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Egg and Egg Product Purchasing Levels Among the Academic Community of Politeknik Negeri Jember

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ABSTRACT

Animal protein plays a crucial role in supporting human health and productivity. This study aimed to describe consumer characteristics, analyze the purchasing levels of eggs and processed egg products, and examine the relationship between consumer characteristics and the purchasing levels of eggs and processed egg products among the academic community of Politeknik Negeri Jember. The study employed a quantitative approach using a cross-sectional survey design. Data were collected in July 2023 through an online questionnaire using a convenience sampling technique. A total of 124 respondents were included in the study. Data were analyzed using descriptive statistics, multiple response analysis, Chi-Square tests, and Cramer's V with IBM SPSS Statistics 27. The results showed that respondents were predominantly aged ≤20 years (30.6%), male (53.2%), non-postgraduate graduates (51.6%), lecturers (46.8%), and had monthly incomes below IDR 2,800,000 (47.6%). Commercial chicken eggs were the most frequently consumed type of egg (95.2%), while salted eggs were the most frequently consumed processed egg product (89.1%). Egg purchasing levels were predominantly high (62.9%), whereas processed egg product purchasing levels were predominantly low (46.0%). No relationship was found between consumer characteristics and egg purchasing levels, while age was associated with processed egg product purchasing levels. The development of egg-based agribusiness should therefore focus on product diversification and age-based market segmentation.

Keyword: Academic Community, Consumer Behavior, Egg Products, Eggs, Purchasing Level

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1. Introduction

Improving the quality of human resources is one of the primary goals of national development and can be achieved through improvements in nutritional status. Animal protein plays a crucial role in growth, tissue maintenance, immune function, and various metabolic processes that support human health and productivity. Nevertheless, patterns of animal-source food consumption vary considerably among population groups and are influenced by socioeconomic conditions, demographic characteristics, and dietary preferences. Previous studies in Indonesia have shown that the consumption of animal-source protein differs according to age group, socioeconomic status, and other sociodemographic factors, highlighting the importance of understanding consumer behavior related to animal protein consumption in efforts to improve nutritional quality [1].

Among various animal-source protein foods, eggs are considered one of the most strategic commodities due to their affordability, availability, ease of preparation, and suitability for consumers across different age groups [2]. The strategic importance of eggs is further reinforced by their accessibility across

diverse socioeconomic groups. In the context of fulfilling animal protein requirements, eggs are frequently selected as an efficient protein source because of their combination of high nutritional value, relatively affordable price, and widespread availability. These characteristics contribute significantly to animal protein consumption patterns in Indonesia and position eggs as a key commodity for supporting sustainable nutritional improvement [3].

In addition to being consumed as fresh products, eggs can be processed into a variety of value-added products. Processing eggs into salted eggs, pindang eggs, and other food products can extend shelf life, diversify consumption options, and increase economic value. Diversification of egg-based products may also support the development of livestock-based agribusinesses by creating products that better match consumer preferences and market demands. Therefore, understanding the consumption patterns of processed egg products is essential for identifying future opportunities in egg-based agribusiness development [4].

Consumer decisions regarding food purchases and consumption are influenced not only by product characteristics but also by individual consumer characteristics. Factors such as age, gender, educational attainment, occupation, and income frequently affect food preferences and purchasing behavior. Differences in these characteristics may lead to variations in consumption frequency, product selection, and purchasing intensity of animal-source foods. Studies on animal protein consumption behavior in Indonesia have demonstrated that attitudes, subjective norms, prior consumption experiences, and consumer characteristics contribute to individuals' intentions to consume different animal protein sources, including eggs [5].

Beyond individual characteristics, egg purchasing decisions are also influenced by socioeconomic conditions and marketing environments that shape consumer preferences. Product price, ease of access, perceived quality, and previous consumption experiences may affect consumer decisions regarding the type and frequency of egg purchases. These factors suggest that egg purchasing behavior is the result of interactions between consumer characteristics and market conditions surrounding the decision-making process [6]. Research on protein food consumption in Indonesia has shown that the consumption of eggs, meat, fish, and dairy products differs across sociodemographic groups, indicating potential relationships between consumer characteristics and animal-source food consumption patterns [7].

The academic community represents an interesting consumer group for investigation because it consists of individuals with diverse backgrounds in terms of age, education, occupation, and income. Students, lecturers, and administrative staff differ in their nutritional requirements, daily activities, and consumption habits, which may influence their food purchasing behavior. Furthermore, members of academic institutions generally have relatively good access to information and education related to food and nutrition, making them a useful representation of consumers with comparatively high levels of food literacy.

Previous studies have examined animal-source food consumption and its determinants at household and community levels. However, research specifically investigating consumer characteristics and purchasing levels of eggs and processed egg products within higher education environments remains limited. Information regarding the relationship between consumer characteristics and purchasing levels of eggs and processed egg products among academic communities is also scarce. This knowledge gap highlights the need for research that provides insights into egg consumption behavior among consumers with diverse educational and socioeconomic backgrounds.

This study offers novelty by simultaneously analyzing consumer characteristics, fresh egg purchasing levels, processed egg product purchasing levels, and the relationships among these variables within an academic community setting. Such an approach is expected to provide a more comprehensive understanding of egg consumer behavior among individuals with relatively high educational attainment and access to information. The findings may serve as a basis for developing more effective marketing strategies and agribusiness development programs for egg commodities [8].

Based on the foregoing discussion, this study aimed to describe the characteristics of consumers of eggs and processed egg products among the academic community of Politeknik Negeri Jember, analyze the purchasing levels of eggs and processed egg products, and examine the relationships between consumer characteristics and purchasing levels of eggs and processed egg products. The findings are expected to provide valuable information for marketing strategy development, processed egg product diversification, and the advancement of egg-based agribusiness.

2. Materials and Methods

2.1. Study Location and Period

The study was conducted at Politeknik Negeri Jember, located in Jember Regency, East Java Province, Indonesia. Data collection was carried out during July 2023 through a survey involving members of the academic community, including students, lecturers, and administrative staff. This study formed part of a broader survey on the consumption of animal-source protein foods designed to obtain information regarding consumer characteristics and purchasing levels of eggs and processed egg products within a higher education environment.

2.2. Study Design

This study employed a quantitative approach using a cross-sectional survey design. A cross-sectional design was selected to collect data at a single point in time, enabling the description of population characteristics and the examination of relationships among observed variables during the study period. This approach is widely applied in social science, public health, and consumer behavior research because it allows researchers to efficiently capture population conditions within a specific observation period [9].

Respondents were selected using a convenience sampling technique, whereby participants were recruited based on accessibility to the target population through the distribution of an online questionnaire among members of the academic community of Politeknik Negeri Jember. Convenience sampling is classified as a non-probability sampling method and is commonly employed in survey research when a complete sampling frame is unavailable and respondents are recruited based on their availability and willingness to participate [10].

The use of online surveys has become increasingly common in consumer behavior research because it enables broader respondent coverage at a relatively low cost while facilitating data collection and management. Among populations with adequate digital literacy, such as university communities, online surveys are considered effective tools for collecting information related to respondent characteristics, consumption preferences, and purchasing behavior. Furthermore, the cross-sectional approach allows the identification of relationships among variables during a specific observation period, making it suitable for exploratory studies on food consumer behavior [11].

2.3. Respondents

The respondents consisted of members of the academic community of Politeknik Negeri Jember who voluntarily participated in the survey. Prior to completing the questionnaire, participants were informed about the objectives of the study, data confidentiality procedures, and the use of data for scientific purposes. Only respondents who provided consent for the use of their data in research were included in the analysis. Of all responses collected during the survey period, a total of 124 respondents agreed to the use of their data for research purposes. Consequently, all 124 responses were included in the final analysis. The respondents comprised students, lecturers, and administrative staff representing diverse socioeconomic backgrounds.

2.4. Instrument and Data Collection

Primary data were collected using a structured questionnaire developed through the Google Forms platform. An online questionnaire was selected because it facilitated instrument distribution, expanded respondent reach, and improved the efficiency of data collection. The questionnaire was distributed to members of the academic community of Politeknik Negeri Jember during July 2023.

The questionnaire included items related to respondent characteristics, types of eggs consumed, processed egg products consumed, purchasing locations for eggs and processed egg products, consumption timing of processed egg products, and purchasing levels of eggs and processed egg products. The collected data were reviewed for completeness prior to tabulation and statistical analysis.

The online questionnaire provided respondents with the flexibility to complete the survey at their convenience while reducing the need for physical documents during data collection. In addition, Google Forms facilitated data coding, minimized the risk of manual data-entry errors, and improved the efficiency of data tabulation. This approach has been widely applied in social and consumer behavior research because it can generate reliable quantitative data when questionnaires are systematically designed and respondents clearly understand the purpose of participation [12].

2.5. Study Variables

The variables observed in this study included respondent characteristics, egg consumption, processed egg product consumption, and purchasing behavior. Respondent characteristics consisted of age, gender, highest educational attainment, occupation, and monthly income level. Egg consumption variables included the types of eggs consumed and egg purchasing levels. Processed egg product consumption variables included the types of processed egg products consumed and the purchasing levels of processed egg products.

2.6. Data Analysis

Data were analyzed using IBM SPSS Statistics version 27. Descriptive statistics were employed to summarize respondent characteristics, types of eggs consumed, processed egg products consumed, purchasing locations, consumption timing, and purchasing levels of eggs and processed egg products. Multiple response analysis was used for variables allowing respondents to select more than one answer, including types of eggs consumed, processed egg products consumed, purchasing locations for eggs, purchasing locations for processed egg products, and the consumption timing of processed egg products. The results were presented as the number of responses, response percentages, and case percentages.

The relationships between respondent characteristics and purchasing levels of eggs and processed egg products were analyzed using Pearson's Chi-Square test. This test was employed to identify associations between categorical variables. The strength of association was assessed using Cramer's V coefficient, with higher values indicating stronger relationships between variables. The use of Chi-Square tests and Cramer's V is widely recommended for categorical data analysis in survey and consumer behavior research [13].

3. Results and Discussion

3.1. Respondent Characteristics

Respondent characteristics constitute an important aspect of consumer behavior studies because they provide insights into the sociodemographic backgrounds that may influence food consumption patterns and purchasing decisions. In this study, respondent characteristics included age, gender, educational attainment, occupation, and monthly income. The distribution of respondent characteristics is presented in Table 1.

As shown in Table 1, respondents were predominantly aged ≤20 years, accounting for 38 individuals (30.6%), followed by those aged 31-40 years (25.8%), 21-30 years (25.0%), and over 40 years (18.5%). The relatively diverse age distribution indicates that the survey successfully reached various segments of the academic community of Politeknik Negeri Jember, including students, lecturers, and administrative staff. Age diversity is an important consideration in consumer behavior research because food preferences and consumption patterns often change throughout life course. Different age groups may exhibit varying nutritional requirements, activity levels, and purchasing considerations when selecting food products, including eggs and processed egg products [14].

Based on gender, 66 respondents (53.2%) were male, and 58 respondents (46.8%) were female, indicating a relatively balanced gender distribution. Such proportional representation provides a more comprehensive overview of egg consumption behavior within the academic community. In food consumer behavior studies, gender is frequently associated with differences in dietary preferences, nutrition awareness, and purchasing decisions. However, the influence of gender on food consumption is often moderated by other factors such as education, income, and lifestyle [15].

Regarding educational attainment, 64 respondents (51.6%) belonged to the non-postgraduate category, while 60 respondents (48.4%) had completed postgraduate education. The relatively balanced proportion between these groups suggests that the respondents represented diverse educational backgrounds. Educational attainment is commonly associated with nutrition knowledge and awareness of healthy eating practices. Individuals with higher educational levels generally have better access to health and nutrition information, which may influence food consumption behavior, including the consumption of animal-source protein foods [16].

In terms of occupation, lecturers represented the largest group, accounting for 58 respondents (46.8%), followed by students with 51 respondents (41.1%) and administrative staff or other occupations with 15 respondents (12.1%). The predominance of lecturers and students indicates that the study adequately captured the two major groups within the higher education environment. Occupational status may influence consumption patterns through differences in daily activities, income levels, and nutritional requirements. Furthermore, occupational characteristics can affect preferences for convenient and readily available food products [17].

With respect to monthly income, nearly half of the respondents (47.6%) were classified as having low income (< IDR 2,800,000 per month), followed by those in the moderate-income category (37.1%) and high-income category (15.3%). These findings indicate that a substantial proportion of respondents belonged to the lower-income group. Income is widely recognized as an important determinant of food accessibility and purchasing power. Nevertheless, eggs are generally regarded as an affordable source of animal protein and can therefore be consumed by individuals across different income levels. Previous studies on protein consumption in Indonesia have shown that socioeconomic conditions influence the selection of protein sources; however, eggs remain one of the most accessible animal-source foods because of their relatively affordable price compared with many other animal protein products [18].

Table 1. Characteristics of Respondents (n = 124)

Characteristics	Category	n	%
Age	≤20 years	38	30.6
	21–30 years	31	25.0
	31–40 years	32	25.8
	>40 years	23	18.5
Gender	Male	66	53.2
	Female	58	46.8
Highest Educational Attainment	Non-postgraduate (Senior High School, Diploma, Bachelor's Degree)	64	51.6
	Postgraduate (Master's and Doctoral Degrees)	60	48.4
Occupation	Student	51	41.1
	Lecturer	58	46.8
	Administrative Staff/Others	15	12.1
Monthly Income	Low (< IDR 2,800,000)	59	47.6
	Moderate (IDR 2,800,000-5,600,000)	46	37.1
	High (> IDR 5,600,000)	19	15.3

Note: Percentages were calculated based on the total number of respondents (n = 124)

The diversity of respondent characteristics suggests that this study encompassed consumers from heterogeneous socioeconomic backgrounds. Such diversity is important because food purchasing behavior is influenced not only by physiological needs but also by economic capacity, access to information, prior consumption experiences, and individual preferences. For widely available and commonly consumed food commodities such as eggs, differences in consumer characteristics may have a greater influence on purchasing patterns, consumption frequency, and product preferences than on the decision to consume the product itself. Consequently, the variation in respondent characteristics provides an opportunity to evaluate the relationships between sociodemographic factors and purchasing levels of eggs and processed egg products more comprehensively [19].

Overall, the respondent profile demonstrates that this study involved members of the academic community with diverse sociodemographic backgrounds. Variations in age, gender, educational attainment, occupation, and income provide an adequate basis for examining consumption behavior and purchasing levels of eggs and processed egg products within a higher education setting. Such diversity also enables the identification of potential relationships between consumer characteristics and purchasing behavior.

3.2. Consumption Pattern

3.2.1. Types of eggs consumed

The types of eggs consumed by respondents are presented in Table 2. The high prevalence of commercial chicken egg consumption indicates that this commodity has become an integral component of daily dietary patterns due to its widespread availability in both traditional and modern retail markets. These findings are consistent with previous studies on egg consumer behavior in Indonesia, which reported that commercial chicken eggs are the most preferred type of egg because of their affordability, high availability, and versatility in household food preparation [20].

The dominance of commercial chicken egg consumption suggests that this type of egg serves as the most accessible source of animal protein for members of the academic community of Politeknik Negeri Jember. The high consumption level may be attributed to abundant market availability, relatively affordable prices compared with other egg types, and flexibility in preparation for various food products. Commercial

chicken eggs are also widely produced throughout Indonesia, resulting in extensive distribution networks and accessibility across different socioeconomic groups [21].

Table 2. Types of Eggs Consumed by Respondents

Type of Egg	Number of Responses	Response (%)	Case (%)
Commercial chicken eggs	118	45.7	95.2
Native chicken eggs	61	23.6	49.2
Duck eggs	37	14.3	29.8
Quail eggs	42	16.3	33.9
Total	258	100.0	208.1

Note: Multiple response analysis; respondents were allowed to select more than one type of egg

In addition to availability, the comprehensive nutritional profile of commercial chicken eggs may contribute to their widespread consumption. Eggs are recognized as a high-quality protein source containing all essential amino acids required by the human body. They also provide important micronutrients, including vitamins A, D, and B12, choline, selenium, and several bioactive compounds that support human health. Given their high nutritional value and relatively low cost, eggs represent an effective food source for meeting dietary protein requirements [22].

Although commercial chicken eggs predominated, nearly half of the respondents also reported consuming native chicken eggs. A total of 61 respondents (49.2%) indicated consumption of native chicken eggs, suggesting a relatively high level of acceptance within the academic community. Native chicken eggs are often perceived as having superior flavor and quality compared with commercial chicken eggs. Furthermore, some consumers associate native chicken eggs with more natural production systems, leading to perceptions of greater health benefits. Preferences for foods perceived as natural and premium quality are increasingly recognized as important determinants of consumer food choices [23].

3.2.2. Egg purchasing level

The purchasing levels of eggs among respondents are presented in Table 3. The predominance of respondents within the high purchasing category indicates that eggs constitute a food commodity that is regularly purchased and consumed by members of the academic community of Politeknik Negeri Jember. The high purchasing level reflects the important role of eggs in respondents' dietary patterns. As a relatively affordable and easily accessible source of animal protein, eggs have become one of the primary options for meeting daily protein requirements. This finding is consistent with previous studies reporting that eggs are among the most accessible animal-source foods due to their widespread availability and relatively lower prices compared with many other animal protein sources [24].

Table 3. Egg Purchasing Level

Category	n	%
Low (never, less than once/month, once/month)	7	5.6
Medium (2–3 times/month)	39	31.5
High (4–5 times/month, >6 times/month)	78	62.9
Total	124	100.0

Note: Percentages were calculated based on the total number of respondents

The high frequency of egg purchases may also be associated with the versatility of eggs as a food ingredient. Eggs can be prepared in numerous ways and serve as main dishes, complementary ingredients, or raw materials for various food products. Such versatility makes eggs a staple commodity that is commonly available in households [25]. In addition, their short preparation time and ease of storage make eggs particularly attractive to consumers with busy schedules, including students, lecturers, and administrative staff.

The results further demonstrate that eggs function not only as a source of animal protein but also as a food commodity accessible to consumers from diverse socioeconomic backgrounds. Although a substantial proportion of respondents belonged to low- and middle-income groups, egg purchasing levels remained high. This finding suggests that eggs possess strong affordability characteristics and can be accessed by consumers with varying levels of purchasing power [26]. Previous studies on protein food consumption in Indonesia

similarly reported that eggs are widely consumed across different sociodemographic groups because of their combination of high nutritional value and relatively low cost [27].

Overall, the findings demonstrate that eggs represent a food commodity with a high purchasing level among members of the academic community of Politeknik Negeri Jember. This high purchasing intensity underscores the important role of eggs as an accessible, nutritious, and affordable source of animal protein for diverse consumer groups. The results further reinforce the strategic position of eggs in supporting dietary protein intake and the development of livestock-based agribusiness systems.

3.3. Processed Egg Product Consumption

3.3.1. Types of processed egg products consumed

In addition to consuming fresh eggs, respondents also consumed various processed egg products with distinct characteristics, flavors, and value-added attributes. The distribution of processed egg products consumed by respondents is presented in Table 4. The predominance of salted egg consumption indicates a very high level of acceptance of this product among members of the academic community of Politeknik Negeri Jember. The popularity of salted eggs may be attributed to their distinctive flavor, extended shelf life compared with fresh eggs, and convenience of consumption[28]. Furthermore, salted eggs have long been recognized as a traditional food product in Indonesia and have become an integral part of local dietary culture, contributing to their high level of familiarity among consumers [29]. The salting process also adds value to eggs by enhancing shelf stability while creating unique sensory characteristics that distinguish them from fresh eggs [30].

Table 4. Processed Egg Products Consumed by Respondents

Processed Egg Product	Number of Responses	Response (%)	Case (%)
Salted eggs	106	72.6	89.1
Balado eggs	2	1.4	1.7
Omelets	14	9.6	11.8
Boiled eggs	6	4.1	5.0
Pindang eggs	18	12.3	15.1
Total	146	100.0	122.7

Note: Multiple response analysis; respondents were allowed to select more than one processed egg product

The findings indicate that respondent preferences for processed egg products remain concentrated on products that are well-established and offer practical advantages in terms of storage and consumption. This observation is consistent with consumer behavior theories suggesting that previous consumption experiences, product familiarity, and ease of use are important determinants of food choice decisions [31]. Products that have long been recognized by consumers generally achieve higher levels of acceptance than newly introduced or less accessible products [32].

Overall, the results indicate that salted eggs are the most widely consumed processed egg product among members of the academic community of Politeknik Negeri Jember. The high consumption level demonstrates that egg product diversification presents promising opportunities for generating additional value from egg commodities [33]. The findings also suggest that consumer preferences for processed egg products are influenced not only by nutritional considerations but also by practicality, shelf life, and product familiarity.

3.3.2. Purchasing level of processed egg products

The purchasing levels of processed egg products among respondents are presented in Table 5. The findings reveal a notable contrast between the purchasing levels of fresh eggs and processed egg products. As discussed in Section 3.2.2, most respondents were classified within the high egg purchasing category, whereas processed egg product purchases were predominantly categorized as low. This discrepancy suggests that although eggs constitute a regularly consumed food commodity among members of the academic community of Politeknik Negeri Jember, consumers still tend to prefer purchasing eggs in their fresh form rather than as processed products.

The relatively low purchasing level of processed egg products may be associated with consumer preferences for the versatility offered by fresh eggs. Fresh eggs can be prepared in numerous ways according to household needs, whereas processed egg products generally serve more specific consumption purposes. Consumers purchasing fresh eggs retain greater flexibility in determining preparation methods based on personal preferences and dietary requirements. From a consumer behavior perspective, purchasing decisions

are influenced by perceived product utility and the extent to which products effectively satisfy consumer needs [34].

The relatively low purchasing level of processed egg products may also reflect limited diversification of egg consumption among respondents. Most consumers appear to continue relying primarily on fresh eggs as their main source of animal protein and have not yet incorporated processed egg products as a regular component of their dietary habits. This situation indicates substantial opportunities for market expansion through product innovation, quality improvement, and promotional strategies aimed at increasing consumer awareness and interest in processed egg products.

Table 5. Purchasing Level of Processed Egg Products

Category	n	%
Low (never, less than once/month, once/month)	57	46.0
Medium (2–3 times/month)	46	37.1
High (4–5 times/month, >6 times/month)	21	16.9
Total	124	100.0

Note: Percentages were calculated based on the total number of respondents

These findings are consistent with agribusiness development concepts emphasizing the importance of value creation through agricultural and livestock product processing. Processed egg products offer opportunities to enhance the economic value of egg commodities while extending product shelf life. Consequently, increasing the consumption and purchasing of processed egg products may generate benefits not only for consumers but also for producers, processors, and other stakeholders throughout the egg value chain.

Overall, the results indicate that the purchasing level of processed egg products among members of the academic community of Politeknik Negeri Jember remains predominantly low. Nevertheless, the high consumption of salted eggs and the presence of consumer groups with moderate to high purchasing levels demonstrate promising opportunities for further development through product innovation and more effective marketing strategies. These findings suggest that processed egg agribusiness continues to hold strong prospects for generating added value and supporting the sustainable development of the egg industry.

3.4. Purchasing and Consumption Behavior

Purchasing and consumption behavior are important aspects of understanding how consumers obtain and consume food products. Information regarding purchasing locations and consumption timing provides insights into consumer preferences, product accessibility, and potential opportunities for marketing strategy development. In this study, purchasing and consumption behavior were examined based on purchasing locations for eggs, purchasing locations for processed egg products, and the consumption timing of processed egg products.

3.4.1. Products purchasing locations for eggs

The purchasing locations selected by respondents for eggs are presented in Table 6. The dominance of small grocery stores suggests that proximity and ease of access remain the primary considerations in egg purchasing decisions. These stores are generally located close to residential areas, enabling consumers to obtain eggs quickly without incurring additional transportation costs or time expenditures. Traditional markets also continue to play an important role in egg distribution because they offer a wide variety of products at relatively competitive prices. These findings indicate that conventional marketing channels remain the preferred means of obtaining eggs among consumers.

The relatively low proportion of purchases through food delivery services and specialized retail outlets suggests that eggs are still perceived primarily as an everyday household necessity that is more commonly purchased directly. Consumer behavior studies have demonstrated that accessibility, location convenience, and shopping habits are important determinants of fresh food purchasing decisions. In addition, consumer trust, product information, and ease of access have been identified as influential factors affecting food purchasing channel selection.

3.4.2. Purchasing locations for processed egg products

The distribution of purchasing locations for processed egg products is presented in Table 7. Unlike fresh eggs, which were primarily purchased from small grocery stores, processed egg products were more commonly

obtained from traditional markets. This pattern may be associated with the characteristics of processed egg products, particularly salted eggs and pindang eggs, which are frequently marketed by specialized vendors or small-scale producers operating within traditional market settings. Traditional markets continue to serve as important distribution channels for processed food products because they often provide a greater variety of locally produced foods than modern retail outlets.

Table 6. Purchasing Locations for Eggs

Purchasing Location	Number of Responses	Response (%)	Case (%)
Traditional markets	88	38.9	71.5
Convenience stores/supermarkets (Alfamart, Indomaret)	21	9.3	17.1
Specialized retail stores (Prima Freshmart, Best Meat)	4	1.8	3.3
Small grocery stores	105	46.5	85.4
Food delivery services (GoFood, GrabFood, ShopeeFood)	8	3.5	6.5
Total	226	100.0	183.7

Note: Multiple response analysis; respondents were allowed to select more than one purchasing location

Table 7. Purchasing Locations for Processed Egg Products

Purchasing Location	Number of Responses	Response (%)	Case (%)
Traditional markets	77	39.3	67.5
Convenience stores/supermarkets (Alfamart, Indomaret)	28	14.3	24.6
Specialized retail stores (Prima Freshmart, Best Meat)	10	5.1	8.8
Small grocery stores	72	36.7	63.2
Food delivery services (GoFood, GrabFood, ShopeeFood)	9	4.6	7.9
Total	196	100.0	171.9

Note: Multiple response analysis; respondents were allowed to select more than one purchasing location

Nevertheless, the presence of supermarkets and specialized retail stores as purchasing locations for processed egg products suggests opportunities for broader market expansion. Processed egg products with attractive packaging, standardized quality, and extended shelf life may be well suited for distribution through modern retail networks, enabling access to more diverse consumer segments.

3.4.3. Consumption timing of processed egg products

The consumption timing of processed egg products is presented in Table 8. The predominance of morning consumption indicates that processed egg products are commonly utilized as breakfast items or as components of meals consumed at the beginning of daily activities. Products such as salted eggs and boiled eggs possess practical characteristics, are easy to serve, and require little or no additional preparation time, making them particularly suitable for morning consumption. Convenience and time efficiency have been widely recognized as important determinants of food selection, especially among consumers with busy daily schedules.

Table 8. Consumption Timing of Processed Egg Products

Consumption Timing	Number of Responses	Response (%)	Case (%)
Morning	56	42.7	45.2
Midday	40	30.5	32.3
Late afternoon	9	6.9	7.3
Night	15	11.5	12.1
Occasional	11	8.4	8.9
Total	131	100.0	105.6

Note: Multiple response analysis; respondents were allowed to select more than one consumption time

The relatively high proportion of midday consumption further suggests that processed egg products function not only as breakfast foods but also as complementary dishes during lunch. In contrast, consumption during the late afternoon and evening was comparatively lower, indicating that processed egg products are more frequently associated with main meal occasions rather than snack consumption.

Overall, the results demonstrate that purchasing and consumption behavior related to eggs and processed egg products remain dominated by conventional marketing channels, particularly small grocery stores and traditional markets. In addition, processed egg products are mostly consumed during the morning as part of regular meal patterns. These findings indicate that product accessibility, purchasing convenience, and time efficiency remain important factors influencing consumer behavior. From an agribusiness perspective, the results suggest that marketing strategies for eggs and processed egg products should continue to strengthen distribution through traditional markets and small grocery stores while simultaneously exploring opportunities to expand distribution through modern retail channels and digital platforms to reach broader consumer segments.

3.5. Relationship Between Consumer Characteristics and Egg Purchasing Level

The relationship between consumer characteristics and egg purchasing levels was analyzed using the Chi-Square test (Pearson Chi-Square). This analysis was conducted to determine whether respondent characteristics, including age, gender, educational attainment, occupation, and monthly income, were significantly associated with egg purchasing levels. The results of the analysis are presented in Table 9.

The absence of a significant relationship between age and egg purchasing levels suggests that eggs are purchased and consumed relatively consistently across different age groups. This finding indicates that eggs are widely accepted food commodities that appeal to consumers regardless of age. As an affordable and readily available source of animal protein, eggs can meet the nutritional needs of diverse consumer groups, ranging from younger individuals to older adults. Previous studies on protein consumption in Indonesia similarly reported that eggs are consumed across various socio-demographic groups, with relatively less variation than several other animal-source foods [35].

Gender was also not significantly associated with egg purchasing levels, as indicated by a χ^2 value of 3.763, a p-value of 0.152, and a Cramer's V value of 0.174. These results suggest that male and female respondents exhibited comparable egg purchasing behaviors. This finding may be attributed to the role of eggs as a staple protein source widely used in both household and individual food consumption. Unlike certain food products that exhibit gender-specific preferences, eggs are generally accepted across consumer groups because of their versatility and broad applicability in various food preparations.

Educational attainment likewise showed no significant relationship with egg purchasing levels (χ^2 = 3.648; p = 0.161). This result indicates that respondents' educational backgrounds did not substantially influence the frequency of egg purchases. Although education is often associated with nutritional knowledge and health awareness, eggs are widely recognized food products whose purchasing decisions are not solely determined by formal education. Their favorable nutritional profile, affordability, and accessibility make eggs an attractive source of animal protein across different educational groups [36].

Table 9. Relationship Between Consumer Characteristics and Egg Purchasing Level

Variable	χ^2	p-value	Cramer's V	Interpretation
Age	12.120	0.059	0.221	Not significant
Gender	3.763	0.152	0.174	Not significant
Educational attainment	3.648	0.161	0.172	Not significant
Occupation	4.099	0.393	0.129	Not significant
Monthly income	5.089	0.278	0.143	Not significant

Note: Chi-Square test conducted at a 5% significance level ($p < 0.05$)

Similarly, occupation was not significantly associated with egg purchasing levels, as indicated by a χ^2 value of 4.099, a p-value of 0.393, and a Cramer's V value of 0.129. Students, lecturers, and administrative staff demonstrated relatively similar egg purchasing patterns. This finding suggests that eggs are widely consumed across all segments of the academic community regardless of occupational status.

Monthly income also showed no significant relationship with egg purchasing levels (χ^2 = 5.089; p = 0.278). These findings indicate that income was not a primary determinant of egg purchasing behavior among respondents. The lack of significance may be explained by the relatively affordable nature of eggs compared with most other animal protein sources. Eggs are frequently regarded as food products that provide an excellent balance between nutritional value and cost, making them accessible to consumers across different income levels. Consequently, variations in income do not necessarily result in substantial differences in egg purchasing frequency [37].

Cramer's V values observed for all variables indicated weak to moderate associations. Age exhibited the highest Cramer's V value (0.221), followed by gender (0.174), educational attainment (0.172), monthly income (0.143), and occupation (0.129). However, because all p-values exceeded the 0.05 significance threshold, none of these associations can be considered statistically significant. These findings suggest that the demographic characteristics examined in this study were insufficient to explain variations in egg purchasing levels among respondents.

Overall, the results indicate that egg purchasing levels among members of Politeknik Negeri Jember were relatively consistent across age groups, genders, educational backgrounds, occupations, and income categories. This finding reinforces the notion that eggs are widely accepted food commodities that can be accessed and consumed by diverse consumer segments. The absence of significant relationships between consumer characteristics and egg purchasing levels further supports previous findings that eggs have become a routine component of dietary patterns and are not strongly influenced by specific socio-demographic characteristics.

3.6. Relationship Between Consumer Characteristics and Purchasing Level of Processed Egg Products

The relationship between consumer characteristics and the purchasing level of processed egg products was analyzed using the Pearson Chi-Square test. This analysis was conducted to determine whether respondent characteristics, including age, gender, educational attainment, occupation, and monthly income, were associated with the purchasing level of processed egg products. The results are presented in Table 10.

The significant relationship between age and the purchasing level of processed egg products suggests that preferences for processed egg products differ across age groups. These differences may be attributed to variations in lifestyle, food preferences, consumption experiences, and dietary needs at different stages of life. Younger consumers generally tend to prefer practical, convenient, and ready-to-consume food products, whereas older consumers often consider established consumption habits, taste preferences, and prior experiences when selecting food products. Such differences may influence the frequency with which processed egg products are purchased by each age group [38].

Age has frequently been identified as an important determinant of food consumption and purchasing behavior because consumer preferences evolve over time. Younger consumers are often more receptive to food innovations, convenience-oriented products, and value-added food items, whereas older consumers tend to maintain more stable consumption patterns. Consequently, age-related differences may contribute to variations in purchasing decisions regarding processed egg products, which possess characteristics distinct from those of fresh eggs.

This finding is particularly noteworthy because age was not significantly associated with the purchasing level of fresh eggs. The contrast suggests that fresh eggs have become staple food products consumed relatively uniformly across age groups, whereas processed egg products remain influenced by age-specific preferences. In other words, consumer age appears to play a more important role in determining purchasing decisions for value-added products than for primary commodities such as fresh eggs.

Unlike age, gender was not significantly associated with the purchasing level of processed egg products ($\chi^2 = 0.863$; $p = 0.650$). This result indicates that male and female respondents exhibited relatively similar purchasing patterns for processed egg products. The absence of a significant relationship suggests that processed egg products have broad consumer acceptance and are not predominantly consumed by a particular gender group. This finding is consistent with consumer behavior studies indicating that food preferences are often shaped more strongly by individual experiences, habits, and product accessibility than by gender alone [39].

Educational attainment also showed no significant relationship with the purchasing level of processed egg products ($\chi^2 = 4.475$; $p = 0.107$). Although education is frequently associated with nutritional knowledge and access to food-related information, the results suggest that educational differences did not produce meaningful variations in purchasing levels. This finding indicates that purchasing decisions for processed egg products are likely influenced more by personal preferences and consumption habits than by formal educational background.

Similarly, occupation was not significantly associated with the purchasing level of processed egg products ($\chi^2 = 4.912$; $p = 0.296$). Students, lecturers, and administrative staff displayed relatively similar purchasing behaviors. Monthly income also showed no significant relationship with the purchasing level of processed egg products ($\chi^2 = 5.828$; $p = 0.212$). The lack of significance suggests that processed egg products remain accessible to consumers from different economic backgrounds and that variations in purchasing power do not necessarily translate into substantial differences in purchasing frequency.

Cramer's V values further indicate that age exhibited the strongest association among all variables examined. Meanwhile, gender, educational attainment, occupation, and monthly income produced lower Cramer's V values of 0.083, 0.190, 0.141, and 0.153, respectively. These values indicate relatively weak associations, suggesting that the observed respondent characteristics explain only a limited proportion of the variation in processed egg product purchasing levels. Cramer's V is commonly used as a measure of association strength for categorical variables, where values closer to zero indicate weaker relationships and larger values indicate stronger associations.

Table 10. Relationship Between Consumer Characteristics and Purchasing Level of Processed Egg Products

Variable	χ^2	p-value	Cramer's V	Interpretation
Age	14.393	0.026	0.241	Significant
Gender	0.863	0.650	0.083	Not significant
Educational attainment	4.475	0.107	0.190	Not significant
Occupation	4.912	0.296	0.141	Not significant
Monthly income	5.828	0.212	0.153	Not significant

Note: Chi-Square test conducted at a 5% significance level ($p < 0.05$)

Overall, the results demonstrate that age was the only consumer characteristic significantly associated with the purchasing level of processed egg products among members of the academic community of Politeknik Negeri Jember. These findings suggest that age-based market segmentation may represent a more effective marketing strategy than segmentation based on gender, education, occupation, or income. From an agribusiness perspective, this information can be used to design more targeted marketing strategies, particularly for the development and promotion of processed egg products tailored to the preferences of specific age groups.

3.7. Implications for Egg Agribusiness Development

The results of this study indicate that eggs still occupy a highly important position in the consumption pattern of animal-source protein foods among members of the academic community of Politeknik Negeri Jember. The high proportion of commercial chicken egg consumption, reaching 95.2%, as well as the dominance of respondents with a high egg purchasing level (62.9%), demonstrates that this commodity possesses a strong and relatively stable market. These conditions indicate that commercial chicken eggs remain the primary product with considerable potential to support the development of poultry agribusiness at production, distribution, and marketing levels. The high demand for eggs also suggests that this commodity has the potential to continue being developed as one of the animal protein sources capable of reaching various consumer groups due to its relatively affordable price and high nutritional value [40].

The results of the study also showed that salted eggs were the most frequently consumed processed egg product, with a consumption rate reaching 89.1%. The dominance of salted eggs indicates that consumers have a strong preference for processed egg products that are practical, easily accessible, possess distinctive flavors, and have a longer shelf life than fresh eggs. These findings suggest that the development of processed egg products should consider the characteristics that constitute the competitive advantages of salted eggs. Processed egg products with a high degree of convenience and ease of storage are likely to achieve greater market acceptance than products requiring additional preparation before consumption.

From a value-added perspective, the development of processed egg products represents one of the strategies capable of enhancing the competitiveness of livestock agribusiness. The processing of eggs into various value-added products can extend product shelf life, broaden consumption options, and increase the economic value of the commodity. Product diversification may also help reduce market dependence on fresh eggs and create new business opportunities for agribusiness actors. The development of egg-based processed products such as premium salted eggs, modern pindang eggs, ready-to-eat eggs, and innovative egg-based food products has the potential to increase added value while simultaneously expanding consumer market segments [41].

The findings regarding purchasing locations for eggs and processed egg products indicate that small grocery stores and traditional markets remain the primary marketing channels used by consumers. A total of 85.4% of respondents purchased eggs through small grocery stores, while 71.5% purchased eggs through traditional markets. For processed egg products, traditional markets and small grocery stores also represented the most dominant purchasing locations. These results indicate that conventional distribution channels continue to play a highly important role in the marketing of eggs and processed egg products. Therefore,

agribusiness development strategies should pay particular attention to strengthening supply chains and distribution systems through traditional markets and small grocery stores as the primary channels located close to consumers.

One of the important findings of this study is the existence of a significant relationship between age and the purchasing level of processed egg products. The Chi-Square test results showed that age was the only respondent characteristic significantly associated with the purchasing level of processed egg products ($p = 0.026$). These findings indicate that market segmentation based on age groups may represent a more effective marketing strategy than segmentation based on gender, educational attainment, occupation, or income. Different age groups tend to exhibit different preferences and consumption behaviors and therefore require different marketing approaches. Consequently, the development of processed egg products should consider the specific characteristics and needs of each age group to ensure that the implemented marketing strategies are more effectively targeted [42].

Overall, the results of the study indicate that the development of egg agribusiness continues to have highly promising prospects. The high consumption and purchasing levels of fresh eggs demonstrate that the egg market is relatively stable and supported by a broad consumer base. On the other hand, the low purchasing level of processed egg products indicates opportunities for value-added development through product innovation, business diversification, and strengthened marketing strategies. The development of products that are practical, easily accessible, possess longer shelf lives, and correspond to the preferences of specific age groups has the potential to enhance the competitiveness of processed egg products while simultaneously supporting the sustainability of egg-based agribusiness.

The implications summarized in Table 11 highlight the potential for integrating production, processing, marketing, and consumer-oriented strategies to support the sustainable development of egg agribusiness. By strengthening value addition, improving distribution efficiency, and responding to evolving consumer preferences, stakeholders throughout the egg value chain may enhance both economic performance and consumer satisfaction.

4. Conclusions

The characteristics of egg and processed egg product consumers within the academic community of Politeknik Negeri Jember were predominantly respondents aged ≤20 years, male, with non-postgraduate educational backgrounds, employed as lecturers, and belonging to the low-income category. Commercial chicken eggs were the most widely consumed type of egg, whereas salted eggs were the most frequently consumed processed egg product. Egg purchasing levels were classified as high, while the purchasing level of processed egg products remained relatively low. Consumer characteristics were not significantly associated with egg purchasing levels; however, age was significantly associated with the purchasing level of processed egg products. These findings indicate that the development of processed egg agribusiness should be directed toward product diversification, strengthening conventional marketing channels, and implementing age-based market segmentation strategies to enhance product value addition and competitiveness.

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6. Conflict of Interest

The authors declare that they have no competing interests.

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