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STUDY OF CORRELATION OF CHICKEN EGGS PRODUCTION TO CALORIE CONSUMPTION AND PREVALENCE OF POOR NUTRITION TO CHILDREN (0-59 MONTHS): COMMUNITY SERVICE SURVEY

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Abstract

Indonesia is a country with low consumption of chicken eggs and this has implications for the high prevalence of malnutrition among children under five in Indonesia. In this community service survey research, an analysis of the correlation between chicken egg production and calorie consumption will be carried out as the prevalence of under-five malnutrition (0-59 months). The analysis carried out is Pearson correlation analysis. The study found that there was a positive correlation between egg production per capita and egg consumption per province with a correlation coefficient of 2.067 x 103 tons/kcal. In addition, there is also a negative correlation between egg consumption and the prevalence of malnutrition in children under five (0-59 months). This study obtained a recommendation that it is important to increase egg production by increasing the productivity of chicken egg SMEs in the community service scheme.

Keywords: Chicken eggs, calorie consumption, correlation analysis, malnutrition, community service.

INTRODUCTION

Chicken eggs are a ubiquitous food source globally and are renowned for being highly nutritious, but are generally not widely consumed among children in low- and middle-income countries (Iannotti, Lutter, Bunn, & Stewart, 2014; Lutter, 2014). , Iannotti, & Stewart, 2016). Eggs as a source of protein are still very little consumed by the people of Indonesia (Setiawan, 2006). The proportion of protein consumption from eggs only reached 5.60% compared to the three other highest protein source consumption commodities, namely grains (30.91%), prepared food and beverages (25.72%), and fish/shrimp/squid/shellfish. (13.60%) (Susenas March

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2020). The low consumption of eggs is one of the factors for malnutrition or lack of protein energy (KEP) which causes malnutrition in children under five in Indonesia (Nurcahyo, 2011).

Based on data from the Indonesian Toddler Nutrition Status Survey (SSGBI) in 2021, the prevalence of stunting is currently still at 24.4 percent and the prevalence of underweight is at 17% (Ministry of Health of the Republic of Indonesia, 2021). This value shows that there are still many children under five who experience malnutrition in Indonesia. This malnutrition can have an impact on child mortality, childhood illness, impaired physical growth, decreased learning abilities, decreased cognitive abilities, and decreased work productivity which will have an impact on the emergence of economic losses in Indonesia (Elnovriza, 2012). One way to overcome or reduce the value of malnutrition in Indonesia is to increase the consumption of egg food commodities which can increase protein nutritional intake (Ramadhani, 2019). The relatively cheaper price of egg commodities can still be reached at all levels of society compared to other protein sources. The increasing power consumption of eggs at all levels of society is expected to improve the nutrition of children under five in Indonesia. To meet protein intake from eggs, egg production from laying hens in Indonesia must increase to meet people's consumption power (Purwati, 2015).

In this study, an analysis of the correlation between the amount of egg production per capita and the amount of egg calorie consumption will be conducted, as the correlation between egg calorie consumption and the prevalence of malnutrition in Indonesia. This study aims to obtain practical recommendations for community service activities that will be carried out by the author regarding the development of an automatic egg detection, weighing, and packing system to increase the competitiveness of Indonesian egg breeders SMEs. It is hoped that the development of this system will increase the production of chicken eggs to improve the nutrition of children under five in Indonesia.

IMPLEMENTATION METHOD

This study used quantitative research methods Pearson correlation analysis. The data used is secondary data from the Central Statistics Agency of the Republic of Indonesia (BPS RI) Livestock in 2020 figures (BPS RI, 2020) for data on egg production in tonnes, BPS RI on calorie consumption and egg protein and milk for the Indonesian population and the province of 2020 (BPS RI, 2020) for production data on egg and milk calorie consumption (kcal), BPS RI Prevalence of malnourished toddlers under five (0-59 months) by Province in Indonesia (PSG) 2018 (Statistics, B. P., 2018) for prevalence data on under-five malnutrition. In this study, several assumptions were used. Calorie consumption is limited to eggs and milk calories. Considering that egg consumption is more dominant than milk, it can be assumed that the proportionality of egg and milk calorie consumption represents egg consumption only. In addition, the calorie consumption used is data on calorie consumption for all ages, but with the assumption that there is proportionality between age groups, the calorie consumption of toddlers is considered proportional to the calorie consumption of other age groups. In this study, infants were defined as infants aged 0-59 months. To get data on egg production in tons per capita, egg production data is divided by the number of residents per province. This is done to obtain proportionality between production and economic activity which is closely related to the total population of a province. The difference in statistical years for two years can be ignored with the assumption that the increase in the value of a variable in one province is linear with

the increase in the same variable in another province.

To find the correlation between egg production in tons per capita and protein-calorie consumption, the independent variable is egg production in tons per capita and the dependent variable is protein-calorie consumption. Meanwhile, to find the correlation between egg production in tons per capita and the prevalence of malnutrition under five, the independent variable is egg production in tons per capita and the dependent variable is the prevalence of malnutrition under five. The correlation coefficient was calculated using the Pearson correlation analysis method of two variables (Fatriansyah, 2022). The standard deviation is calculated using the general standard deviation equation. Data outliers are eliminated when calculating the standard deviation.

The profile of secondary data can be seen in table 1 as follows.

Table 1. Profile of secondary research data

Variable	Population	Average	Standard deviation
Egg production per capita (tonnes)		0,20	0,31
and protein-calorie consumption (kcal)	34	57,07	16,12
prevalence of under-five malnutrition under five (0-59 months)		4,39	4,39

RESULTS AND DISCUSSION

Based on the results of the correlation analysis data between egg production in tons per capita and protein-calorie consumption (Figure 1), it shows a positive correlation. These results indicate that increasing egg production will also increase the protein-calorie consumption of Indonesian society in general. Several regions in Indonesia do not show a general pattern of trend data patterns. Below the curve, there are three outlier provinces, namely Aceh, Bali, and North Sumatra. The three regions show data with high egg production but low protein calorie consumption. This is because the province is included in a rural or agrarian province and the marketing of egg production inside and outside the province is still low and accompanied by a low consumption culture. In addition, the position of these provinces is not well connected with other provinces so the marketing of chicken egg products outside the province is still limited. Meanwhile, above the curve, there are the provinces of Riau Islands and DKI Jakarta, which are urban areas with the characteristics of low egg production and high protein calorie consumption. Other provinces follow a pattern where the higher the egg production, the higher the protein-calorie consumption with the correlation coefficient shown in table 2 of 2.067 x 103 tons/kcal (Table 1). For example, NTT is the region of Indonesia with the lowest egg production and the lowest protein calorie consumption; Banten with high egg production and high protein calorie consumption as well.

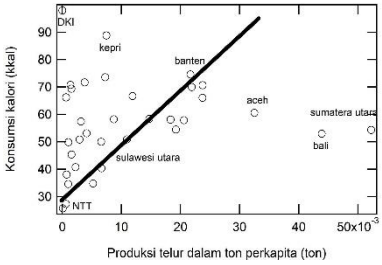

Figure 1. Correlation of egg production in tons per capita and protein-calorie consumption of Indonesian people

Figure 2 shows the plot of the results of the correlation analysis between protein-calorie consumption and the prevalence of malnutrition under five in Indonesia. The correlation coefficient value shown in table 2 shows a negative number of -8.3 x 10-2 /kcal, which means that the more protein calories consumed, the less malnutrition occurs, which is indicated by the lower prevalence of malnutrition in children under five. in Indonesia. The DKI Jakarta area shows the results of the lowest prevalence of malnutrition in children under five with the highest protein calorie consumption among all regions of Indonesia. Meanwhile, Maluku is the region of Indonesia that has the most malnutrition under five with very low protein calorie consumption. Consumption of calories in protein is one of the factors that affect nutritional intake in toddlers. The consumption of eggs as protein intake will correlate with the decreasing prevalence of malnutrition in children under five. To fulfill egg protein-calorie intake, it is necessary to increase egg production, especially in areas of Indonesia with high protein-calorie consumption.

Figure 2. Correlation of protein-calorie consumption and prevalence of malnutrition under five (0-59 months) in Indonesian society

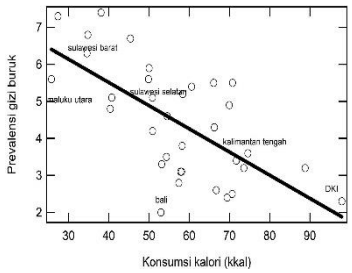

Table 2. Correlation coefficient values and standard deviation of egg production per capita (tons) vs. calorie consumption (kcal) and calorie consumption (kcal) vs prevalence of malnutrition under five (0-59 months)

No	Egg production per capita (tonnes) vs. calorie consumption (kcal)	Calorie consumption (kcal) vs prevalence of under-five malnutrition (0-59 months)
Correlation coefficient	2,067 x 10^3 tonnes/kcal	-8,3 x 10^{-2} /kcal
Standard deviation	0,087 x 10^3 tonnes/kcal	0,8 x 10^{-2} /kcal

This study found a positive correlation between egg production and calorie consumption. This strengthens the author's foundation for community service in developing an automatic egg detection, weighing, and packing system to increase the competitiveness of Indonesian egg breeders SMEs with the Matching Fund scheme of the 2022 Tokoreka. The author's goal in doing this community service is to increase the productivity of Indonesian MSME egg breeders where the average is only capable of producing 200 eggs per day. With the use of mechanization, it is expected that SMEs can produce 400 eggs per day. With an increase in production which will increase calorie consumption, then with the negative correlation value obtained from this study, the prevalence of under-five malnutrition (0-59 months) in Indonesia will decrease. Improving the nutritional quality of children under five is very important to strengthen Indonesia's future development resources.

CONCLUSION

This study found that the calorie consumption of the Indonesian population is closely related to egg production. For this reason, to increase the calorie consumption of the Indonesian population, related parties can make efforts to increase egg production by fostering MSMEs. The author uses this fact to carry out community service development of an automatic egg detection, weighing, and packing system to increase the competitiveness of Indonesian egg breeders MSMEs with the Matching Fund scheme of Tokoreka 2022. In addition, in this study, the authors found that the prevalence of malnutrition under five (0-59 months)) will decrease with increased calorie consumption. This is important to strengthen Indonesia's future development resources.

CONFESSION

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