Health Beliefs and Motivating Factors to Buy Bottled Water: A Case Study of the University Students of Bangladesh

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Abstract

The majority of people in Bangladesh are illiterate and unconscious about their health. They are unable to understand the importance of their health. They even do not know the benefits of health precautions which are primarily concerned with food and drinking water. It is identified from the research that the people have some general and specific beliefs on health benefits related to drinking water. The beliefs are bottled water is purer than tap water, health benefits of bottled water are not substantial bottled water is not properly processed, etc. Therefore, people are hardly enthusiastic to buy and consume bottled water. On the other hand, research shows that there are some motivating factors for buying bottled water. These factors are concerned with health benefits, concerns about tap water, convenience, taste, preference over soft drinks, bottle itself, status symbol, luxury item, media, and advertising aspects. Given these observations in mind, this study concentrates only on the beliefs and motivating factors to buy bottled drinking water. This study is only confined among the university students who are studying at the private universities located in Dhaka city. A total of 399 students were interviewed with a structured questionnaire. Both descriptive and inferential statistics were used in analyzing data. For identifying the factors relating to health beliefs and buying decision of bottled water, factor analysis was conducted. Results show that the students give most importance on safety and taste of the bottled water whenever they buy. The other factors include media exposure and reputation of the bottled water, chemical smell, hygienic, concerns about tap water, use as luxury item or status symbol, advertising by the producer, shape of the bottle (small or big),and convenience or readily availability of the water. This study suggests that the producers of bottled water should give importance on the health and hygiene aspects and promotional factors for promoting their sales in Bangladesh.

Background

The consumption of bottled water has been substantially increasing all over the world in since decade (Doria, 2006). The increase also has happened in the countries where tap water is used as drinking water. The reasons could be attributed by the number of factors. The factors are primarily concerned with safety and health benefits. Experts opined that the human body is primarily made up of water. About 3 kilograms water is in a body out of every 4.5 kilograms of the body weight. Human beings require at least 7 glasses of water to enable his/her organs to function well. Therefore, it is necessary to know what kind of water is drinkable and what is not. It is reasonable to ask question about the safety of drinking water as the quality of drinking water varies from place to place depending on its source and the way it is treated, packed, and distributed. The water directly available at home may contain harmful chemicals and bacteria and that may lead to long-term side effects in the human body. Tap water may include things like chlorine, pesticides and herbicides. When a person drinks tap water chemicals can enter into his/her body and makes harmful for his/her health. Poor quality of drinking water can cause illness from poisoning or infection in the body. Children and the elderly are the most affected groups by the drinking water as they have less resistance power in their bodies. Two most significant waterborne diseases are gastroenteritis and lead poisoning may cause from the bad quality drinking water. It is possible that the water used as drinking water has unacceptable levels of pesticides including atrazine that can cause damage of liver, kidney, and heart of the human beings. Arsenic in high concentrations is likely to be present if the water is sourced from the ground. Long term arsenic exposure has been associated with a variety of cancers, including those of the lungs, kidneys, bladder, and prostate etc. Chlorinated water contains large amounts of chemical compounds known as Trihalomethanes (TCM) which is harmful for the body. These all are believed to increase possibilities of cancer in human bodies. Hence, the use of water especially drinking water is very much sensitive and important for everybody to maintain good health and have a long life. The use of bottled water all over the world is shown in Table 1. It shows that in Asia the use of bottled water is only two percent. This indicates that Asian people are still in dark about the benefits of bottle drinking water.

Table 1 World Bottled Water Consumption in 1999

Sl. No.	Regions	Consumption (%)
1	North America	20
2	Pacific	19
3	Eastern Europe	15
4	Latin America	07
5	North Africa and the near East	06
6	Asia	02
7	Africa	00
8	Western Europe	85

Source: Bolt, 2000

Review of Literature

Bottled drinking water is safer than tap water. However, a few study shows that there are germs or arsenic in bottled water too even it is processed. There are three major types of bottled water that were identified by Ferrier (2001) such as, natural mineral water, spring water, and purified water. *Natural mineral water* is, an extremely specific product responding to strict criteria. It is wholesome underground still or aerated water, protected against pollution hazards and characterized by a constant level of minerals and trace elements. This water cannot be treated, not added any exogenous elements, such as, flavors or additives solids. *Spring water* is, also underground water protected against pollution hazards. It cannot be treated but it doesn't need to have a constant mineral composition. Water from different springs can be sold under the same brand name. *Purified water* is surface or underground water that has been treated in order to be suitable for human consumption. It differs from tap water only through the way it is distributed.

Bottled drinking water is mineral water sold in sealed and potable for the people. It is also called spring water or sometimes distilled water. Bottled water usually is purer, healthier and safer than the tap water as it is sealed and there is no chance to contaminate. Bottled waters are now used in almost all places such as, homes, offices, parties, airplanes, restaurants and even sometimes it is carried all the time by the people whenever they travel. Estimates show that there were over eight billion gallons of bottled water that was consumed across the globe in 2006. This consumption in US alone in 2007 was 8.8 billion gallons or 29 gallons per person (Cooperwiki, 2009). It was the second most consumption of beverage in the US after carbonated soft drinks.

The reasons for using bottled water in developed countries are given in Table 2. It shows that the people of US drink bottled water because of health risk and as substitute for other beverage. While Canadian and French people drink bottled water because of organoleptics like, taste.

Table 2 Reasons for Bottled Drinking Water in USA, Canada, and France

Reasons	US (1993) (%)	Canada (1999) (%)	France (1989) (%)	France (1995) (%)	France (2000) (%)
Organoleptics (like taste)	7	71	54	43	47
Health and risk	47	25	13	19	23
Prefers mineral or spring water	-	-	28	19	16
Substitute for other beverage	47	-	-	-	-
Hardness	-	-	-	14	23
Other reasons (unspecified)	11	3	6	4	5
Don't know	-	1	-	-	-

Source: AWWA-RF (1993), Levallois et. al., (1999), and IFEN (2000). In: Doria (2006)

In Bangladesh, people are mostly illiterate and unconscious about their health and hazards. This is because of the poor level of literacy among the people. Most of the people live in village where there is not much arrangement to make them aware about their health hazards. Therefore, religious and cultural beliefs make the health of these people more hazardous. On the other hand, people living in the city are quite conscious about their health's and hazards. They know the benefits of precautions taken for maintaining good health. These precautions are primarily concerned with food and drinking water. In Bangladesh, drinking water is available in two forms. One form is bottled water and other form is non-bottled water. Bottled water entered into the market of Bangladesh after 1988 flood when hepatitis broke out widely and people began to regard tap water as unsafe. Research shows that the people living in the city have some general and specific beliefs on health benefits related to bottled drinking water. The beliefs are bottled water is purer than tap water, health benefits of bottled water are not substantial, bottled water is not properly processed etc. Therefore, people living in the city are not much serious about the use of bottled drinking water in Bangladesh.

Bottled water used by the people of developing countries like Bangladesh is also not free from germs and contamination. A study was conducted in Bangladesh on four brands of bottled water regarding the quality of the water and it found that all four brands were judged to be unsatisfactory by accepted health standards (Khan et. al., 1992). About 80% of the total tube-wells pump underground drinking water that is contaminated with arsenic. Surface water is also not free from arsenic. Specific beliefs of the people are concerned with plastic bottles (Ward, et. al., 2009). The bad side of the bottled water is that in the developing countries bottled water is contaminated by the bacteria quite frequently even there is assurance on the label and thus it is to be boiled before drinking (Masaak and Hiroaki, 1998). Study also showed that it is safer to consume filtered drinking water after filtration system and boiled than tap source water (Chan and et. al., 2007).

There are number of reasons for buying and using bottled drinking water. The reasons are identified by the different studies conducted by the different researchers at different times in different countries. The reasons are mainly related to the quality of the water. Health consciousness is the main reason for using bottled water. People have general and specific health beliefs about the bottled water. The general belief is that the bottled water conferred general health benefits and is better than non-bottled water. There is less chance to contaminate if the water is bottled. In developing countries like Bangladesh, this belief is rather very strong where non-bottled water is not hygienic at all.

The reasons for the consumption of bottled water vary from person to person. Study shows that the people buy bottled water if it is convenient, low cost, and has better taste (Ward et. al., 2009). Bottled water can be carried from one place to another place and is useable at any time when it is necessary. Sometimes, bottled water is less costly compared to other soft drinks. Taste also might be different when water is bottled after purification and by using chemicals. In a study conducted on the producers of drinking water in India, it was found that the demand of the bottled water depends on water purity, easy availability the time and place, and consumers' attitude towards the whole aspects of branded bottled water (Devasenathipathi, 2008). Behavioral factors concerned with the dissatisfaction with tap water organoleptics (especially taste), health risk, demographic aspects, perceived quality of the water source, trust in tap water companies etc. Therefore, these are the factors induce the users to use bottled water (Doria, 2006). Good quality water, purer water, healthier water is the demand of the bottled water drinkers (Doria, 2006). In Bangladesh, status, taste, reasonable price, and attractive advertisement are the most important factors for buying bottled water in Bangladesh (Habib, et. al., 2009).

Given the facts in mind, this study aims at identifying the factors concerned with health beliefs and motivation to buy bottled drinking water by the university students of Bangladesh.

Research Design

This study attempts to identify the factors related to the health beliefs and motivation to buy bottled water by the university students of Bangladesh. To conduct the study, primary and secondary sources of information were used. Primary data was collected from the university students who are studying at the private universities located in Dhaka city. Four top ranked private universities such as, North South University, East West University, BRAC University and American International University were selected as sample university.

There are about 20,000 students in the sampled private universities. Sample size was determined by using the formula suggested by Yamane (1967) that requires a total of 392 students to be interviewed. However, this study interviewed 399 sample respondent students with a structured questionnaire for the survey. This study uses first, purposive and then, random sampling method to select the respondents. Sample distribution is shown in Table 3.1.

Table 3.1 Distribution of the Sample Respondent Students

Sl. No.	Name of the University	Number of Students Interviewed
1	North South University	110
2	East West University	103
3	BRAC University	87
4	American International University	99
Total		399

To determine the sample size the following sample size determination formula was used (Yamane, 1967).

$$n = \frac{N}{1 + N(e)^2}$$

Where n is the sample size, **N** is the population size, and **e** is the level of precision. 95% confidence level and **P** = .5 are assumed.

The level of precision is the range in which the true value of the population is estimated. This range is often expressed in percentage points, (e.g., ±5 percent). The confidence or risk level is based on ideas encompassed under the Central Limit Theorem. The key idea encompassed in the Central Limit Theorem is that when a population is repeatedly sampled, the average value of the attribute obtained by those samples is equal to the true population value.

In analyzing data, both descriptive and inferential statistics were used in analysis. For describing the overall situation of drinking water in Bangladesh, descriptive statistics like simple percentages were used. For identifying the factors relating to health beliefs and buying decision of bottled drinking water by the university students, factor analysis was performed.

Results and Discussions

Data were analyzed by using factor analysis to identify the factors. Factors analysis shows that the communalities of the variables concerned with the beliefs and motivation to buy bottled drinking water are very high (Table 4.1). This indicates that the variables used for identifying the factors are highly cohesive among the group.

Table 4.1 Communalities of the Variables

Sl. No	Variables	Extraction
1	Concerns about tap water	.701
2	Bottle itself	.537
3	Safe	.730
4	Maintain standard procedure	.712
5	Hygienic	.759
6	Free from chemical smell	.749
7	Free from harmful chemicals and contaminants	.731

8	Convenience	.817
9	Taste	.746
10	Preference over soft drinks	.788
11	Status symbol	.724
12	Luxury item	.679
13	Media	.712
14	Advertising	.675
15	Reasonable price	.603
16	Potable	.636
17	Good quality	.701
18	Reputed brand	.567
19	Shape of the bottle	.744

Extraction Method: Principal Component Analysis.

Factor analysis results show that the variables related to the beliefs and motivating variables formed eight factors. The most important belief and motivating factor to use bottled drinking water is safety and taste (.2.83) followed by media exposure and reputation (2.37), chemical smell (1.96), hygienic (1.52), concerns about tap water and luxury (1.32), advertising (1.13), shape of the bottle (1.12), and convenience (1.03) (Table 4.2). These variables together explain 70.05% of the variance of the data set used in identifying the factors to buy and consume bottled drinking water by the university students of Bangladesh.

Table 4.2 Health Beliefs and Motivating Factors to Buy Bottled Water in Bangladesh

Factors	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1. Safety and Taste	2.834	14.913	14.913
2. Media Exposure and Reputation	2.378	12.518	27.432
3. Free from Chemical Smell	1.968	10.356	37.788
4. Hygienic	1.520	8.002	45.790
5. Concerns about Tap Water and Luxury	1.324	6.966	52.756
6. Advertising	1.132	5.958	58.714
7. Shape of the Bottle	1.120	5.896	64.610
8. Convenience	1.034	5.440	70.050

Extraction Method: Principal Component Analysis.

The first factor for buying the bottled water is safety and taste of the water (Table 4.3). Safety and taste factor was formed by the three variables such as safe (.838), taste (.837) and bottle itself (-.631). These variables have higher level of factor loadings that indicates that the variables formed the factor have higher level of correlation with the factor.

Table 4.3 Safety and Taste

Variable	Factor loadings
Safe	.838
Taste	.837
Bottle itself	-.631

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

Table 4.4 shows that four variables relating to the motivation to buy bottled drinking water and the variables formed a factor named media exposure and reputation. The variables are media (.750), reputed brand (.720), potable (.572) and reasonable price (-.513). Factor loadings are also very high of these variables.

Table 4.4 Media Exposure and Reputation

Variable	Factor loadings
Media	.750
Reputed brand	.720
Potable (clean)	.572
Reasonable price	-.513

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

The third important factor for buying decision of bottled drinking water is chemical smell (Table 4.5). University students like to consume the bottled water as those are free from chemicals. Chemical smell (.823), preference over soft drinks (-.686), and harmful chemicals and contaminants (.586) variables formed this factor.

Table 4.5 Chemical Smell

Variable	Factor loadings
Free from chemical smell	.823
Preference over soft drinks	-.686
Free from harmful chemicals and contaminants	.586

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

Table 4.6 shows the forth factor for buying the bottled drinking water by the university students of Bangladesh. The name of the factor is 'hygiene' constituted by hygiene (.854) and status symbol (.656) variables.

Table 4.6 Hygienic

Variable	Factor loadings
Hygienic	.854
Status symbol	.656

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

Concerns about tap water and luxury feeling is another factor considered by the students in buying the bottled drinking water in Bangladesh (Table 4.7). They buy that bottled water where standards are strictly maintained by the producers.

Table 4.7 Concerns about Tap Water and Luxury

Variable	Factor loadings
Concerns about tap water	.748
Luxury item	.716
Maintain standard procedure	-.483

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

Table 4.8 shows the 'advertising' as a factor for buying bottled drinking water by the university students. If the company is familiar to the students they buy that bottled water.

Table 4.8 Advertising

Variable	Factor loadings
Advertising	.807

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

Shape of the bottle (.844) and good quality (.589) variables formed a factor named shape of the bottle (Table 4.9). Bangladeshi university students consider the shape of the bottle in buying the bottled water.

Table 4.9 Shape of the Bottle

Variable	Factor loadings
Shape of the bottle	.844
Good quality	.589

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

Convenience is another factor that is sued to buy bottled drinking water by the university students of Bangladesh (Table 4.10).

Table 4.10 Convenience

Variable	Factor loadings
Convenience	.886

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

Conclusions

This study was conducted to identify the factors related to the belief and motivation to buy bottled drinking water by the university students of Bangladesh. Study identified eight factors. Safety and taste is the most important factor used to make the buying decision by the university students. As these students are highly educated, they are capable to identify the safety aspects of the bottled water. Because of the different sources of ground water, the taste of the bottled water is different. The other factors are media exposure and reputation of the bottled water, chemical smell, hygienic, concerns about tap water, use as luxury or status symbol, advertising of the bottled water by the producer, shape of the bottle (small or big), convenience or readily availability of the water etc. The reasons for considering these factors could be attributed by the health consciousness of the students and the media exposure of the products. Hence, this study suggests that the bottled water producers should focus on the quality of the product and the advertising and promotion aspects of their marketing efforts to increase the sales of their bottled drinking water. However, there is an ample scope to conduct study further on another group of people to identify the factors in this regard.

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