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SOCIAL DEMOGRAPHIC FACTORS INFLUENCING CONSUMER'S PREFERENCES ON RICE ATTRIBUTES IN INDONESIA: A MULTINOMIAL LOGISTIC APPROACH

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ABSTRACT

This study assessed factors influencing consumer's preferences on rice attributes in Indonesia using data collected from a sample of 329 consumers in South Sumatra Province in Indonesia. This study used two variables such as independent variables and dependent variables. Independent variables as a predictor of attributes of consumer preferences include social-demographic variables. On another side, dependent variables include attributes of rice-based on the preferences of the consumer. Social demographic factors such as gender, age, number of families, occupation, education, and income are mentioned to influence consumer's preference for rice. Rice attributes such as small broken, chalky grains, higher broken, varieties, family reference, friend reference, suppliers, advertisement, foreign object, residue, packaging, brand, volume expansion, head rice, flavor, aroma soft texture, durability, and whiteness. This study employed the multinomial logistic regression analysis to examine the effects of these variables on rice preference. This study revealed that among household characteristics that influence consumers' preference for rice attributes were household income and the type of occupation of the household head.

Keywords: social-demographic; preferences; consumer; rice attributes; multinomial logistic regression

INTRODUCTION

Rice is the most important commodity in Indonesia, especially for the poorest members of society **(Timmer, 2004; Widarjono, 2018)**. Rice is not only considered by consumers as a commodity but also as a product with certain criteria. Consumers' rice preferences differed greatly among nationalities. Rice trader's and the farmer have to understand these different preferences to offer the right products to their customers **(Suwannaporn and Linnemann, 2008)**. Product attributes are product elements that are considered important by consumers and are used as the basis for purchasing decisions **(Banović et al., 2010; Garvin, 1984)**. Product attributes are characteristics of a product that functions as evaluative attributes during decision making. Products have several characteristics that serve as indicators that represent quality for consumers **(Lancaster, 1966; Powel, Han and Chaloupka, 2010; Stávková, Stejskal and Toufarová, 2008; Zeithaml, 1988)**.

Along with the increase in income, there will gradually be a shift in spending patterns, in which expenditure on food will decrease and there will be an increase in the portion of expenditure for non-food items **(Engel, Blackwell, and Miniard, 1995; Grunert, 2005; Kotler and Amstrong, 2008)**. Consumer preference for the rice that will be purchased is also affected by several factors, namely marketing activities that are characterized by product variations in terms of packaging, brand and size, promotion, product quality, and customer testimonials **(Suwannaporn, Linnemann and Chaveesuk, 2008)**. The quality of rice is getting better with the existence of modern rice milling units, but the amount of rice consumption per capita has decreased, especially in high-income groups. The rice milling industry in Indonesia has been dominated by small-scale rice mills for a long time. This type of mill is incapable of producing good quality rice at low costs. The number of small-scale rice mills (SSRM) has continued to grow. This type of rice mills is currently presumed to face serious difficulty in obtaining grains, resulting in quite high idle capacity **(Sawit, 2019)**. High-income consumers who like premium rice from local varieties can push up the price of this type of rice, which is only available in small quantities in the market **(Damardjati et al., 1988; Unnevehr, Duff and Juliano, 1992)**.

The consumption of rice in South Sumatra from January to December 2018 was estimated to be around 824,290 tons, lower than the total rice production in the same year **(Central Bureau of Statistics, 2019)**. The rice surplus in South Sumatra in 2018 was estimated at around 687,690 tons. The per capita consumption was estimated using the average per capita consumption figure per province **(Central Bureau of Statistics, 2019)**. The

average rice consumption of the people in South Sumatra was 124 kg per capita per year while the average national consumption was 111.58 kg per capita per year. For the city of Palembang, with a population of 1.7 million people, the consumption of rice was estimated to achieve 210,000 tons. Palembang City contributes to rice production in South Sumatra Province in 2018 was only 24,470 tons **(Central Bureau of Statistics, 2017)**. The expenditure pattern of the Palembang City population during the last 4 years for non-food expenditure is greater than expenditure on food. This shows that the welfare of the population of Palembang City has increased so that the preference shift from prioritizing quantity to quality. In this case, the attributes of rice become important determinants of consumer preferences **(Central Bureau of Statistics, 2019)**.

South Sumatra Province is known as the center and is one of the biggest contributors to rice production in Indonesia. The estimated total rice production in South Sumatra in 2018 was 2.65 million tons which, if converted into rice was 1.5 million tons. The consumption of rice in South Sumatra from January to December 2018 was estimated at 824,290 tons **(BPS, 2019)**. Palembang has a diverse community structure where culture, lifestyle, education, and employment are reflected in everyday life. The diversity naturally affects the people in the city in consumption decision making of a product, including the consumption of rice. Sako, Kalidoni, and Ilir Timur III are districts that represent the most prevalent population of all districts in Palembang. The sub-district has a population with a background in social status that varies greatly from the lower, middle, and upper classes.

This article discusses the social demographic factors that influence consumer preferences for rice in Palembang based on the survey covering 3 districts in Palembang City.

Scientific hypothesis

It is assumed that the social demographic characteristics of consumers in Palembang City that affect consumer preferences include age, gender, number of family members, education level, occupation, and income level.

MATERIAL AND METHODOLOGY

Study Area, Population, and Sample Size

Palembang City as the capital city of South Sumatra Province is located between 2^0 5' and 3^0 5' South latitude and between 104^0 37' and 104^0 52' East longitude. The area of Palembang City is 40,061 hectares or about 2.65 percent of the total land area of South Sumatra Province. In 2000 there were 14 sub-districts and 103 sub-districts and in 2017 there were 4 additional sub-districts, bringing the total to 18 sub-districts and 107 sub-districts.

This study was undertaken in the city of Palembang, South Sumatra Province, Indonesia (Figure 1). The districts selected were Sako District, Ilir Timur II District, and Kalidoni District. Sako District represents low-income consumers, Ilir Timur II District represents upper-middle-income consumers and Kalidoni District represents high-income consumers. The number of samples in this study was 329 respondents. This city was selected for: (1) residence of households consuming rice with quality reference, (2) place of various types of rice retailers from traditional to modern sellers. Data collection was conducted in May – September 2019. The distribution of the sample is presented in Table1. Figure 2 was given to show the distribution of respondent household income.

Statistical Analysis

Multinomial logistic regression analysis

The multinomial logit regression (MNL) is commonly used in collision severity analysis, in which collisions can be categorized into more than two levels with one level as a reference category **(Guo et al., 2018)**. The multinomial or multivariate logit model, unlike the logit model, is rarely applied in analyzing consumer preferences for rice attributes. However, this model is more flexible since it can accommodate various choices faced by decision-makers. Not limited to just two options as in the logit model. Logistic regression does not assume a linear relationship between the independent and dependent variables but is non-linear so it does not require classical assumptions as in linear regression. The independent variables include gender, marital status, age of consumers, level of education, number of family members, occupation, income, and other rice attributes, while the dependent variable is the quality and physical attributes of rice, including crunchiness, taste, aroma, and grain.

The type of measurement used in this study is an ordinal measurement (stratified) with a Likert scale. The Likert scale is used to examine how strongly the subjects agree or disagree with statements on a 5-point scale, namely 1 = very dislike, 2 = dislike, 3 = neutral, 4 = like and 5 = very like **(Sugiyono, 2015)**.

The logit multinomial regression equation in this study is expressed in the form **(Hosmer and Lemeshow, 2000)**:

$$\text{Ln}\,(P / 1\text{-}P) = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + e \quad (1)$$

Where:
Ln = Natural logarithm
P = probability of consumer preference choosing an attribute
b_0 = Regression constant, or Intercept
b1,2,3 .... 6 = Age regression coefficient
X_1 = Age (years)
X_2 = gender (0 = female, 1 = male)
X_3 = Number of family members (people)
X_4 = Education level (0 = elementary-junior high school, 2 = high school, 3 = Bachelor degree)
X_5 = Occupation (0 = Housewife, 1 = private, 2 = PNS / BUMN)
X_6 = Income Level (Rupiah)

Rice Attribute:
Y_1 = Small broken, Chalky Grains, Higher Broken, Varieties
Y_2 = Family Reference, Friend Reference, Suppliers, Advertisement
Y_3 = Foreign object, Residue
Y_4 = Packaging, Brand
Y_5 = Volume Expansion, Head Rice, Flavor, Aroma
Y_6 = Soft texture, Durability
Y_7 = Whiteness
e = Confounding variance

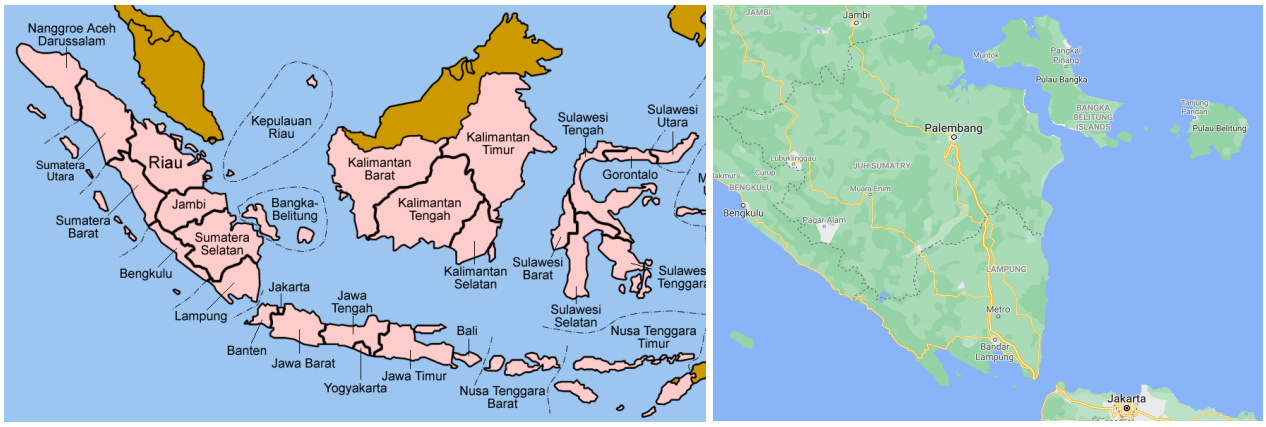

Figure 1 Location of the study in Palembang, South Sumatra, Indonesia.

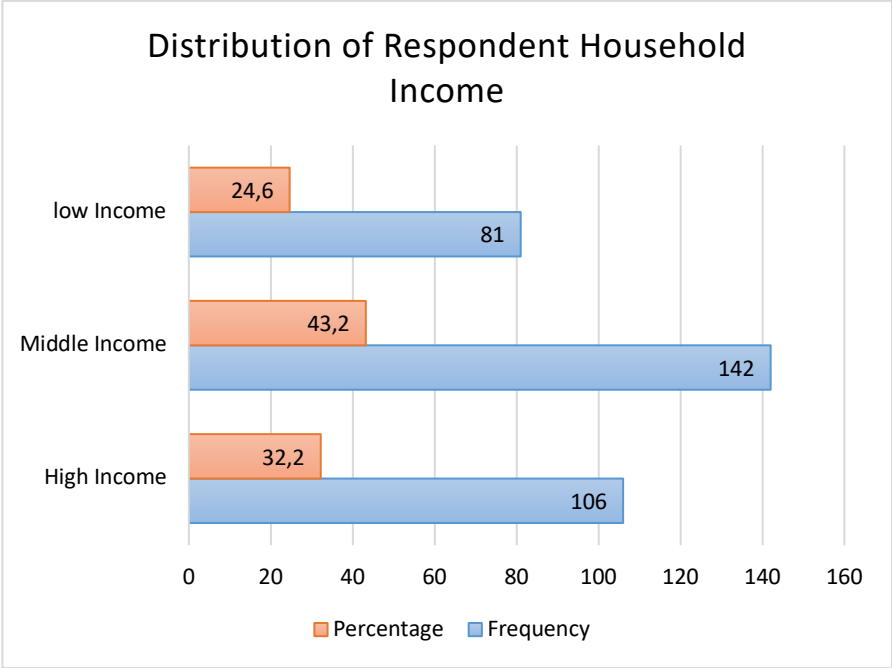

Figure 2 Distribution of Respondent Household Income.

Logistic regression statistical testing is used to check the goodness of a model. The logistic regression method is expressed in a probability model, namely a model where the dependent variable is the logarithm of the probability that an attribute will apply in the presence of certain independent variables.

Multinomial logistic regression analysis is a logistic regression that is used when the dependent variable has a multinomial scale with a nominal scale response variable. Logistic regression analysis includes independent test, simultaneous testing, partial testing, model suitability, model goodness, and classification accuracy. The *p*-values used in the analysis were p <0.01; 0.05 and 0.10.

Model Significance Test

This test is used to determine the effect of the independent variables on the dependent variable together (overall) in the logistic regression model. This test uses the Likelihood Ratio Test with the following hypothesis:

H_0: $\beta_1 = \beta_2 ..... = \beta_i = 0$ (there is no at least one independent variable that affects the dependent variable)
H_1: $\beta_i \neq 0$ (there is at least one independent variable that affects the dependent variable)
for i = 1,2,3, ... n

The test statistics used in this test are:

$$G^2 = -2 \ln \frac{lo}{li} \qquad (2)$$

Where:
l_0= Maximum likelihood value of the reduction model (Reduced Model) or a model that only consists of constants (without explanatory variables)
l_i = The maximum likelihood value of the full model (Full Model) or a model with all independent variables

The value of G^2 follows the Chi-squares distribution with degrees of freedom p, so the hypothesis is rejected if $G^2 > X^2$ (α, p) or *p*-value <α, which means that the independent variables (X) jointly affect the dependent variable (Y).

Model Parameter Test

This test is carried out after knowing that in the influential test result, there is at least one independent variable that affects the dependent variable. The purpose of this test is to determine the independent variables that significantly affect the dependent variable. This test is carried out through the Wald (W) test to test the meaning of the β coefficient partially with the following hypothesis:

H_0: $\beta_i = 0$ (the independent variable from i that has no significant effect on the dependent variable).

H_1: $\beta_i \neq 0$ (the independent variable from i that has a significant influence on the dependent variable).

for i = 1,2,3, ... n

The test statistics used are:

$$W_k = \frac{\beta_k}{SE(\beta_k)} \qquad (3)$$

Where:

W_k = Wald value

β_k = Coefficient vector associated with the estimator (coefficient X)

SE (β_k) = Error of β_k

H_0 will be rejected if $W > X^2$ (α, p) or *p*-value <α, which means the independent variable X_i partially affects the dependent variable Y.

Odds Ratio Test

This test is a measure of risk, or the tendency to experience certain events from one category to another, where the category Xi = 1 against Xi = 0. The value of the odds ratio coefficient is expressed in exp (β), which states the risk, or the tendency of the effect of observations with category Xi = 1 is the number of times compared to the observation with the category Xi = 0.

RESULTS AND DISCUSSION

Social Demographic Characteristics of the Respondents

The distribution of the demographic profile of respondents is shown in Table 2. Social demographic characteristics of the respondents such as age, gender, education, income, and occupation were hypothesized to positively or negatively influence consumer preferences. The total sample comprises 217 males and 112 females. The age of respondents was grouped into 3 categories; 35 years or below comprises 45.3%, 36 to 49 years old 32.2%, and 50 years or more 22.5%. Respondent's educational background was grouped into 3, elementary to junior high school 7.6%, senior high school 18.9%, and university 73.5%. Respondent's household income was grouped into 3, high income 32.2%, middle income 43.2%, and low income 24.6% (Figure 2).

Factors Affecting Consumer Preferences on Rice Attributes

Multinomial logistic regression analysis is a logistic regression that is used when the dependent variable has a multinomial scale. Logistic regression analysis includes independent test, simultaneous testing, partial testing, model suitability, model goodness, and classification accuracy (Table3).

Relationship between predictor variables (Xs) and consumer preferences (Y)

Based on the test statistics, Table 4 shows that the variables age and education has value χ^2 *count* that is smaller than χ^2 *table* and a *p*-value greater than 0.1, which means failure to reject H_0, so it can be concluded that with a confidence level of 90% there is no relationship between consumer preferences in Palembang City with age dan education level of consumers. So that in this simultaneous test only the variables of gender, family members, occupation, and income level will be further analyzed.

Modeling of consumer preferences

The response variable in this study is consumer preferences based on the attributes which consist of seven groups, namely group 0 (small broken, chalky grains, broken grains, varieties), group 1 (family reference, friend reference, supplier, advertisement), group 2 (foreign object, residue), group 3 (packaging, brand), group 4 (volume expansion, head rice, flavor, aroma), group 5 (soft texture, durability) and group 6 (whiteness). Simultaneous testing is used to find out a predictor variable that has a significant effect on consumer preferences.

Table 5 shows that the G value of 802.378 is greater than the value 2 tables which are 79.386 and a *p*-value (0.10) of 0.000 which is smaller than 0.1, which means reject H_0, so it can be concluded that with a confidence level of 90% there is at least one predictor variable (social demographic factors) that has a significant effect on consumer preferences on rice attributes. Simultaneous testing of the consumer preference attribute group in the city of Palembang resulted in a decision to reject H_0 so that it could be continued on a partial test.

Assessment of the feasibility of the regression model

Model feasibility testing is carried out to determine whether there is a difference in observation results and predictions. The model is said to be able to predict the value of the observation because it matches the observation data if the value is sig. Chi-square >0.10. The value of goodness of fit test in Table 6 is measured by the Chi-square value in the coefficient of deviation. In the table, it can be seen that the value of the statistical significance of Chi-square is 0.216 which is above 0.10.

Table 6 shows that the Pearsons value obtained was 1,274.793 smaller than the value $\chi 2$ table 1,300.131 and the *p*-value of 0.216 are greater than 0.10 (*p*-value >α; (0.216 >0.10), so it can be concluded that with a confidence level of 90% the resulting regression model is fit for further analysis, namely Pseudo R^2 and Classification Test.

Table 1 The distribution of the sample.

Districts	Population (People)	Sub Sample Size (People)
Sako	95,104	113
Ilir Timur II	167,491	116
Kalidoni	122,672	100
Total	385,267	329

Note: Source*:* Field survey results (2019); **Central Bureau of Statistics (2019)**.

Table 2 Socio-demographic profile of respondents.

Characteristics	Attributes	Number (N = 329)	%
Age	≤35 years	149	45.3
	36 – 49	106	32.2
	50 up	74	22.5
Gender	Male	217	66.0
	Female	112	34.0
Occupation	Government officers	168	51.1
	Private sector workers	118	35.9
	Housewives	43	13.1
Educational background	Elementary – Junior High	25	7.6
	Senior High School	62	18.9
	Bachelor	242	73.5
Monthly income	Below Rp 2.999.999	122	37.1
	Rp 3.000.000 – 9.999.999	176	53.5
	Rp 10.000.000 or higher	31	9.4
Number of family members	3	130	39.5
	4 – 5	151	45.9
	>5	48	14.6

Note: Source: Field survey results (2019).

Table 3 The variable sused in the study.

Variable	Type	Category
Consumer Preference (Y)	Multinomial	1 = Small broken, Chalky Grains, Higher Broken, Varieties (Reference category) 2 = Family Reference, Friend Reference, Suppliers, Advertisement 3 = Foreign object, Residue 4 = Packaging, Brand 5 = Volume expansion, Head Rice, Flavor, Aroma 6 = Soft texture, Durability 7 = Whiteness
Age (X_1)	Ratio	Year
Gender (X_2)	Nominal	0 = Female 1 = Male (Reference category)
Family members (X_3)	Ratio	Person
Education level (X_4)	Ordinal	0 = Elementary – secondary school 1 = High school 2 = University (Reference category)
Occupation (X_5)	Nominal	0 = Housewife 1 = Private 2 = Government Official (Reference category)
Income (X_6)	Ratio	Rupiah

Note: Source: Results of data analysis.

Table 4 Independence test results.

Variable	Df	χ^2 count	χ^2 table	*p*-value	Decision
Age	12	21,680	21,026	0.179	Failed to reject H0
Gender	6	30,375	12,591	0.000	Reject H0
Family members	12	9,737	21,026	0.022	Reject H0
Education	12	10,888	21,026	0.539	Failed to reject H0
Occupation	18	33,475	28,869	0.005	Reject H0
Income	12	33,865	21,026	0.002	Reject H0

Note: Source: Results of data analysis.

Table 5 Concurrent test results.

	Likelihood Ratio Test			
Model	G.	Df	χ^2 table	*p*-value
Final	802,378	30	79,386	0.000

Note: Source: Results of data analysis.

Table 6 Model suitability test results.

	Likelihood Ratio Test			
	Chi-Square	Df	χ^2 table	*p*-value
Pearsons	1,274.793	1,236	1,300.131	0.126
Deviance	691.133	1,236	1,300.131	1.000

Note: Source: Results of data analysis.

Table 7 Pseudo R-square Value.

Type	Score
Cox and Snell	.214
Na gelkerke	.224
McFadden	.076

Note: Source: Results of data analysis.

Table 8 Accuracy of model classification.

Observed	Predicted							Percent correct (%)
	F I	F II	F III	F IV	F V	F VI	F VII	
F I	0	0	3	0	0	5	0	0.0
F II	0	0	3	0	0	29	0	0.0
F III	0	0	25	0	0	38	0	39.7
F IV	0	0	9	0	0	16	0	0.0
F V	0	0	1	1	0	36	0	0.0
F VI	0	0	9	0	0	137	0	93.8
F VII	0	0	2	0	0	16	0	0.0
Overall Percentage (%)	0	0	15.8	0	0	84.2	0	49.2

Note: F (factor). Source: Results of data analysis.

Pseudo R^2 values were measured using the Nagelkerke R Square **(Agresti, 2011)**. Nagelkerke R Square is a modification of the Cox and Snell's coefficients to ensure that the value varies from 0 to 1. This is done by dividing Cox and Snell's R^2 values by their maximum values. The Nagelkerke R^2 value can be interpreted as the R^2 value for multiple regression. The results of the Nagelkerke value can be seen in Table 7.

The Nagelkerke R Square value of 0.224 indicates that the variability of the dependent variable which can be explained by the variability of the independent variable is 22.4%, while the remaining 77.6% is explained by other variables not used in this study.

Model feasibility can also be predicted using a classification matrix that calculates the correct and incorrect estimation values on the dependent variable. The

classification matrix shows the predictive power of the regression model. The classification accuracy obtained by the model can be seen in Table 8.

Table 8 shows the classification accuracy of the model, which is 49.2%, which means the model's ability to predict accurately according to observations (real conditions) is 49.2%, while the resulting classification error is 50.8%.

Partial Analysis of the Effect of Predictor Variables on Consumer Preferences

To determine the significance of the influence of the predictor variables on individual consumer preferences, a parameter test was carried out individually using the Wald Test. The test results using the attribute group of small broken, chalky grains, higher broken and varieties as a comparison category for parameter estimates between the attribute groups of rice with age, sex, type of work, and income level can be seen in Table 9.

Table 9 shows that the variables that have a significant effect on consumer preferences are consumer age, gender, occupation and income level, which can be expressed in the six multinomial logistic regression functions as follows:

g1 (X) = 2.545 + 0.778x2 (0) - 0.138x3 - 1.786x5 (0) - 0.006x5 (1) - 0.190x6
g2 (X) = 3.142 - 0.543x2 (0) - 0.094x3 - 2.826x5 (0) - 0.043x5 (1) - 0.021x6
g3 (X) = 2.128 + 0.029x2 (0) - 0.063x3 - 2.361x5 (0) - 0.183x5 (1) - 0.068x6
g4 (X) = 2.487 + 0.437x2 (0) - 0.229x3 + 0.437x5 (0) + 0.919x5 (1) - 0.096x6
g5 (X) = 3.203 + 0.795x2 (0) - 0.067x3 - 0.613x5 (0) + 0.568x5 (1) - 0.128x6
g6 (X) = 0.364 + 0.389x2 (0) + 0.248x3 - 2.464x5 (0) + 0.096x5 (1) - 0.127x6

The first logit covers attributes of family references, friend references, suppliers, and advertisements. Explanatory variables that have a significant effect on the decision choosing this attribute is the level of income with a *p*-value of 0.007, while gender, number of family members, and type of work do not have a significant effect with a *p*-value >0.10 at the significance level of $\alpha = 10\%$. In the logit equation 1, the coefficient of the income variable is -0.190 with an odds ratio of 0.827 and the Wald test is significant at the 10% level. This shows if the variables of gender, family member, type of work are constant, then every IDR 1 million increase in terms of income level, the opportunity to choose attributes of family references, friends references, suppliers, and advertisements compared to choosing attributes of whole grains, broken items, groats, and shapes is 0.827. This means that the higher the income of consumers, the more likely it is to prefer the attributes of small broken, chalky grains, higher broken, varieties compared to attributes of family references, friend references, suppliers, and advertisements.

The analysis result that household characteristics that influence consumers' preference for rice attributes were household income and the type of occupation of the household head. This finding is in line with studies **(Wahyudi et al., 2019)** which found that consumers' incomes lead to increased demand for quality.

Preferences for rice attributes are found influenced by gender, education levels, household size and income, rice consumption, expenditure share, and purchase frequency **(Anang, Adjei Adjetey and Abiriwe, 2011)**. Increased Consumers' personal food choices are changing due to a greater variety of food products higher incomes, and better choices of food retailers **(Brečić, Mesić and Cerjak, 2017)**.

Consumers with high household income choosing attributes of whole grains, broken items, groats, and shapes. The physical appearance of the rice is an attraction for consumers to buy. Another support of preference consumers is presented by **(Tomlins et al., 2007)**. Visual characteristics of rice grains are important to search attributes that affect consumers' purchasing decisions and hence are used as some of the first selection criteria in varietal improvement programs. The appearance of a product can influence consumer choice in different ways. A product's appearance can have aesthetic and symbolic value for consumers, communicate functional characteristics and give a quality impression (functional value), and communicate the ease of use (ergonomic value) **(Creusen and Schoormans, 2005)**.

High-income consumers have the largest variability in rice grain quality attributes and concurrently appear to have the most pronounced preferences among consumers **(Cuevas et al., 2016)**. Quality attributes of rice are different in the other countries. Guatemala consumers were willing to pay premiums for those desirable qualities.

Specific attributes such are taste, cooking quality, cooking time, and aroma were the quality characteristics that most consumers preferred **(Anang, Adjei Adjetey and Abiriwe, 2011)**. In New Zealand, the top three attributes supported for community, freshness, and seasonality **(Hiroki, Garnevska and McLaren, 2016)**. In Sri Lanka, attributes of rice like rice production, processing, marketing, and value addition **(Walisinghe and Gunaratne, 2012)**.

Food acceptability, choice, and consumption are complex processes influenced by many factors as intrinsic, e.g. color, aroma, flavor, and texture, as well as extrinsic to the product. The extrinsic factors have been included in several types of research aiming at having a better understanding of consumer behavior **(Iop, Teixeira and Deliza, 2006)**. Consumers' tastes are known as factors that affect product demand such as rice. Branded packaged rice produced by local agro-industries is expected to meet the rice multi-attribute **(Widayanti et al., 2020)**.

Family members and age are not significantly influencing consumers' preference for rice attributes in this analysis. A large number of families means a lot of rice is consumed so that the attribute factor is ignored. At this point, the price factor becomes the main determining factor considered by consumers. It's inline with finding studies **(Supriana and Pane, 2018)** that characteristics of rice consumers have a positive and significant effect on the amount of rice consumed are age and the number of family members. In other studies **(Wahyudi et al., 2019)** which analyzed socio-demographic factors that economic and demographic changes such as education, urbanization rates, and female labor force participation rates, along with current transportation and communications advances, influence consumer preferences

Table 9 The variables that have a significant effect on consumer preferences.

Logit Equation	Predictor Variable	B	Wald	*p*-value	Odds Ratio
Logit 1 (family reference, friend reference, supplier, advertisement)	Constant	2.545	3.648	0.056	
	Gender (0)	0.778	0.718	0.397	2.176
	Aug Family	-0.138	0.302	0.582	0.871
	Occupation (0)	-1.786	2.445	0.118	0.168
	Occupation (1)	-0.006	0.000	0.995	0.994
	Income	-0.190	7.240	0.007 ***	0.827
Logit 2 (foreign object, residue)	Constant	3.142	6.602	0.010	
	Gender (0)	-0.543	0.407	0.524	0.581
	Family Members	-0.094	0.163	0.686	0.910
	Occupation (0)	-2.826	4.142	0.042 **	0.059
	Occupation (1)	-0.043	0.002	0.963	0.968
	Income	-0.021	0.207	0.649	0.980
Logit 3 (packaging, brand)	Constant	2.128	2.536	0.111	
	Gender (0)	0.229	0.001	0.974	1.030
	Family Members	-0.063	0.060	0.806	0.939
	Occupation (0)	-2.361	2.800	0.094 *	0.094
	Occupation (1)	-0.183	0.034	0.854	0.853
	Income	-0.068	1.313	0.252	0.934
Logit 4 (volume expansion, head rice, flavor, aroma)	Constant	2.487	3.623	0.057	
	Gender (0)	0.437	0.240	0.625	1.549
	Family Members	-0.229	0.855	0.355	0.795
	Occupation (0)	0.437	0.240	0.625	1.549
	Occupation (1)	0.919	0.919	0.338	2.507
	Income	-0.096	2.467	0.116	0.909
Logit 5 (soft texture, durability)	Constant	3.203	7.157	0.007	
	Gender (0)	0.795	0.895	0.344	2.214
	Family Members	-0.067	0.091	0.763	0.935
	Occupation (0)	-0.613	0.394	0.530	0.542
	Occupation (1)	0.568	0.390	0.533	1.764
	Income	-0.128	5.955	0.015 **	0.880
		0.364	0.066	0.797	

Note: *** = Significant at p <0.01; ** = Significant at p <0.05; * = Significant at p <0.10.

CONCLUSION

Household characteristic factors that significantly influence the preference attributes of rice, family reference, friend reference, supplier, advertisement, soft texture, durability, volume expansion, head rice, taste and degree of whiteness are the level of consumer income. Meanwhile, the household characteristic factors that significantly influence the preference attributes of foreign matter rice, residue, packaging, brand, and degree of whiteness are the types of consumer occupation.

The reference group is an important factor in increasing the demand for rice. Thus, the rice should be marketed in organizational groups. The development of the rice market should be carried out in collaboration with employee cooperatives in public and private institutions. This group is a very potential target market, because it is relatively well educated, has a steady income, and has a high intensity of communication among members.

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