
Total family member	-.004	.003	-.232	-1.210	0.131	.189	5.28
Education of household's head	-6.074E-5	.001	-.010	-.088	.930	.528	1.89
Monthly family food expenditure	2.603E-6	.000	.371	2.091	**0.079**	.221	4.52
Food buying decision maker	.024	.005	.384	4.416	**0.0001**	.922	1.09

Among eight factors, four factors were found statistically significant. Gender of the consumer, family type and monthly family food expenditure were estimated significant results at the 10 percent level of significance and the family's food buying decision maker reported statistically significant at the 1 percent level of significance. Since the most influential demographic factor is 'food buying decision maker', therefore it is found from the regression model that the female decision maker is more likely to purchase more ice cream than the male decision maker. Therefore, if the possibility of changing decision making from male to female head has increased by 1 percent, it is expected to increase ice cream consumption by 38.4 percent and vice versa.

A negative coefficient of gender of the consumer (-0.184) implies that ice cream consumption is decreased about 18.4 percent with male consumer than the female. That means female consumers are likely to consume more ice cream than their male counterpart. Households' expenditure on monthly family food consumption has a positive relation to households' monthly ice cream consumption. It is evident from the regression model that if monthly family food consumption increases 1 percent then the ice cream consumption will be increased by 37.1 percent. The negative coefficient of family type -0.241 indicates that ice cream consumption is decreased by 24.1 percent with increasing family size. That means small size nuclear type families consume more ice cream than the large extended families and vice versa.

Consumer perception towards ice cream

To examine the consumer's attitude, a five-point likert scale was used along with 5 positive and 5 negative statements (Table 6).

Table 6. Mean scores for consumer perception

No.	Statements	Mean	Standard deviation	Ranks
1	Ice cream is a comfort food for all	3.33	1.05	5
2	Its taste & sweetness is perfect	4.09	0.78	1
3	Its price is reasonable & affordable	2.89	1.17	8
4	It is a healthy food	2.83	1.04	9
5	Ice cream is harmful for children	3.53	1.02	4
6	It makes body fat	3.26	1.02	6
7	It contains low nutrient & high chemical	3.14	0.97	7
8	It is not available everywhere	2.43	1.21	10
9	Its physical appearance is mind blowing	4.04	1.03	2
10	It makes cold disease like tonsil	4.01	0.81	3

Mean score value of each statement

Table 6 shows the level of consumer's attitude towards ice cream for each statement and the mean score of their attitudes. A comparative percentage values against each statement are graphically presented in Fig. 3. Percentage value of each rank (strongly agree, agree,

neutral, disagree, strongly disagree) helps to understand consumer's positive or negative attitudes towards ice cream.

In Table 6 the highest mean score was attained by the 2nd statement; "its taste and sweetness is perfect". So, consumers' perception toward this statement was more positive and influential than the other. The second highest mean score was gained by the 10th statement; "its physical appearance is mind blowing". The 9th statement "it makes cold, disease like tonsil gained the 3rd highest mean scoring. The lowest mean scoring was gained by the 8th statement; "it is not available everywhere".

Table 6 and Fig. 3 depict that the 2nd statement gained highest "agree" response (61 percent) and a mean score (4.09) from the consumer. In other words, the largest segment of consumers was agreed with the statement of "Its taste & sweetness is perfect". So, maximum consumers were satisfied with the taste and sweetness of ice cream. On the other hand, statement 2 gained the lowest disagree response (7 percent) from the consumer. This finding shows the bipolar nature of the likert type scale. Likewise, 9th statement gained highest disagree response (57 percent) with lowest agree response (7 percent). Broadly speaking, maximum consumers expressed disagree response with the statement that ice cream makes cold disease like tonsil. In fact, ice cream does not make cold, disease particularly tonsil.
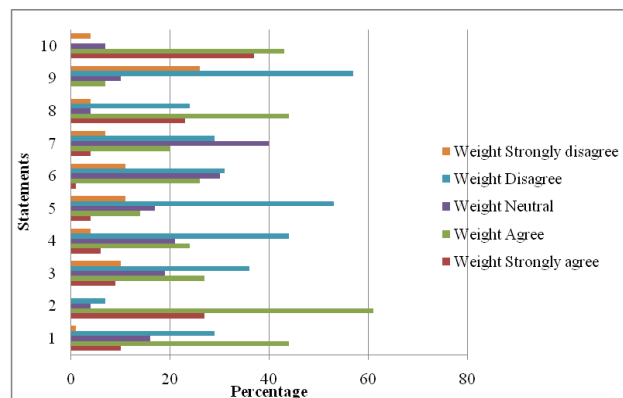

Fig. 3. Percentage of consumer weighted response for each statement

About 73 percent consumers were strongly agree with the statement "its physical appearance is mind blowing" which is the highest number of strongly agree weight with second highest mean score of 4.04. Therefore, ice cream is presented in our market in enough attractive ways. Maximum consumer liked its physical appearance which tends to capture their attention to buy. This indicates increasing interest among the consumers. Moreover, it's a message to Bangladesh ice cream industry that our ice cream product is enough appealing.

Conclusion

This paper considered some demographic, psychometric and product factors and their strength of relationship with households' ice cream consumption. Special emphasize was given on demographic factors to evaluate the ice cream consumption behavior of the consumer, either positive or negative. Among eight demographic factors, four factors viz., consumers gender, family type, monthly family food expenditure and food buying decision maker showed the most significant influence upon households per day ice cream consumption. In case of female either as a consumer or as a household decision maker, consume more ice cream than their male counterpart. The most influential psychometric motive of ice cream consumption was consuming a tasty dessert and not delivering calories. Perception about current market price of ice cream was mixed; dependent consumers especially children had no headache about the price while independent income earning consumers reported strong dissatisfaction towards current market price of ice cream thereby, they demand for lowering the price. This research adds some insights of consuming ice cream in Bangladesh which provides important product related features to the ice cream producers.

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