Consumer Preference Towards Layer Chicken Eggs and Native Chicken Eggs in Yogyakarta

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ABSTRACT

Protein needs in the body can be met by consuming chicken eggs. Native chicken eggs were the first to be consumed and produced in Indonesia, but layer chicken eggs are more widely consumed and produced than native chicken eggs. The study aimed to determine consumer attitudes and consumer preferences towards chicken eggs and find factors that affected consumer preferences for chicken eggs. This study involved 100 respondents. Fishbein multi-attribute and conjoint analysis were used to determine consumer attitudes and consumer preferences, while binary logistic regression analysis was used to determine factors affecting preferences. The results revealed that consumers had a more positive attitude towards layer chicken eggs than native chicken eggs. The ideal characteristic of layer egg was one with large size, clean shell, dark brown shell color, and price of Rp 20,000-22,000/kg (approximately 15 eggs/kg), while the characteristics for native chicken eggs are large size, clean shell, white shell color, and a price of Rp 2,600-3,000/item. Factors that increase consumer preference for native chicken eggs are age, education, and perception that native chicken eggs are more nutritious, while the factor that increases the probability of consumer preference for layer chicken eggs is the perception of shell color.

Keywords: Binary Logistic Regression, Conjoint Analysis, Fishbein Multi-attribute, Layer Chicken Eggs, Native Chicken Eggs.

1. INTRODUCTION

Eggs are foodstuffs from poultry that contain animal protein, are easy to digest, and have a delicious taste. Community needs for eggs were initially met from native chicken eggs cultivated in the residents' yards. Along with the increasing population and technological developments then came the layer of chicken eggs. The development of layer chicken eggs is very rapid, seen from its production and consumption dominance. Production of layer chicken eggs in 2017 was 1,527,135 tons with a consumption of 6.53 kg/capita/year, while the production of native chicken eggs in the same year was 210,925 tons with a consumption of 0.18 kg/capita/year [22].

Native chicken egg farming continues to develop at a slower pace than layer chicken eggs. It shows that layer chicken eggs can not replace all roles of native chicken eggs. Consumer choices about the type of chicken eggs to be consumed vary. Before making a purchase decision, consumers are aware of the need for chicken eggs. Consumers consider intrinsic and extrinsic factors. In addition to these factors, the attributes inherent in layer eggs and native chicken eggs are also considered by consumers, which ultimately shape consumer preferences [21]. Consumer preferences for a product are helpful for producers and marketers to consistently provide products according to the needs and desires of consumers so that consumer satisfaction can be achieved and producers make a profit.

Research by [12] regarding consumer preferences towards eggs from family farms in Chille declared that consumers prefer eggs from farms or alternative production systems than conventionally produced eggs.

The research reported that price and egg size were the most important purchasing factors, whereas the yolk color was reported as the most important attribute. When buying eggs, consumers in Turkey pay the most attention to the egg production date because consumer awareness about food safety is increasing. Egg brand comes in second, followed by egg size, price, and color. The majority of consumers prefer medium-sized eggs over large and small sizes. Egg yolks that are dark in color are more desirable than young egg yolks. Consumers perceive that a darker yolk color has a better taste and more nutrients [4].

Egg consumers in Eastern Ethiopia prefer chicken eggs with a brown shell color because they feel more nutritious and taste better than white shell eggs. The color of egg yolk that is attractive to consumers in Eastern Ethiopia is dark yellow because it is rich in nutrients. Large egg size is the choice of consumers because it provides maximum satisfaction. Eggs from local chickens are more preferred than eggs from exotic chickens because they taste better and local chickens [7].

The study on Malaysian consumer preferences for eggs involved 202 respondents and was analyzed using the conjoint analysis method. Egg size is the most important attribute, followed by packaging size, shell color, and egg function [2]. Research on chicken egg preferences was also carried out by [14] in India and showed that the egg attributes that were most important to consumers were egg price, feed given to chickens, and egg size. Research about consumer preference of 448 people in the Accra metropolitan area [17] showed that factors that influence consumers in buying eggs in order are size, price, the appearance of cleanliness, and egg color. Egg size and price are always the main determinants of consumers in buying eggs. Egg cleanliness is a consumer concern because it is related to health.

Consumers in Turkey view organic eggs as healthier, more nutritious, and tastier than conventional eggs. Eggs from local brands are preferred due to several factors, including environmental sustainability, health, safety, taste, and support for the local economy [20]. Egg color has no relevance to the purchase decision. An experiment [24] showed that price and farming system had the most significant mean relative importance in shaping consumers' preferences towards the egg, while other attributes such as nutrition and health claims, egg size, package size, and hen breed were far less critical.

Several factors influence consumer preferences. Socio-cultural factors such as income and education level affect the preferences of egg consumers. A research found that high-income Danish consumers have a preference for native and organic eggs [16]. Biological and physiological factors such as gender and age were found to influence consumer preference for eggs. British women tend to buy more native chicken eggs from farmed chickens without cage than men [10].

Research comparing consumer preferences for chicken and native eggs is still limited. Therefore, this study aims to determine consumer attitude towards the attributes of layer chicken eggs and native chicken eggs, to determine combination of attributes that form consumer preferences for layer chicken eggs and native chicken, and to determine the factors that influence consumer preferences for layer chicken eggs and native chicken eggs. Research on chicken egg preferences is still rarely carried out in Indonesia, so it needs to be examined considering that chicken eggs are an animal food whose consumption level increases from year to year. Producers can use the results of the research to provide products needed by consumers.

2. RESEARCH METHOD

The primary method used in this research is the descriptive analysis method. This method is used to process, present, and describe the data that has been collected to provide information related to research [25]. The study was conducted in the Special Region of Yogyakarta in March 2021. Sampling was carried out using nonprobability sampling techniques, especially convenience sampling. According to [11] convenience sampling is sampling from a population by chance where the sample is believed to fit the main criteria for being respondents. Respondent data collection was carried out online using google form due to the Covid-19 pandemic, so it was impossible to conduct direct interviews. The number of respondents was 100 people who consumed eggs and native chicken eggs.

Consumer attitudes were analyzed using Fishbein's Multi-attribute analysis. Fishbein's Multi-attribute. Model illustrates that consumer behaviour towards a product or brand is determined by two things, namely: (1) Belief in the attributes of a product (b_i value) and (2) level evaluation importance (e_i value) of a product attribute. The Fishbein Multi-attribute Model is formulated as Equation (1) [26]:

$$Ao = \sum_{i=1}^{n} b_i \; x \; e_i \qquad (1)$$

where *Ao* is the attitude to an object, b_i is the strength of belief that the object has an *i* attribute, e_i is the evaluation on *i* attribute, and *n* is the number of attributes owned by the object..

The first step in the Fishbein multi-attribute analysis is to determine the attributes. The attributes in this study are size, shell color, egg yolk color, shell cleanliness, packaging, and price. Then determine the value of the belief (b_i) and importance evaluation (e_i). The values of e_i and b_i are measured on a Likert scale of 1 to 5, with one as the lowest value and five as the

highest value. Furthermore, the value of the strength of belief and importance evaluation is multiplied to determine consumer attitudes (*Ao*) which are then interpreted as consumer attitudes towards layer chicken eggs and native chicken eggs [26].

A more concrete approach to chicken egg preferences can be found by finding a combination of important attributes. This combination of important attributes was analyzed using conjoint analysis with four of the six attributes used in the previous analysis. These four attributes were selected based on the highest score on consumer attitudes. Conjoint analysis is a multivariate technique explicitly developed to understand respondents' preferences for any object type (product, service, or idea). The final result of the conjoint analysis is the total consumer utility for a product determined by the utility contributed by each attribute level [13]. Conjoint Analysis implies the assumptions that the choice behaviour of consumers is governed by the maximization of utility [1]. Lancaster put forward the assumptions regarding the product attributes in 1996, which was later called the attribute approach. The attribute approach assumes that what consumers pay attention to is the physical product and the attributes contained in the product.

The first step in conjoint analysis is to determine the attributes. Attributes analyzed by conjoint analysis are attributes that have the highest value of consumer attitudes. Attributes used are color, size, cleanliness, price. The selected attributes are then defined in the form of a level which is the value of the attribute. The level is used to describe an object in terms of its level in the set of attributes that characterize it [13]. Attributes and levels for layer chicken eggs include shell color (dark brown, light brown), size (large, medium, small), price (Rp 20,000-22,000, Rp 23,000-25,000, Rp 26,000-28,000), shell cleanliness (clean, stains). Attributes and levels for native chicken eggs include shell color (white, beige), size (large, medium, small), price (Rp 2,600-3,000, Rp 3,100-3,500, Rp 3,600-4,000), shell cleanliness (clean, dirty).

The next step is designing a combination of attributes using the full profile method. In this case, a total of 36 hypothetically possible combinations or product profiles (3x2x2x3) can observed from the main attributes and their respective levels. A large number of attribute combinations makes it impossible for respondents to rank them one by one. So, the number of combinations will be reduced using the fractional factorial design with SPPS 22 analysis software [13]. The levels and characteristics of each attributes for layer chicken eggs are presented in Table 1 and for the native chicken eggs are presented in Table 2. The importance and utility value calculation are done by ranking the combination of attributes and analyzed using SPSS 22.

Factors affecting consumer preferences for chicken eggs were analyzed using binary logistic regression analysis. Logistic regression analysis is used to test the relationship between the independent variable and the dependent variable when the dependent variable is dichotomous. The dichotomous variable usually consists of only two value representing the occurrence or absence of an event, i.e., 0 or [13]. The logistic regression model for chicken eggs is written as Equation (2):

$$ln\left(\frac{p}{1-p}\right) = \beta_{0+}\beta_1 X_1 + \beta_2 X_2 + \beta_3 lnX_3 + \beta_4 D_4 + \beta_5 lnX_5 + \beta_6 D_6 + \beta_7 D_7 + \beta_8 D_8 + e \qquad (2)$$

where ln (p/(1-p)) is the consumer preference for chicken eggs (0: choosing native chicken eggs, 1: choosing layer chicken eggs), X1 is age (years), X2 is the number of family members, X3 is household income (Rp), D4 is gender (0: male, 1: female), X5 is education (years), D6 is the perception of egg nutrition (0: other, 1: native chicken eggs have more nutrients than layer eggs), D7 is the perception of shell color (0: other, 1: the older the shell, the more nutritious), D8 is the perception of yellow color (0: other, 1: the older the yolk, the more nutritious), ßo is a constant, ß1,… ßn are regression coefficients, and *e* is the residual (error).

Table 1. Combination of Layer Chicken Egg Attributes

Combination	Attributes			
	Shell color	**Size**	**Cleanliness**	**Price/kg**
1	Dark brown	Medium	Clean	20,000-22,000
2	Dark brown	Small	Clean	23,000-25,000
3	Light brown	Large	Clean	23,000-25,000
4	Light brown	Small	Dirty	20,000-22,000
5	Light brown	Medium	Clean	26,000-28,000
6	Dark brown	Small	Clean	26,000-28,000
7	Dark brown	Large	Clean	20,000-22,000
8	Dark brown	Large	Dirty	26,000-28,000
9	Dark brown	Medium	Dirty	23,000-25,000

Source: Primary Data Analysis (2021)

Table 2. Combination of Native Chicken Egg Attributes

Combination	Attributes			
	Shell color	**Size**	**Cleanliness**	**Price/item**
1	White	Medium	Clean	2,600-3,000
2	White	Small	Clean	3,100-3,500
3	Beige	Large	Clean	3,100-3,500
4	Beige	Small	Dirty	2,600-3,000
5	Beige	Medium	Clean	3,600-4,000
6	White	Small	Clean	3,600-4,000
7	White	Large	Clean	2,600-3,000
8	White	Large	Dirty	3,600-4,000
9	White	Medium	Dirty	3,100-3,500

Source: Primary Data Analysis (2021)

3. RESULTS AND DISCUSSION

3.1. Respondent Characteristics

Most of the respondents in this study were women (91%) between 23-59 years of age. Most respondents have Bachelor's degree (54.70%) and buy layer chicken eggs at shops/stalls (46.52%) and traditional markets (38.27%) because they are closer to their home. Meanwhile, native chicken eggs are more often purchased in traditional markets (37.93%) and modern markets (24.42%). One of the crucial factors that influence the purchase of chicken eggs is household income. The average household income of the respondents in this study was Rp 5,406,000 per month. Consumers more often buy one kilogram of layer chicken eggs, while for native chicken eggs as many as six eggs in each purchase.

3.2. Consumer Attitude on Layer Chicken Eggs and Native Chicken Eggs

Consumer attitudes were measured using the Fishbein multi-attribute attitude model, which was obtained from the multiplication of the value of consumer belief (bi) and the value of evaluating the importance (ei) of the attributes. From six attributes used in this analysis, the three most important attributes that consumers consider in terms of the highest attribute evaluation value are shell cleanliness (4.33), price (4.18), and size (3.80). The highest value of consumer belief in layer chicken eggs is owned by the attributes of shell cleanliness (4.02) and price (4.02), while the packaging attribute (3.49) is the attribute with the lowest belief value. For native chicken eggs, the attribute with the highest belief value was shell cleanliness with a score of 3.86, while the lowest value was owned by the price attribute with a value of 3.36. This score shows that consumer confidence in the cleanliness of native chicken eggs is high, but the price offered is more expensive than layer chicken eggs, so that the belief value for the price attribute is the lowest.

The value of consumer attitudes (Ao) is obtained by multiplying the value of the belief (bi) and importance evaluation (ei). The value of consumer attitudes (Ao) shows the consumer's assessment of the attributes attached to egg, which include size, shell color, egg yolk color, shell cleanliness, packaging, and price. Respondents' assessment layer chicken eggs and native chicken eggs was influenced by the respondent's experience in consuming these eggs.

The value of consumer attitudes towards layer chicken eggs was 88.76 higher than native chicken eggs, namely 84.69 (Table 3). It shows that consumers prefer to buy layer eggs than native chicken eggs. Respondent's belief in the attributes of layer chicken eggs was higher than native chicken eggs, especially in the attributes of shell cleanliness and price. Consumers prefer layer chicken eggs because they are cheaper, larger in size, and can be purchased anywhere. Consumer attitudes on layer chicken eggs and native chicken eggs are classified into the neutral category because consumer belief in all attributes of layer chicken eggs and native chicken eggs only belongs to the "trust" category. Likewise, with the evaluation of important which are dominated by important categories.

Table 3. Fishbein Multiattribute Analysis Result on Layer Chicken Eggs and Native Chicken Eggs

Attributes	ei	Layer Chicken Egg		Native Chicken Egg	
		bi	*Ao = ei x bi*	*bi*	*Ao = ei x bi*
Size	3.80	3.92	14.90	3.85	14.63
Cleanliness	4.33	4.02	17.41	3.86	16.71
Shell color	3.79	3.85	14.59	3.75	14.21
Price	4.18	4.02	16.80	3.36	14,04
Packaging	3.47	3.45	11.97	3.47	12.04
Egg Yolk Color	3.75	3.49	13.09	3.48	13.05
Total			88.76		84.69

Source: Primary Data Analysis (2021)

3.3. Consumer Preference

3.3.1. Consumer Preference on Layer Chicken Eggs

This study has constructed nine combinations of attributes for layer chicken eggs and native chicken eggs considered important for consumers. The selection of goods or services is carried out by ranking them from the most preferred by consumers to those most disliked [23]. A total of 100 respondents were asked to rank the combination of attributes according to their preferences (between 1-9).

Conjoint analysis has validity testing to see the correlation of variables measured with actual conditions in the field. Kendall's tau is a measures of the correlation between the observed and the predicted preferences of the rank-order variables under study [13]. Kendall's tau values for layer chicken egg preference was 0.889 with the significance of 0.00 is less than the level of significance of 0.05. The test statistics show very high overall correlations for the conjoint model. This result indicates that the attributes analyzed using 100 respondents described the population's desire to buy eggs in the Special Region of Yogyakarta.

The conjoint analysis will calculate the relative importance value for each attribute and measure the utility value for each level. In terms of the relative importance of attributes of layer chicken eggs, it was found that the cleanliness attribute (33.15%) was at the top of the four attributes included in the study, then followed by price (30.07%), size (23.90%) and color (12.88%) (Table 4). The range of the utility values (highest to lowest) for each factor provides a measure of how important the factor was to overall preference. Factors with greater utility ranges play a more significant role than those with smaller ranges

In addition, these results also provide information about which level of attributes the respondent prefers. In general, a higher utility value reflects a greater demand for the attribute. In terms of egg cleanliness, consumers prefer eggs with clean shells (utility=1.547) (Table 4). Consumers consider egg shells containing chicken manure to carry certain diseases. According to [10], feces that stain eggshells may contain pathogenic organisms that can contaminate the eggs and make them unhealthy. The waste will pose a risk to public health. This disease is called salmonellosis, which is caused by the bacteria Salmonella spp.

For the price, consumers prefer layer chicken eggs for Rp 20,000-22,000/kg (utility=1.547). According to them, the price of layer chicken eggs is in accordance with the benefits obtained from consuming native chicken eggs. Consumers preferred large egg sizes (utility=1.067), while consumers did not favor the medium and small sizes. The color of the dark brown shell was preferred by consumers (utility=0.265) (Table 4). Consumers choose a dark brown shell color because it feels more nutritious and tastes better than a light shell color egg. However, the color of the shell does not affect the contents of the egg. The actual shell color depends on the chicken's genes. Eggshell has a significant effect on eggshell strength [3]. Not only consumers in Yogyakarta, but consumers of chicken eggs in Malaysia [2] and India [14] also prefer dark brown egg shells. In contrast to chicken egg consumers in Turkey who prefer eggs with light coloured shells because they are considered cleaner [4].

Table 4. Importance Value of Each Attribute and Utility Value of Each Attribute Level of Layer Chicken Eggs

Attributes	Importance Value (%)	Attribute Level	Utility
Size	23.90	Large	1.067
		Medium	-0.247
		Small	-0.820
Cleanliness	33.15	Clean	1.547
		Dirty	-1.547
Shell color	12.88	Dark Brown	0.265
		Light brown	-0.265
Price/kg	30.07	Rp 20,000-22,000	1.547
		Rp 23,000-25,000	0.330
		Rp 26,000-28,000	-1.493
Pearson's R	0.998	Significance	0.000
Kendall's tau	0.889	Significance	0.000
Konstanta	4.389		

Source: Primary Data Analysis (2021)

3.3.2. Consumer Preference on Native Chicken Eggs

The correlation value of Kendall's tau for native chicken egg preference was 0.889 and the score of significance 0.000. The significant result of this test is an attestation of the model's high reliability. It shows that the attributes analyzed using 100 respondents described the population's desire to buy native chicken eggs in the Special Region of Yogyakarta. Table 5 presents the importance value of each attribute. importance value shows which attributes/factors are most important to respondents. The size occupies third place, indicating that cleanliness and price are much more important in determining consumer choice behaviour.

The utility value for each level is also obtained from conjoint analysis. A higher utility value means that the level is preferred by consumers. Eggs with clean shells (utility=1.448) are preferable to dirty shells. The preferred price for native chicken eggs is Rp 2,600-3,000/item (utility=1.263). Large egg size is preferred by consumers (utility=0.420). Consumers like eggs with large sizes because consumers want to maximize utility. In accordance with the research [18], consumers feel satisfied if they consume large eggs. The color of the white shell is preferred by consumers (utility=0.270) because it is considered cleaner.

Table 5. Importance Value of Each Attribute and Utility Value of Each Attribute Level of Native Chicken Eggs

Attributes	Importance Value (%)	Attribute Level	Utility
Size	16.051	Large	0.420
		Medium	-0.313
		Small	-0.107
Cleanliness	37.406	Clean	1.448
		Dirty	-1.448
Shell color	12.713	White	0.270
		Beige	-0.270
Price/item	33.830	Rp 2,600-3,000	1.263
		Rp 3,100-3,500	-0.040
		Rp 3,600-4,000	-1.223
Pearson's R	0.986	Significance	0.000
Kendall's tau	0.889	Significance	0.000
Konstanta	4.431		

Source: Primary Data Analysis (2021)

3.4. Factors that Influence Consumer Preferences for Chicken Eggs

Binary logistic regression analysis was used to determine what factors influence consumer preference for chicken eggs. Binary logistic regression analysis does not require classical assumptions such as normality test and heteroscedasticity test because the dependent variable is a dichotomous variable (0 and 1) which does not require linear assumptions between the independent variable and the dependent variable so that the residual does not require the test. However, in

binary logistic regression analysis, the multicollinearity test is still carried out [13]. Based on the correlation coefficient matrix, the correlation value of all independent variables is less than 0.8, so there is no multicollinearity problem.

The coefficient of determination can be seen from the Nagelkerke R-Square value of 0.491. It means that 49.1% of the variation in the dummy variable consumer preferences for chicken eggs can be explained by variables of age, the number of family members, income, gender dummy, education, native chicken egg dummy, shell color dummy, and egg yolk color dummy. In comparison, the remaining 50.9% of the variation in the dummy variable consumer preferences for chicken eggs is explained by other variables not included in the model.

The model suitability test or goodness of fit can be seen from the Hosmer-Lemeshow significance value. The Hosmer-Lemeshow significance value obtained is 0.164. This value is more significant than α (0.05), which means no significant difference between the model and its observation value. These results indicate that the model used is correct for predicting the value of observations.

Simultaneous test or maximum likelihood is seen from the Chi-square significance value. The Chi-square significance value is 0,000. This value is smaller than α (0.05), which means the independent variable consisting of age, number of family members, education, income, gender dummy, native chicken egg dummy, shell color dummy, and egg yolk dummy collectively has a significant effect on the dependent variable, namely consumer preferences for chicken eggs.

The Wald significance value of the age variable is 0.023, which is smaller than α (0.05) so that the age variable has a significant effect on consumer preferences for chicken eggs. The regression coefficient for the age variable is negative with an Odds Ratio of 0.938. It means that every one-year increase in age will reduce the opportunity to consume eggs by 0.938 times. It shows that older consumers will not prefer to consume eggs but prefer to consume native chicken eggs. As a person gets older, the physiology of their body will change. The protein and vitamin E content in native chicken eggs is higher than eggs in layer chicken eggs [5]. Both of these are antioxidants that play an essential role in keeping the body healthy and preventing disease.

The Wald significance value of the education variable is 0.029, which is smaller than α (0.05) so that the education variable has a significant effect on consumer preferences for chicken eggs. The regression coefficient for the education variable is negative with an Odds Ratio of 0.655. It means that every year

increase in education will reduce the opportunity to consume eggs by 0.655 times. It shows that consumers with an increasing level of education will prefer to buy native chicken eggs than layer chicken eggs. A person's education level will affect the acceptance of outside information. A person with a higher level of education is considered to have the ability to receive better information to pay more attention to the nutritional content, benefits, and deficiencies of the types of food to be consumed. According to [15] respondents who have a higher level of education have broad knowledge and insight and have a better understanding of receiving information.

The dummy variable for the perception of local chicken eggs shows whether consumers buy chicken eggs because the perception of local chicken eggs is more nutritious than layer chicken eggs. The significance value of the dummy variable perceptions of local chicken eggs is 0.011, smaller than α (0.05), meaning that the dummy variable perceptions of native chicken eggs significantly affect consumer preferences for chicken eggs. The regression coefficient for the perception of the native chicken eggs dummy variable is negative with an Odds ratio value of 0.058. This value shows that consumers who buy chicken eggs because of the perception of healthier native chicken eggs have a 0.058-fold greater opportunity to buy native chicken eggs compared to consumers who buy layer chicken eggs.

Testing the protein content in eggs and eggs of native chickens using visible light spectrophotometric methods showed that the egg white and yolk of native chickens had higher protein than eggs. The protein content in local chicken egg yolk had the highest protein content of 1,229.5 mg/mL, and the white protein content of native chicken eggs was 945.07 mg/mL, while the egg yolk of native chicken was 930.9 mg/mL, and the white chicken egg had 930.9 mg/mL. the lowest level was 863.3 mg/mL [19]. Testing the protein content of layer and native chicken eggs using the Kjeldahl method also shows that native chicken eggs have higher protein than eggs [5].

The dummy variable of shell color perception indicates whether the consumer buys chicken eggs because of the color of the chicken eggshells. The Wald significance value of the perceptions of shell color dummy variable is 0.004 smaller than α (0.01) it means that the dummy variable perception of shell color has a significant effect on consumer preferences for chicken eggs. The regression coefficient for the perception of shell color is positive with an Odds Ratio value of 5.798. This value shows that consumers who buy chicken eggs because of the perception of the color of the shell on chicken eggs have the opportunity to buy eggs 5.798 times greater than consumers who buy native chicken eggs.

The color of the shell does not affect the nutritional content of the egg. Shell color has a significant effect on shell strength, shell weight, and shell thickness. The color of the shell is getting older due to the length of time the shell was formed. This long time makes the pigment and calcium deposits more and more. It makes the shell thicker and stronger [8]. Shell color was also found to correlate with shell thickness significantly [6].

Table 6. Results of Binary Logistic Regression Analysis Factors Affecting Consumer Preference for Chicken Eggs

Independent Variable	Coef.reg	Wald	Significance	Odds
Age	-0.064**	5.179	0.023	0.938
Number of family members	0.325	2.065	0.151	1.383
Ln(Household income)	0.225	0.106	0.745	1.252
Gender	1.117	1.170	0.279	3.056
Education	-0.423**	4.772	0.029	0.655
Perception of egg nutrition	-2.848**	6.450	0.011	0.058
Perception of shell color	1.757***	8.266	0.004	5.798
Perception of egg yolk color	-0.996	2.662	0.103	0.369
Constant	6.293	0.409	0.522	540.522
Nagelkerke R-square			0.491	
Hosmer and Lemeshow			0.164	
Chi square			0.000	

Source: Primary Data Analysis (2021)

**) Significance at the level of trust 95% (0,05)

***) Significance at the level of trust 99% (0,01)

Research related to the preference towards Layer Chicken Eggs and Native Chicken Eggs as well as the factors that influence the preference has never been conducted in Yogyakarta. These results may provide important information about product attributes to agribusiness management as a way to identify new market segments. Besides that, this research can be a reference for breeders to provide eggs according to consumer desires.

4. CONCLUSION

Consumers' attitude towards the attributes of chicken eggs is that they prefer layer chicken eggs to native chicken eggs. The most desired combination of consumer attributes for layer chicken eggs, namely having a large size, clean shell, dark brown shell color, and a price of Rp 20,000-22,000 per kg, while the combination of consumer attributes for native chicken eggs that consumers want has a large size, clean shell, white shell color, and a price of Rp 2,600-3,000 per egg. The factors that increase consumer preference for native chicken eggs are age, education, and the perception of native chicken eggs is more valuable, while the factor that increases the chances of consumer preference for layer chicken eggs is shell color perception.

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