An Analytical Study on Consumer's Preferences for Eggs Attributes through Conjoint Survey

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Abstract

Today, all over the world eggs are considered as an important part of daily meals. In India, consumption of milk, meat and eggs are rising than that of cereals. The Economic Survey of 2015-16 presented that the agriculture of India is a system of mixed crop-livestock. This survey explained that rank of India is first in production of milk i.e. 18.5% of all over the world production with an output of 146.3 million tons annually. This study focuses on preferences of egg purchaser and uses conjoint analysis to identify consumer preferences in the market. By applying technique the trade off that consumers make between size, color, price , packaging, functional, feed given to chicken in the purchasing of egg for 95 respondents was established. Data is collected from primary sources through a well structured questionnaire. For the collection of data convenience sampling is used. Sample respondents are teachers and students of various departments of M.D.University, Rohtak. The result found that 63.2% of respondents are eggetarian and remaining 36.8% are non-eggetarian. Results also analyzed which level of attributes is preferred by respondents.

Keywords: Consumer's Preferences, Eggs, Attributes, Conjoint Survey

Introduction

Today, all over the world eggs are considered as an important part of daily meals. In India, consumption of milk, meat and eggs are rising than that of cereals. As we saw in the past, the agricultural output (i.e. 37%) growth was come from animal products. Eggs and Meat output from the total output has grown faster and poultry the fastest. In an Indian economy, the food sector plays a vital role in concern of development and growth of a country. With the introducing of New Economic Policy (LPG) 1991, Many Multinational Corporations starts their business in India and because of, LPG policy, more consumers attracts towards the fast food products and very much to the egg products. Therefore, demand for fast food has increased while the demand for staple food has decreased. From the last decades, patterns regarding food consumption of consumers have been changed rapidly with the changes takes place in an environment. With the expansion of industries in India, there are lots of employment opportunities generated and because of this, income level of consumers also increases which result in great demand of quality and fast food.

•Consumers gives dually importance on a balanced diet, brand consciousness , higher education levels, healthfulness, superior quality , convenience and valued animal welfare are certain factors through which consumers are decided whether they buy the egg products or not. There are lots of factors which affects the choices of consumers like:-

- Environmental Factors
- Cultural Factors
- Consumers Tastes and Preferences
- Income level of consumers
- Buying behavior of consumers
- Contextual influences
- Price of product etc.

Egg's consumption across Asia Pacific Nations, especially in China and India is increasing because there is high volume of middle class population and their purchasing power is also increasing. These Nations, dominates the global market of eggs.

The Economic Survey of 2015-16 presented that the agriculture of India is a system of mixed crop-livestock. This survey explained that rank of India is first in production of milk i.e. 18.5% of world production with an annual output of 146.3 million tons in 2014-15 and this was 137.69 million tons in 2013-14 with 6.26% growth rate. Production of egg and fish was also registered with an increasing trend over the years. Production of egg was around 78.48 billion in 2014-15, but the production of poultry meat was estimated at 3.04 MT. Total Gross Domestic Product of country has 1% of fisheries sector and 5.08 of agriculture sector. The production of fish is showing an increasing trend as it was 10.16 MT during 2014-15 but in 2015-16 it was estimated at 4.79 MT.

Demand Projections of Livestock Products in India

Table- 1

Product	1993	2000	2010	2020
Milk	46.18	60.77	94.3	147.21
Mutton and Goat Meat	0.83	1.36	3.81	12.72
Beef and Buffalo Meat	0.49	0.61	0.84	1.15
Chicken	0.25	0.33	0.52	0.81
Eggs	9.62	13.88	24.9	44.06

Source: www.google.com/search/project on poultry-7-638

Review of Literature

It is remarkable to analyze what research work has been done in every part of the world in context of consumer preferences regarding egg products. Many studies have been conducted by the researchers in the field of consumer preferences regarding egg products. An attempt has been made to present a critique review of the literature available. Some of the studies are:

A stated choice analysis was done by Yiqing LU (2013) to know the preference of consumers for egg products from Enhanced Animal Welfare Production System in Canada. The main objective of the study was to develop new economic knowledge about the egg market which include Canadian consumers marginal WTP for each housing systems, organization that verifies the housing system, as well as the characteristics of a housing system. By using Conjoint Analysis he indicated in his result that consumers of Canada are willing to pay a premium of $1.147 and $0.550 for eggs from free run and free range systems respectively, and verification for the housing systems, but not for eggs from enriched cage systems. There were also positive marginal WTPs for cage-free, outdoor access, access to nests box, perches, scratching pads and more space. In both choice experiment, the WTP for cage-free attributes or housing systems with cage-free attributes (i.e., free run and free range systems) was lower in treatment 2 (with additional information) than treatment 1.

Hanis.A and Nasir.M(2013) in his journal analyzed the preference of consumers for the selected egg attributes by conjoint analysis in Malaysia. A sample of 202 respondents from the capital cities of all states in Malaysia was taken to establish the trade-offs between the selected attributes i.e. size of eggs, colour, size of packaging, functional attribute and price with different levels of these attributes. Theory of Demand given by Lancaster was taken as base for this study. To make an analysis descriptive analysis was done followed by rating score for egg attributes, relative importance or egg attributes and willingness to pay for egg attributes respectively. Malaysian consumers most prefer (large, omega, brown and 10 per packet) egg profile. They also found that excellent marketing strategies were needed to establish a consumer oriented market. Consumer's

willingness to buy for the product was high but the functional attributes of egg was less preferred comparatively according to this study.

Yan Heng (2015) executed a survey to check the Consumer attitudes in case of egg products. An online survey was conducted to collect the data and this survey was conducted nationwide. Stratified sampling technique was used for collecting data and a pilot study with 60 respondents was taken to pre-test the data. He found in his result that majority of respondents (63.5%) perceived the conventional layer management practices of housing hens in cages. 86% respondents favored the quality of products produced in animal –friendly environment. Cage- free attribute was preferred by respondents with the highest average premium of $0.49 per dozen.

Objective of the study

The main objective of the study is to find out the factors which affect the preferences of consumers while buying eggs through Conjoint Analysis.

Research Methodology

Research methodology of the present study is as follows:-

In the present study, mainly exploratory research design is adopted, as the main purpose of the study is to gain new insights in context of consumer preferences regarding egg products. It also represented some characteristics of descriptive research designs. Data is collected from primary sources through a well structured questionnaire. For the collection of data convenience sampling is used. Sample respondents are teachers and students of various departments of M.D.U Rohtak. 100 questionnaires were distributed among respondents, but 95 questionnaires were found complete in all respects. In this study, responses collected through questionnaire are coded, tabulated and is analyzed with the help of statistical and analytical packages like SPSS. Conjoint analysis is used in this paper.

Conjoint Analysis

Conjoint analysis model establish consumer trade-offs amongst multi-attribute concepts to know the preferences of consumers. According to this model products is a chain of fixed levels of attributes and that the total utility that the consumer consumes. It gives many attribute combinations that are most preferred by consumers and also give information how these combinations are important and also the importance of each and every attribute.

Steps to conduct conjoint analysis

The first task in Conjoint Analysis study is to establish the attributes and level of attributes to include in the actual questionnaire. The attributes and their various levels are identified using an exploratory research and discussion with experts. Once the attributes and their various levels are identified the respondents are presented with the combination of attributes with levels to show their preference for various combinations.

Table-2: Different Attributes and their Levels

Selected Attributes of the Study	Selected Level of Attributes
Size	Large(more than 73 gm) Medium(53-73gm) Small(less than 53gm)
Color	Brown White
Packaging	6 per pack 10 per pack 12 per pack 30 per pack
Functional	Omega(enhanced) Regular(non-enhanced)
Price	Rs. 4 per egg Rs.6 per egg Rs.8 per egg
Feed given to chicken	Organic Conventional

Source: Researcher Calculation

Two approaches are available for constructing conjoint analysis stimuli i.e. the pair-wise approach and full profile approach. In full profile approach complete profiles are consider for all the attributes. In the present study, the total possible profiles are 3*2*4*2*3*2= 288. In order to reduce the task of respondent's evaluation, a fractional factorial design is employed and the set of 16 profiles is generated with the use of SPSS Orthogonal Fractional Factorial Design. These combinations are presented to the respondents where respondents were asked to rank the egg in the range of one to sixteen. Responses collected through questionnaire are coded, tabulated and analyzed with the help of Conjoint Analysis.

Table-3

	Size	Colour	Packaging	Functional	Price	Feed given to chicken
1.	large(more than 73gm)	Brown	12 per pack	omega(enhanced)	Rs.4 per egg	Organic
2.	small(less than 53gm)	Brown	12 per pack	omega(enhanced)	Rs.4 per egg	organic
3.	large(more than 73gm)	Brown	30 per pack	regular(non enhanced)	Rs.8 per egg	organic
4.	small(less than 53gm)	white	30 per pack	regular(non enhanced)	Rs.4 per egg	Conventio nal
5.	medium(53-73gm)	brown	6 per pack	omega(enhanced)	Rs.4 per egg	Conventio nal
6.	medium(53-73gm)	white	12 per pack	regular(non enhanced)	Rs.4 per egg	organic
7.	small(less than 53gm)	White	10 per pack	regular(non enhanced)	Rs.4 per egg	organic
8.	small(less than 53gm)	Brown	30 per pack	omega(enhanced)	Rs.4 per egg	Conventio nal
9.	large(more than 73gm)	White	6 per pack	regular(non enhanced)	Rs.4 per egg	Conventio nal
10.	medium(53-73gm)	brown	10 per pack	regular(non enhanced)	Rs.8 per egg	Conventio nal
11.	small(less than 53gm)	brown	12 per pack	regular(non enhanced)	Rs.6 per egg	Conventio nal
12.	medium(53-73gm)	white	30 per pack	omega(enhanced)	Rs.6 per egg	organic
13.	small(less than 53gm)	white	6 per pack	omega(enhanced)	Rs.8 per egg	organic
14.	small(less than 53gm)	brown	6 per pack	regular(non enhanced)	Rs.6 per egg	organic
15.	large(more than 73gm)	white	10 per pack	omega(enhanced)	Rs.6 per egg	Conventio nal
16.	small(less than 53gm)	white	12 per pack	omega(enhanced)	Rs.8 per egg	Conventio nal

Results and Discussion

Findings of the study are presented in this part. Here, descriptive analysis of the study, followed by rating score for eggs attributes is discussed.

Table- 4: Demographic profile of respondents

Demographic Factors		Percentage N=95
Gender	**Male**	47.4
	Female	52.6
Age	**<20**	31.6
	20-40	66.
	>40	2.1
Education	**Up to UG**	48.4
	PG and above	51.6
Income Level	**<40,000**	32.6
	40,000-1,00,000	36.8
	>1,00,000	30.5
Occupation	**Student**	84.2
	Service	11.6
	Business	4.2

The distribution of demographic profiles of respondents is as: of the total respondents, 47.4% were male and 52.6 were female. The age of respondents were grouped into Three categories; Less than 20 yrs., 20-40 and above 40 yrs. Of these, the highest group according to the age range was 20-40 years old (66.3%), followed by <20 years old (31.6%), >40 years old (2.1%).Respondents' education was categorized into two group; up to UG and PG & above. 51.6% respondents were PG and above and the others remaining were up to UG(48.45%). Respondents' income was grouped into three categories, below 40,000; 40,000-1,00,000 and above 1,00,000. About 32.6% were from below 40,000, 36.8% were between 40,000-1,00,000 and about 30.5% were above 1,00,000. In terms of respondents' occupation, the category of occupation was divided into three. The categories were; student, serviceman, business. About 84.2% were student followed by 11.6% were working as serviceman and 4.2% were included in business.

Table- 5: Whether respondent is eggetarian or not

		Frequency	Percent
Valid	No	35	36.8
	Yes	60	63.2
	Total	95	100.0

As it is evident from the table-5, 63.2% of respondents are eggetarian and remaining 36.8% are non-eggetarian. It shows that majority of the respondents are eggetarian.

Table-6: Form of consuming egg

		Frequency	Percent
Valid	Fried	17	17.9
	Boiled	41	43.2
	Roasted	4	4.2
	All of them	33	34.7
	Total	95	100.0

As above table shows that 17.9% of respondents use fried eggs, 43.2% use boiled eggs, 4.2% use roasted eggs and remaining 34.7% use a mix of the three forms.

Table-7

Benefits you seek from consuming egg

		Frequency	Percent
Valid	Protein	69	72.6
	Vitamins	20	21.1
	Fat contents	6	6.3
	Total	95	100.0

Table 6 shows that 72.6% of respondents consume eggs for protein followed by 21.1% consume for vitamin and 6.3% for fat contents respectively.

Table-8: Purpose of eating egg

		Frequency	Percent
Valid	Health benefits	89	93.7
	Habitual	1	1.1
	Comfort food	5	5.3
	Total	95	100.0

The result shows that 93.7% respondents eat eggs for health benefits and 5.3% considered it as a comfort food and only 1% respondents eat eggs habitually. It shows the awareness of respondents for health benefits.

Ranking score for egg profiles

Table-9: Utilities

		Utility Estimate	Std. Error
Size	small(less than 53gm)	-.464	.402
	medium(53-73gm)	.167	.471
	large(more than 73gm)	.297	.471
Colour	White	-.368	.301
	Brown	.368	.301
Size of packaging	30 per pack	.274	.522
	12 per pack	.342	.522
	10 per pack	-.228	.522
	6 per pack	-.389	.522
Functional	regular(non enhanced)	-.033	.301
	omega(enhanced)	.033	.301
Price	Rs.4 per egg	1.259	.402
	Rs.6 per egg	-.764	.471
	Rs.8 per egg	-.495	.471
Feed given to chicken	Conventional	-.548	.301
	Organic	.548	.301
(Constant)		8.301	.333

Apart from that, the result also discussed which level of attributes is preferred by respondents. Generally, higher utility value reflects better demand for the attributes. With regard to size of eggs, large eggs was most preferred (utility= .297), followed by medium eggs with (utility=.167) and small eggs was not preferred (utility= -.464). In case of colour, consumer preferred brown eggs more compared to white eggs. The utility for both were .368 and -.368 respectively. For the size of packaging 12 per pack was preferred by the respondents (utility= .342). The consistency between the size of eggs (the larger egg was better) and the size of packaging (more egg per packaging was better). As explained earlier, the study discovered that functional attributes were the least preferred attributes of egg compared to other attributes. However, in terms of preferences of the level of functional attributes, omega eggs were still preferred compared to regular eggs. The utility for both levels were .033 and -.033 respectively.

Table-10: Importance Values

Size	14.060
Colour	13.608
Size of packaging	13.507
Functional	1.205
Price	37.384
Feed given to chicken	20.236

Averaged Importance Score

In terms of relative importance of egg attributes, we found that price of eggs topped the list of six attribute included in the study. As illustrated in table 10, the relative importance of price was 37.38 compared to other attributes for eggs. Feed given to chicken was ranked second (20.23) and size was ranked third (14.06). The respondents are indifferent between color and size of packaging. They give almost equal importance to these attributes. It was unexpected that functional attributes was found as the least preferred attribute by consumers as it only contributed 1.2% in terms of relative importance of attribute of eggs.

Table-11: Correlations

	Value	Sig.
Pearson's R	.880	.000
Kendall's tau	.650	.000

a. Correlations between observed and estimated preferences

Reliability and Validity

Basically results are analyzed for checking accuracy, reliability and validity. The objective of conjoint analysis is to ascertain how consistently the model predicts the set of preference evaluations under different situations. Results obtained by conjoint analysis are reliable and valid as: While evaluating the goodness of fit of the estimated conjoint model, we found that value of Kendall's tau is 0.650, value of Pearson's R is 0.880. These values show that results are significant at 5 percent level of significance as both the values are high.

Limitations

1. Selection of attributes and their levels included in this study is a limitation because there are also some attributes which may be important for the consumers beyond those considered in this study.
2. The effects of demographic factors were not analyzed with demand and egg attributes.

Conclusion

In conclusion, we can say that this study provide valuable inputs to producers or marketers to improve their marketing efforts as well as market positioning in line with the demanded egg attributes. Majority of the respondents was eggetarian. It is found that respondents are aware about their health benefits. The result also discussed which level of attributes is preferred by respondents. In terms of relative importance of egg attributes, we found that price (37.384) of eggs topped the list but functional attributes (1.205) was found as the least preferred attribute of six attribute included in the study. While evaluating the goodness of fit of the estimated conjoint model, we found that value of Kendall's tau is 0.650, value of Pearson's R is 0.880 These values show that results are significant at 5 percent level of significance as both the values are high.

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