

Original Research Article

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## A Study on Factors Affecting Consumers Decision to Purchase Vegetables

Kanchan Singh and Neeraj\*

Department of Agriculture and Environmental Sciences, National Institute of Food  
Technology Entrepreneurship and Management, India

\*Corresponding author

### ABSTRACT

Fresh vegetables are integral part of consumer's food expenditure. Every consumer wants good value for money in market for making purchase of fresh vegetables and also looks forward to have good quality, pest and disease free, hygienic and safe produce at affordable price. The current research work was carried out to investigate the consumer perspective and concerns during supply chain of fresh vegetables. The study was carried out in Delhi (India). The core parameters for concerns were grouped under categories like consumer's behavior on purchase of vegetables; consumer's concern on vegetables safety and dependence on information channel. Among various factors studied, results indicate that freshness and price were the main factors affecting the consumer's decision to buy vegetables. Buying preferences do not get much affected by age or gender of the buyer. Most of the respondents preferred buying vegetables more than once in a week and also preferred to buy them fresh and from local market rather than super markets. Female respondents were more concern about freshness, price, total quality, and shelf life, place of purchase and place of origin. Male respondents were more concerned about pesticide residues, heavy metals and packaging contamination than female respondents. Most of the respondents used friends or family, TV, and internet as a source of food safety information. Most of the respondents believe that vegetables which they are eating are not safe and production location of the vegetables is most sensitive area to have maximum contamination. Despite the price as second most concerned factor found in the study for purchasing vegetables, majority of respondents were ready to pay higher price for safe vegetables.

#### Keywords

Consumer  
behaviour,  
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### Introduction

Fresh vegetables are integral part of consumer's food expenditure. Every consumer wants good value for money in market for making purchase of fresh vegetable and also looks forward to have good quality, pest and disease free, hygienic and safe produce at affordable price. The lifestyle changes in recent times has made an impact on

purchasing behaviour of consumers owing to rise in spendable income, rise in dual income groups, less time to spend in local mandi markets, accessibility to online purchase platforms, etc. (Akpınar *et al.*, 2009). Consumers would also like to prefer healthy and good quality vegetables but yet the decision- making process is complex and the importance of motives (hygiene, pesticides residue, etc) and barriers (price, awareness,

etc.) may affect the buying behaviour of consumers (Padel and Foster, 2005). Huang *et al.*, (1999) and Liu *et al.*, (2013) also describes about the affinity of consumers to have hazard free food which primarily is characterized by good quality, nutritious and free from harmful or toxic residues, such as fertilizers, pesticides, heavy metals, and nitrates are controlled within limits set by national standards.

The act of consumption influences consumers purchasing decisions and the decision to purchase is further influenced by price (Bagozzi and Dholakia, 1999). However, as far as fresh vegetables are concerned, non-price factors like product quality, shelf life, place of purchase, place of origin of vegetable, nutrition values, awareness on safety concerns etc., play an important role in determining purchase decision (Chikkamath *et al.*, 2012).

As consumers are integral part of vegetable supply chain and also act as end users, the present study was undertaken with an attempt to investigate the consumer behavior and concern during supply chain of fresh vegetables in Delhi region with a major objective to identify the factors influencing the purchasing decision of vegetables.

## **Materials and Methods**

The current study has been undertaken in Delhi region to identify the consumer's preference while purchasing fresh vegetables. The primary data was collected with the help of questionnaire-based personal interview technique across Delhi region in order to understand their purchasing behavior. The structured questionnaire was divided in four major components viz., 1. Demographic characteristics of respondents (Table 1a), 2. Consumer's behavior on vegetable purchase (Table 1b), 3. Consumer's concerns on vegetable safety (Table 1c) and 4. Consumer's

dependence on information channel (Table 1d). A 5-point Likert scale ranging from "very unconcerned" (1), "neutral" (3) to "very concerned" (5) was used to evaluate the degree of factors affecting vegetables purchase and consumer's concerns on vegetable safety. Responses of 137 consumers were collected. Data set were analyzed using Microsoft Excel and SPSS.

The data collected has been analyzed to understand respondent's demographic profiles, vegetables purchase place and frequency, kind of vegetable preference, knowledge on nutritional aspects of vegetables, vegetable safety, willingness to pay, methods to deal with problematic vegetables and sources of information.

## **Results and Discussion**

### **Respondent's demographic profile**

The Table 2 summarizes the demographics profile of the respondents by gender, age, educational background and Income level.

The results indicate that majority of respondents were male (66%) followed by females. This probably is indicative that while going back to home from office, people prefer to purchase vegetables. This is also indicative of concerns that people prefer to buy fresh vegetables for cooking. About 57 % of the respondent's fall in age bracket of 25-45 years.

Most of the respondents were at least graduate (38.69%) followed by high school/intermediate (32.85%). Most of the respondents were in category of < Rs. 5,000 (29.20%) followed by > Rs. 25,000 (24.09%). The overall profile suggests that the most of the respondents in this survey were young and middle age with high education and belonged to low income group.

### **Consumer's behavior on vegetable purchase**

#### **Vegetable purchase frequency of respondents**

For the dataset under study, the purchase behavior of consumers for buying vegetables has been presented in Table 3.

The results indicate that most the respondents (34.31%) prefer buying vegetables more than once in a week followed by about 25.55% respondents who prefer to buy vegetables daily. About 18% respondents procured vegetables once in a week.

#### **Preferred place for vegetables purchase**

The results showed that most of the consumers (71.53%) prefer local market for buying vegetables (Table 4). In personal interview they also revealed that vegetables in supermarket are not fresh and vegetables sold in local markets are fresh and cheaper therefore most respondents chose local market to buy vegetables frequently.

Respondents find more diverse produce in local market and being close to their home or work place.

So it is suggested that actor in supply chain of vegetables should find a way to increase the consumers trust in vegetables sold at other places rather than local market. There were 19.71% respondents who trusted the supermarket.

#### **Vegetable purchase preference in terms of fresh or packed**

The results indicate that respondents/consumers preferred to buy fresh vegetables (88.32%) prefer to buy fresh vegetables as compared to packaged vegetables (Table 5).

### **Understanding of nutritional importance of vegetables**

Most of the respondents/consumers (73%) were aware about the nutritional benefits of vegetables (Table 6). But still 27% respondents were not very clear about the nutritional advantage of vegetables.

#### **Factors influencing consumer purchase on vegetables**

The data related to the factors influencing consumers' purchase on vegetables is presented in Table 7. As per the results obtained freshness and price are two most important concerns affecting the purchase of fresh vegetables whereas the total quality i.e. external appearance and aroma ranked third in preference. The shelf life is defined as the period after the product becomes unacceptable for consumption from sensorial and nutritional or microbial safety perspectives. Shelf life was not a major concern for respondents. The other factors having lower level of concern include place of purchase, brand outlet and place of origin respectively.

The statistical analysis was performed to access the impact of vegetable purchase related factors to demographic concerns by using one way ANOVA (Analysis of Variance). The level of significance was set at 0.05. A value of  $P < 0.05$  was considered statistically significant and highlighted in bold (Table 8). The data presented in Table 8, also indicates that Gender has significant concern related to the importance of freshness and females are more concerned for freshness of the vegetable during purchase as compare to that of male counterparts. The age also has an impact freshness concern of vegetables and results indicate that respondents of middle age group (25-45 years) are more concerned for freshness than higher age respondents and younger age respondents.

**Table.1a** Demographic characteristics of respondents

Gender	Age group	Education level	Income level
Male Female	<25 years	Illiterate,	<Rs.5,000,
	25-35 years	Below Junior High School,	Rs. 5,000-10,000,
	36-45 years	High School/Intermediate,	Rs.10,000-20,000,
	>45 years	Graduate, Post Graduate/Above	Rs. 20,000-25,000, > Rs. 25,000

**Table.1b** Questions asked in consumer’s behavior on vegetable purchase

1. How frequently do you buy vegetables? (Daily, Once in a week, More than once in a week, Once in a month, More than once in a month, Seldom, Never)
2. Which place do you prefer to purchase vegetables? (Local market, Super market, Wholesale market, Online, Other)
3. Which kind of vegetable do you prefer to purchase?(Fresh, Packaged/Frozen)
4. Do you understand nutritional knowledge about vegetables?(Yes, No)
5. For each of the factor (Freshness, Shelf-life, Price, Brand outlet, Place of purchase, Place of origin, and Total quality) that affects consumer’s buying decision were indicated for: 1) Very unconcerned; 2) Unconcerned; 3) Neutral; 4) Concerned or 5) Very concerned ?

**Table.1c** Questions asked in consumer’s concerns on vegetable safety

1. Which stage of supply chain is the most risky to cause vegetable safety problem as perceived by consumers? (Production, Processing, Transportation, Sale, Consumption, Other)
2. For each of the safety factor (Pesticide residue, Excessive additives, Heavy metals, Microbial contamination, and Packaging contamination) that affects buying decision, please indicate whether you are: 1) very unconcerned; 2) Unconcerned; 3) Neutral; 4) Concerned or 5) Very concerned?
3. Do you satisfy with safety of vegetables? (Yes, No)
4. Are you willing to pay more for safe vegetables i.e. certified vegetables, if yes then how much more you are willing to pay?[yes (0-10%, 10-20%, >20%), No]
5. By which method do you deal with problematic vegetables (i.e. spoilage, insects etc.) after purchase?(Returning, Complaining to relevant vendor, Discarding, Other)

**Table.1d** Consumer’s dependence on information channel

1. From which source do you get the food safety information?				
Internet	Newspaper	TV	Broadcasting	Friends or family

**Table.2** Demographic profile of respondents

Demographic characteristics	Category	Number	Percentage
<b>Gender</b>	Male	90	66
	Female	47	34
<b>Age</b>	<25 years	40	29.20
	25-35 years	44	32.12
	36-45 years	35	25.55
	>45 years	18	13.14
<b>Education</b>	Illiterate	6	4.38
	Below Junior High School	17	12.41
	High School/Intermediate	45	32.85
	Graduate	53	38.69
	Post Graduate/Above	16	11.68
<b>Monthly Income</b>	< Rs. 5,000	40	29.20
	Rs. 5,000-10,000	21	15.33
	Rs. 10,000-20,000	20	14.60
	Rs. 20,000-25,000	23	16.79
	> Rs. 25,000	33	24.09

**Table.3** Vegetable purchase frequency

Purchase frequency	Number	Percentage
<b>Daily</b>	35	25.55
<b>Once in a week</b>	26	18.98
<b>More than once in a week</b>	47	34.31
<b>Once in a month</b>	8	5.84
<b>More than once in a month</b>	15	10.95
<b>Seldom</b>	5	3.65
<b>Never</b>	1	0.73

**Table.4** Preferred location for vegetable purchase

Purchase location	Number	Percentage
<b>Local market</b>	98	71.53
<b>Super market</b>	27	19.71
<b>Wholesale market</b>	18	13.14
<b>Online</b>	2	1.46
<b>Other</b>	5	3.65

**Table.5** Vegetable preference of respondents (fresh vs packed)

Preference	Number	Percentage
Fresh	121	88.32
Packaged	16	11.67

**Table.6** Respondent's nutritional knowledge about vegetables

Respondents	Number	Percentage
Yes	100	72.99
No	37	27.01

**Table.7** Rank of the factors influencing consumer purchase on vegetables

Factors	Mean	±SD
Freshness	4.4306	0.7933
Price	3.9781	1.0535
Total quality	3.8467	1.0138
Shelf life	3.7664	1.1065
Place of purchase	3.3869	1.0931
Brand outlet	2.5620	1.0769
Place of origin	2.3942	1.2681

**Table.8** The differences of the consumers' concerns on the factors influencing consumers' purchases on vegetables with different demographic groups

S. No.	Factor	Gender	Age	Education Level	Income Level
		P value	P value	P value	P value
1.	Freshness	<b>.026</b>	.448	.612	<b>.001</b>
2.	Shelf life	.051	<b>.001</b>	.525	<b>.001</b>
3.	Price	<b>.039</b>	<b>.017</b>	<b>.025</b>	.097
4.	Brand outlet	.688	.075	<b>.021</b>	<b>.001</b>
5.	Place of purchase	.766	.315	.061	.224
6.	Place of origin	.360	.297	.117	<b>.016</b>
7.	Total quality	<b>.019</b>	.069	.699	<b>.040</b>

**Table.9** Consumers responses towards factors influencing consumer purchase on vegetables

Respon dent's concer n's	Price		Total quality		Shelf life		Place of purchase		Brand outlet		Place of origin of vegetable	
	Frequ ency	Per cent	Frequ ency	Per cent	Frequ ency	Per cent	Frequ ency	Per cent	Frequ ency	Per cent	Frequ ency	Per cent
<b>Very Unconcerned</b>	5.00	3.60	4.00	2.90	3.00	2.20	11.00	8.00	26.00	19.00	44.00	<b>32.10</b>
<b>Unconcerned</b>	8.00	5.80	13.00	9.50	24.00	17.50	13.00	9.50	39.00	28.50	35.00	25.50
<b>Neutral</b>	23.00	16.80	19.00	13.90	13.00	9.50	44.00	32.10	46.00	<b>33.60</b>	27.00	19.70
<b>Concerned</b>	50.00	36.50	65.00	<b>47.40</b>	59.00	<b>43.10</b>	50.00	<b>36.50</b>	21.00	15.30	22.00	16.10
<b>Very Concerned</b>	51.00	<b>37.20</b>	36.00	26.30	38.00	27.70	19.00	13.90	5.00	3.60	9.00	6.60
<b>Total</b>	<b>137</b>	<b>100</b>	<b>137</b>	<b>100</b>	<b>137</b>	<b>100</b>	<b>137</b>	<b>100</b>	<b>137</b>	<b>100</b>	<b>137</b>	<b>100</b>

The figures in bold indicate the maximum common concern of respondents in specific group.

**Table.10** The most risky stage consumers perceived through the vegetable supply chain

Stage	Number	Percentage
<b>Production</b>	57	41.61
<b>Processing</b>	34	24.82
<b>Transportation</b>	40	29.20
<b>Sale</b>	21	15.33
<b>Consumption</b>	4	2.92

**Table.11** Frequency of various responses regarding factors on vegetable safety

Respondent's concern's	Pesticide residues		Excessive additives		Heavy metals		Packaging contamination		Microbial contamination	
	Frequ ency	Perce nt	Frequ ency	Perce nt	Frequ ency	Perce nt	Frequ ency	Perce nt	Frequ ency	Perce nt
<b>Very Unconcerned</b>	6.00	4.40	5.00	3.60	7.00	5.10	0.00	0.00	4.00	2.90
<b>Unconcerned</b>	6.00	4.40	15.00	10.90	15.00	10.90	12.00	8.80	12.00	8.80
<b>Neutral</b>	20.00	14.60	36.00	26.30	35.00	25.50	41.00	29.90	27.00	19.70
<b>Concerned</b>	55.00	<b>40.10</b>	60.00	<b>43.80</b>	52.00	<b>38.00</b>	62.00	<b>45.30</b>	46.00	33.60
<b>Very Concerned</b>	50.00	36.50	21.00	15.30	28.00	20.40	22.00	16.10	48.00	<b>35.00</b>
<b>Total</b>	<b>137</b>	<b>100</b>	<b>137</b>	<b>100</b>	<b>137</b>	<b>100</b>	<b>137</b>	<b>100</b>	<b>137</b>	<b>100</b>

The figures in bold indicate the maximum common concern of respondents in specific group.

**Table.12a** Consumers trust on vegetables safety

Trust on vegetable's safety	Number	Percentage
No	98	71.53
Yes	39	28.47

**Table.12b** Willingness to pay (WTP) for safe and quality vegetables

WTP	Number	Percentage
No	59	43.07
Yes	<b>78</b>	<b>56.93</b>
If Yes, then to what extent in terms of extra/higher price	0-10 %	31.39
	10-20%	23.36
	>20 %	2.19

**Table.13** Method preference to deal with problematic vegetables

Method	Number	Percentage
Returning	45	32.85
Complaining with vendor	54	39.42
Discarding	47	34.31
Other	4	2.92

**Table.14** Consumer's dependency on information channel

Channel	Number	Percentage
Friends and family	52	37.96
TV	40	29.20
Internet	35	25.55
Newspaper	28	20.44
Broadcasting (Radio)	9	6.57
Others	7	5.11

The results also shows that gender is not significantly related to shelf life, brand outlet, place of purchase and place of origin. Age is not significantly related with brand outlet, place of purchase, place of origin, freshness and total quality. Education is not significantly related with freshness, price, place of purchase, place of origin and total quality. In a similar kind of study Cheng *et al.*, 2016 identified seven factors as freshness, shelf life, total quality, place of purchase,

price, place of origin and brand were identified as the factors influencing consumers' vegetable purchase. His study also indicated that freshness and shelf life as top two concerns for vegetable purchase and brand ranked as the least concern in this study when consumers made their purchase decisions on vegetables. Freshness is a decisive attribute for consumers to choose vegetables. Consumer's perception of freshness is likely to involved many aspects

as shelf life, nutritional value, safety and sensory aspects (Peneau *et al.*, 2009). Therefore, consumers want to take freshness as their top consideration when they purchase vegetables.

The results related to consumer's responses towards various factors influencing their decision to purchase vegetables are presented in the Table 9. The results indicate that majority of respondents i.e. 73.7% (37.20%: very concerned and 36.50% Concerned) are concerned about the price they are paying for buying the vegetables. About 47.40% and 43.10% respondents are concerned about the total quality and shelf life of vegetable being purchased by them. About 50% of the respondents (36.50% concerned and 13.90% very concerned) were concerned about the place from where they are purchasing the vegetables whereas remaining were either neutral or not very concerned about this aspect. About 81% of the respondents (19.00% Very unconcerned, 28.50% Unconcerned and 33.60% Neutral) were not very cautious and concerned about the name of brand outlet for purchase of vegetables. It was also interesting to note that about 57% of vegetable purchasing respondents (32.10% Very unconcerned, 25.50% Unconcerned) were not at all having concerns related to the place of the origin of the vegetables.

### **Consumer concerns on vegetable safety**

#### **Most risky stage consumers perceived through the vegetable supply chain**

Table 10 shows perceptions of different respondent's on the most risky stage through vegetable supply chain. Most of the respondents (41.61%) believed that the agriculture production stage was one of the most risky stage to cause vegetable safety problems indicating a big concern on what happened to the vegetables on the farm level.

The safety hazards in vegetables such as pesticide residues and heavy metal contamination may have direct impact on quality of vegetable at farm gate level. 29.20% respondents perceived the vegetable transportation stage was a crucial stage where safety of vegetables is most likely to be compromised. There were only 15.33% and 2.92% people perceived sale and consumption stage as the ones with the highest risk, respectively.

The results find support from the study of Danelon and Salay (2012) which highlights that vegetables can be contaminated during the agriculture production, transportation, storage, preparation, distribution and consumption stages. The demand by urban consumers for blemish-free and attractive produce encourages excessive use of pesticides and nitrate-rich chemical fertilizers.

#### **Consumer concerns on vegetable safety related to contamination**

Data presented in the Table 11, shows that about 76.60% (40.1% concerned and 36.5% very concerned) respondents were concerned about pesticide residues present in vegetables. About 43.80% of respondents were concerned while only 15.35% of respondents were very much concerned about excessive additives present in vegetables and 26.30% were neutral about presence of excessive additives in purchased vegetable. This shows lack of knowledge among consumers about safety factors. Excessive additive here refers to use of chemicals and insecticides for bleaching and cleaning of vegetables for improving the appearance, color enhancers, coatings, glossy sprays, etc. Regarding heavy metal contamination, about 58% respondents were concerned (35.60% Highly concerned and 33.60% Concerned) about heavy metals present in purchased vegetables and a total of 41.6% were neutral, unconcerned or very

unconcerned about this aspect. About 61 % respondents are concerned about the packaging and contamination due to poor packaging of the vegetables whereas a large group of respondents (about 30%) is neutral on this aspect which may be due to their lack of awareness about the bulk packaging and handling of vegetable produce. Regarding the microbial safety of the vegetables, 68.60% respondents were concerned out of which 35.0% are highly concerned while 33.60% of respondents were concerned about microbial contamination of purchased vegetables. Access to clean water for irrigating vegetables represents a major challenge. Sewage water contains a broad spectrum of pathogens, which survives for several weeks in the field (Carl Johan Lagerkvist *et al.*, 2013).

Previous studies have also reported and observed that some crops including vegetables were contaminated with heavy metals in some polluted areas in China (Fu *et al.*, 2008) and several food scares of heavy metal contamination on vegetables in China and India (Huang *et al.*, 2014).

All these hazard risks are increasingly becoming a concern for fresh vegetable consumption. Hence, it is important for the fresh vegetable suppliers to assure the safety of fresh vegetables and establish or maintain consumer's trust in fresh vegetables by providing safe vegetables as a kind of healthy food (Cheng *et al.*, 2016).

Consumer studies on purchase behavior and safety concern need to be carried out to help the food industry to control product safety and quality. Many studies have also measured the perceptions of consumers on different aspects of food safety (Shim *et al.*, 2011; Van Boxtael *et al.*, 2014). A limited number of studies are focused on consumer's perception of vegetable safety risks, such as pesticide residues and product freshness.

### **Consumers' trust on vegetable safety and willingness to pay**

Data presented in Table 12a indicates that only 28.47% respondents believe that vegetables which they are purchasing for consumption are safe while majority of respondents (71.53%) believe that vegetables they are purchasing from the market are not safe for consumption. The results presented in the Table 12b also indicate that, out of all the consumers interviewed 56.93% respondents were willing to pay higher price for safe and certified vegetables out of which 31.39% respondents were willing to pay 0-10% higher price followed by 23.36% of respondents who were ready to pay upto 10-20% higher price for safe and quality vegetables.

This also indicates that if consumer is made aware and educated on aspects of safe, certified and quality vegetable produce in markets, this may develop as a niche area for health and quality conscious consumers.

### **Method to deal with poor quality vegetables**

The respondents were asked about how they deal with a situation when vendor dodges them by giving poor quality of vegetables while making a purchase, most of the respondents (39.42%) claimed that they complained to the vendors. About 34% would like to discard and will not use whereas and 32.85% respondents said that they return the problematic vegetables to the vendors (Table 13). Consumers may select points of purchase through beliefs in risk reduction and trust, but may not reap all of the benefits of selecting these purchase locations. Similarly, lack of information and distrust between producers and consumers has been found to adversely affect the introduction of changes to the food delivery system in developing countries (Mergenthaler *et al.*, 2009).

### **Consumer's dependence on information channel**

Out of various channels, the information received by the consumers/ respondents regarding vegetable quality, food safety concerns falls at large in the trusted group of friends and family (Table 14). About 92.71% respondents receive information from three broad channels viz., Friends and family (37.96%), TV (29.20%) and Internet (25.55%). In a study conducted on Chinese consumers, it was also revealed that consumers mainly obtain information about safe food from television and newspapers, prior experience, relatives and friends. Magazines, professional books and the internet are less frequently used (Liu *et al.*, 2013). While consumers are exposed to more information than ever before, it is important to understand that more information does not necessarily mean better informed consumers. Verbeke (2005) stressed that information should be properly managed and targeted to address particular needs as not all consumers are alike. Interested consumers could be engaged to purposefully seek information. Risk perception also depends on the information sources that consumer's use, which can include the mass media, friends and personal experience (Cheng *et al.*, 2016). The study was an attempt to understand the concerns of consumers in Delhi regarding purchase of vegetables which included concerns like vegetables purchase place and frequency, kind of vegetable preference, knowledge on nutritional aspects of vegetables, vegetable safety, willingness to pay, methods to deal with problematic vegetables and sources of information, etc. The results shows that gender, education, age have impact on buying behaviour and purchase decision of consumers regarding vegetables. Gender showed significant concern related to the importance of freshness as females buyers were more concerned about

freshness of the vegetable during purchase in comparison to male counterparts. Most of the respondents preferred buying vegetables more than once in a week followed by respondents who prefer to buy vegetables daily. There was concern of respondents to buy fresh vegetables rather than packaged ones. They also had higher preference for purchasing vegetables from local market rather than super markets. Most of the respondents were aware about the nutritional benefits of vegetables. Freshness and price were two most important concerns that affected the purchase of fresh vegetables whereas the total quality i.e. external appearance and aroma ranked third in preference. The other factors having lower level of concern include place of purchase, brand outlet and place of origin, respectively. The results also indicate that consumers have concerns about the price of vegetable being paid by them for the purchase of vegetables. They considered the production stage at farm as one of the most risky stage in supply chain of vegetables. Respondents also had higher perception that the vegetables they are purchasing are not very safe and if an opportunity given, they would like to buy safe and certified vegetables even at little higher price. Most of the respondents received information from three broad channels viz., friends and family, TV and internet.

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