MILK CONSUMPTION BEHAVIOR IN HOUSEHOLD HAVING CHILDREN IN GROWING AGE IN YOGYAKARTA SPECIAL PROVINCE

R. Widiati, T. A. Kusumastuti and S. Andarwati
Faculty of Animal Science, Gadjah Mada University
Jl. Fauna 3, Bulaksumur Campus, Yogyakarta - Indonesia
Corresponding E-mail: rini_gunawan54@yahoo.co.id

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ABSTRAK

Tujuan penelitian ini adalah untuk menentukan faktor sosial ekonomi yang mempengaruhi konsumsi susu dan kecenderungan mengkonsumsi susu secara rutin pada rumahtangga yang mempunyai anak usia pertumbuhan di Propinsi Daerah Istimewa Yogyakarta. Responden diambil secara purposif dari rumahtangga perkotaan dan perdesaan, masing-masing 122 rumahtangga perkotaan dan 102 rumahtangga perdesaan. Pengambilan data dengan metode survei menggunakan kuesioner yang disampaikan kepada responden. Analisis data secara kuantitatip menggunakan regresi berganda model *log linear* dan regresi *binomial logistic*. Hasil penelitian menunjukkan bahwa harga susu dan pendidikan ibu sangat signifikan menentukan pengeluaran untuk konsumsi susu dalam rumahtangga. Secara individual, pendapatan tidak berpengaruh signifikan terhadap pengeluaran konsumsi susu, namun berdasarkan lokasi, kelompok masyarakat perkotaan dengan pendidikan ibu dan pendapatan rumah tangga yang lebih tinggi berbeda secara signifikan dibanding kelompok masyarakat perdesaan. Jumlah anak usia $\leq$ 12 tahun secara signifikan mempunyai kecenderungan untuk mengkonsumsi susu secara rutin. Program peningkatan konsumsi susu untuk anak usia pertumbuhan seharusnya difokuskan pada peningkatan pengetahuan ibu-ibu pada kelompok masyarakat golongan pendapatan rendah terutama di perdesaan disertai dengan ketrampilan khusus agar memperoleh kesempatan kerja untuk mendapatkan tambahan pendapatan tunai.

Kata kunci : perilaku konsumsi susu, rumahtangga,anak-anak, perkotaan dan perdesaan

ABSTRACT

The objectives of this study were to determine socio-economic factors that influence milk consumption and propensity to routine milk consuming in a household that have children in growing age in both urban and rural area of Yogyakarta Special Province. Numbers of respondent were 122 households in urban area and 102 in rural area. Survey method was used to collect data using questionnaires presented to respondents. The data were analyzed quantitatively using a log linear multiple regression and binomial logistic regression models. Results of the research showed that milk price and mother's education background were highly significant factors in determining the milk consumption expenditure. Individually, the income was not significant factor. Furthermore, urban household group with higher mother's education and household income were different significantly with the rural one. A number of children who were less than 12 years old had significantly greater propensity to consume milk routinely. The program to increase milk consumption for children in growing age should be focused on improving the knowledge of mothers in low income communities especially in rural areas accompanied with required skills to get employment opportunities and extra cash income.

Keywords : milk consumption behavior, household, children in growing age, urban and rural

INTRODUCTION

Milk is a high-quality source of protein so that makes it perfect for children growth, especially the brain growth in the critical stage starting from 3 months fetus up to 3 years old toddler. At the year of normally the brain has experienced approximately 95% of its total growth and the growth will stop at the age of 20 (Winarno, 1993). Moreover, Martorell *et al*. (2010) found improvement of nutrition during that stage in both for short and long term will

substantially increase the human capital and economic productivity.

From year to year, Indonesian milk consumption was increasing nation wide. In 2011, the national milk consumption has reached 12.85 liters per capita per year. However, in the Special Province of Yogyakarta, it was only at 10.7 liters/capita/year (Ditjen Peternakan dan Kesehatan Hewan, 2012). Moreover in the same year, it was recorded that the amount of annual milk consumption in Indonesia was still lower than the ones in a number of countries in Asia, namely Malaysia (50.9 liters), India (47.1 liters), Singapore (44.5 liters), Thailand (33.7 liters), Vietnam (14.3 liters), and the Philippines (13.7 liters). On the supply side, milk consumption in Indonesia at present is still largely met by imports (72%). This will cause the domestic price of milk follows the international market that is likely fluctuate and increased, which in turn it ultimately decreases local people's purchasing power, lessens their milk consumption and eventually poses a threat for the generation of nation's intelligence. The policy to increase consumption of milk should be based on factors that influence the behavior of milk consuming in a region or in a particular group (Wehrheim,.2006 and Traill, 2012). Theoretically, consumer behavior was the actions that were directly involved in obtaining, consuming, spent products and services, including the decision processes that precede and follow these actions (Engel *et al*., 1995). Consumer behavior was complex and sophisticated. It was influenced strongly by psychological factors, social, economic, cultural and personal factors when people buy, use and dispose products and services (Rena and Vade, 2010; Tuan *et al*., 2013). However, any researchers generally focus on priority issues.

Changes in the food system were the result of a number of interrelated factors began from changes in society's income as the main determinant, but how much the impact were would vary according to community groups' capacity (Stamoulis *et al.,* 2004 and Wehrheim, 2006).

Population growth, urbanization and income growth led to increase consumption of meat and milk is expected to continue into the new millennium and thus creates a livestock revolution (Delgado, 2003). This opportunity was immediately captured by many developed countries rather than by their counterpart, the developing countries. It has been characterized by rapid progress in production technology and marketing in the developed countries.

The empirical analysis provides evidence that overall, financial capacity was highly related to a person's health due to the nutritious food intake. Ruel and Garrett (2004) found the urban children had better nutritional status than their counterparts in rural areas who were associated to a poorer family environment. There was evidence of differences in the nature of their socio-economic determinants of the nutritional status of children between urban and rural areas. But how much influence will be different in each region and also depends on the policies or existing government programs. The relationship between diet quantity and cognition depends on socio economic position of consumer represented by indicators such as mother's education and employment which is a decisive factor in food consumption (Essery *et al*., 2008). Health, cognitive behavioral, and socio-economic conditions and environmental were correlated with among women. They were highly correlated with a woman's decision making process in determining the food consumption for her children. Sufficient maternal education was known to have a very beneficial effect to a variety of child feeding, health and care so it could be an important driver of variations in child nutrition in urban and rural areas (Ruel and Garrett, 2004).

The others research found that the socio economic profile of the consumers, such as income status, occupational position, product price, educational level, age and region are the major determinants of the consumption patterns of milk (Virdi *et al*., 2007; Bartoseviciene *et al*., 2005). The objectives of this study were to determine the socio-economic factors that influence the milk consumption and propensity to routine milk consuming in a household that have children in growing age in the Yogyakarta Special Province.

MATERIALS AND METHODS

Sampling Methods and Data Collection

Location of the study was in Yogyakarta Special Province, represented by Yogyakarta city for urban area, and Bantul regency for rural area. Respondents were households that have children in growing age taken by purposive sampling, namely households that have children in grade 4 and 5 of elementary school that around $\leq$ 12 years old. From those criteria, two urban primary

schools namely Serayu and Sapen in Yogyakarta city and two rural primary schools, namely Mangir Lor and Tapen in Bantul regency were taken. In each area, they were 1 public school and 1 private school. There were 121 and 101 households as respondents respectively in urban and rural areas. Data collection were done in early 2013 by survey method using a questionnaire to investigate to the respondents. The questions were regarding the opinions of respondents in getting milk, consuming it and characteristics of respondents such as number of family and age in each family member, occupation, household income and life style to drink milk.

Operational Definition

The respondent's occupation as labor was defined as a household of respondent who worked with payment equal to regional minimum wage in the study location which was around ≤IDR. 1,000,000.00/month. Meanwhile a private employment was the one whose income was above IDR. 1,000,000.00/month and a civil servant was the one who got regular monthly payment from the central government until the retired period which has already been set by national law and regulation.

Types of consumed milk were distinguished as (1) liquid milk either from heated pure milk or formulated liquid milk from industry, (2) condensed milk, (3) powdered milk, which was consistent with National Social Economic Survey 2005 (Statistic Bureau, 2007). Further, the price of sweet condensed and powdered milk were equated with 1 liter of liquid which was converted based on the label in the package from each type and brand of milk.

Routine milk consuming was considered as a household that cared to have a minimum three times milk consumed per week, meanwhile non-routine milk consuming was a household that had less than three times milk consumption per week and also the one who stated not to drink milk routinely.

Data Analysis

Data analysis was done by descriptive and quantitative method. Descriptive analysis was used to explain the characteristics of respondents and obtained from tabulation of questionnaires. Quantitative analysis was used to seek the determinant socio economics factors that influences the expenditure of milk consumption which were proxy of the quantity and quality of milk consumption in household of respondents using a log linear regression models. Equations of the model can be written as follows:

$$LnY = \ln\alpha + \beta 1\ lnX1 + \beta 2\ lnX2 + \beta 3\ lnX3 + \beta 4\ lnX4 + \beta 5\ lnX5 + \beta 6\ lnX6 + D1 + D2 + \mu \quad \ldots. (1)$$

where :

Y	=	expenditure of milk consume (IDR/month)
α	=	intercept
β1 ……β7	=	regression coefficient
X1	=	education of father (year)
X2	=	education of mother (year)
X3	=	household income (IDR/month)
X4	=	member of household who age ≤12 years old (person)
X5	=	member of household who age ≥12 years old (person)
X6	=	price of milk (IDR)
D1	=	dummy of school location 1 = urban 0 = rural
D2	=	dummy of school status 1 = public 0 = private/government
μ	=	stochastic disturbance term

Regression coefficient was estimated with Ordinary Least Square (OLS) methods. Then it was tested using the value of R-squared, F-test and t-test. The regression coefficient from this model should demonstrate the elasticity of each parameter toward milk consumption spending (Gujarati,2003).

Furthermore, Binomial Logistic regression (logit) was used to seek the determinant factors that influences propensity to the household consuming for milk routinely or not. The logit model is a function of cumulative probability logistic, which is formulated as follows:

$$Pi = E(Y=1/Xi) = 1/1+e^{-(\alpha+\beta Xi)} \quad \ldots\ldots\ldots\ldots\ldots\ldots (2)$$

For ease of exposition, it can be written as:

$$Pi = 1/1+e^{-zi} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3)$$

where $Zi = \alpha + \beta Xi$

Equation (3) was the cumulative logistic distribution function. In that equation, Zi ranges from $-\infty$ to $+\infty$, Pi ranges between 0 and 1 and that Pi is non linearity related to Zi (in Xi and the β's).

If Pi is probability of a hosehold consumed of milk routinely, then (1-Pi) is the probability of milk consumed not routinely, where:

Table 1. Characteristics the Household of Respondents

No.	Illustration	Sample of Elementary School			
		Urban		Rural	
		Sapen, n = 64 (private)	Serayu, n=57 (government)	Tapen, n=49 (private)	Mangir Lor, n=52 (government)
1.	Number of family (person) :				
	- Total	4.46	4.28	4.58	4.22
	- Children aged ≤ 12 Years	1.63	1.79	1.98	1.73
	- Children aged >12 Years	0.63	0.85	0.68	0.54
	- Adult	2.10	1.64	1.92	1.95
2.	Father:				
	Age (year)	43.23	42.32	44.57	40.95
	Education (year)	14.80	14.94	10.00	9.84
	Occupation (%) :				
	- Civil servants	26.56	38.60	6.12	10.00
	- Private	73.44	61.40	42.86	33.14
	- Labor	0	0	51.02	56.86
3.	Mother :				
	Age (year)	40.28	39.16	40.44	37.70
	Education (year)	15.02	14.63	10.10	9.43
	Occupation (%) :				
	- Civil servants	21.88	22.81	10.20	0
	- Private	31.25	33.33	12.24	13.73
	- Labor	0	0	43.75	58.82
	- Housewife	46.88	43.86	34.69	27.45
4.	Family income/month (IDR)	7,040,816	7,112,244	1,755,510	1,460,816

$$1\text{-}Pi = 1/1+e^{zi} \quad \text{..... (4)}$$

Therefore, it can be written as :

$$Pi/1\text{-}Pi = 1+e^{zi}/1+e^{-zi} = e^{zi} \quad \text{..... (5)}$$

Further Pi/(1-Pi) is the Odds Ratio in favor of milk consumed routinely or the ratio of the probability that a household will consume milk routinely.

In the form the natural log of the Odds Ratio, namely

$$\text{Ln}\frac{Pi}{1-Pi} = Zi = \alpha + \beta Xi \quad \text{.....(6)}$$

e = 2.71828

In the form of equation was :

$$\text{Ln}\frac{Pi}{1-Pi} = \alpha + \beta 1X1 + \beta 2X2 + \beta 3X3 + \beta 4X4 + \beta 5X5 + \beta 6X6 + \beta 7X7 + D1 + D2 \quad \text{.....(7)}$$

$$Pi = \frac{1}{1+e^{-(\alpha+\beta 1X1+\beta 2X2+.....+\beta 6X6+\beta 7X7+D1+D2)}} \quad \text{.....(8)}$$

Because of the model was non linear so that the model was tested using Maximum Likelihood Estimation (MLE) test to get the value of Likelihood Ratio Index (LRI) which should be equal to R-squared in OLS regression, Likelihood Ratio (LR) test which should be equal to F-test in OLS regression, and Wald test which should be

equal to t-test in OLS regression (Gujarati, 2003 and Greene, 2002).

RESULTS AND DISCUSSION

The Characteristics of Respondents

The result of the research descriptively showed that around 73% of the children from respondent were ≤12 years old and 27% of children were above 12 years old, with the average total number of family members was 4.4 people in both urban and rural area. The formal parents' education and family's incomes of urban households were better than the ones of rural households. Livelihood in most of the rural households (over 50%) were the average worker with low income and thus noticed that there was income gap between urban and rural households, which respectively were IDR 7,076,530.00/month and IDR 1,608,163.00/month. This was probably due to disparity of employment opportunities. Moreover, the school samples in urban area (Sapen and Serayu) were considered as "high level". The characteristics of respondents were presented in detail in Table 1. Meanwhile, from Table 2, it could be seen that on average, the behavior of the respondents who had a propensity to consume milk routinely in two urban elementary schools were better than their counterparts in rural area. Milk consumption level and frequency were estimated by amount of milk consumption expenditure, which were IDR 74,950.00- IDR 76,016.00/month in urban area and IDR 20,036.00 – IDR 32,237.00/month in rural area. Consumed milk consists of powdered milk, sweetened condensed milk and liquid milk, which respectively were 61.46%, 17.27%, 21.27% in urban area and 18.97%, 44.51% and 36.52% in rural area. If the price of heated fresh milk in the market was IDR 8,000.00/liter, the average of each household milk consumption was 9.43 liter/month in urban area and 3.27 liter/month in rural area. This suggested that the urban households had willingness to pay for higher price for milk.

Furthermore, based on converted price per liter of heated fresh milk, powdered milk was the most expensive because of its quality. Unfortunately it was usually imported.

Table 2.Respondents' Milk Consumption Behavior

No.	Illustration	Sample of Elementary School			
		Urban		Rural	
		Sapen, n = 64 (private)	Serayu, n=57 (government)	Tapen, n=49 (private)	Mangir Lor, n=52 (government)
1.	Respondents tend to drink milk routinely(%)	92.19	89.47	65.31	51.93
2.	Respondents tend not to drink milk routinely (%)	7.81	10.53	34,69	48.07
3.	Type of milkconsumed frequently(%)				
	- powdered milk	56.25	66.67	24.49	13.46
	- condensed milk	18.75	15.79	42.86	46.15
	- liquid milk	25.00	17.54	32.65	40.39
4.	Milk consumption expenditure(IDR/ month/household)	74,950	76,016	32,237	20,036
5.	Source of knowledge about the benefits of milk (%):				
	- Television advertisement	51.56	61.40	71.43	76.47
	- Formal and Non-formal education	48.44	38.60	28.57	23.53

Table 3. Multiple Log Linear Regression for the Factors Influencing Milk Consumption

Independent variable	Coefficient	Standard. Error	t-Statistic	Probability
Constanta	-3.28	1.96	-1.67	0.10
Father's education (X1)	0.07	0.26	0.28	0.78
Mother's education (X2)	0.78	0.27	2.85***	0.00
Family income (X3)	-0.06	0.12	-0.48	0.63
Children aged ≤ 12 years (X4)	0.23	0.14	1.64	0.10
Children aged > 12 years (X5)	-0.12	0.16	1.64	0.44
Milk price (X6)	1.35	0.14	9.41***	0.00
Dummy of location (D1)	0.38	0.20	1.90**	0.05
Dummy of school type (D2)	-0.17	0.11	-1.52	0.13
R-squared				0.56
Adjusted R-squared				0.54
F - statistic				0.000

*** = level significantly 0.01 (P<0.01)
** = level significantly 0.05 (P<0.05)
* = level significantly 0.1 (P<0.1)

Table 4.Binary Logistic Regression for the Factors Affecting the Propensity to Milk Consume Routinely

Independent variable	Coefficient	Std. Error	z-Statistic	Prob.	Odds Ratio
Constanta	-3.79	1.40	-2.71	0.01	0.02
Father's education (X1)	0.02	0.07	0.37	0.71	1.02
Mother's education (X2)	0.36	0.08	4.42***	0.00	1.44
Family Income (X3)	0.00	0.00	-0.93	0.35	1.00
Children aged ≤ 12 years (X4)	0.61	0.33	1.85*	0.06	1.84
Children aged ≤ 12 years (X5)	- 0.21	0.2	-1.06	0.29	0.81
Milk price (X6)	0.00	0.00	-0.08	0.94	1.00
Dummy of location(D1)	1.13	0.64	1.76*	0.08	3.08
Dummy of school type (D2)	-0.06	0.43	-0.14	0.89	0.94
McFadden R-squared	0.32				
LR statistic	6.75				

Determinant Factors of Expenditure to Milk Consumption and Propensity to Consume

The results of log linear multiple regression analysis showed that the R-squared value was 0.5561 and F test was significant (P <0.01). Partially, mother's education capacity and milk price have influenced significantly (P <0.01) positive to the total expenditure of milk consumption, milk price had elastic influence (Table 3). This result was consistent with (Ruel and Garrett, 2004; Essery *et al*., 2008; Krešić,, 2010), that mother was the one who determine family nutrition and mother's education had a significant influence to the family's nutritional

status. Mother's education determined the total milk consumption because generally the mother held the household finance, thus decision-making in either to purchase or not to purchase milk was strongly influenced by her education. Children's nutritional status depended on maternal support in providing food in the household. If the mother was well-educated and working, she could support the family in providing better food and nutrition which in turn made the children grow well (Ruel and Garrett, 2004). The milk price which showed quantity and quality was positively influencing the milk consumption expenditure. It meant that the higher of quantity and quality of milk was consumed, the greater the expenditure of milk would be spent. This meant to increase the consumption of milk in rural areas with low-income communities, subsidy should be given to purchase milk in the elementary schools with low price. Individually, household income did not significantly influence the expenditure of milk consumption. However dummy of location had a positive and significant effect P <0.05, where descriptively mother's education and household income in urban areas were higher than rural.

The results of the binary logistic regression model analysis showed that mother's education had a positive significant effect (P <0.01) to the propensity for routine milk consuming. The value of the Odds Ratio showed probability of propensity to routine milk consuming in households with higher mother's education made milk consumption increased by 1.44 times higher than in those who did not consume milk routinely. Similarly, a number children with less than 12 years and the dummy location significantly (P<0.10) influenced routine milk consumption (Table 4).

CONCLUSION

Milk price and mother's education were highly significant determined milk consumption expenditure. Furthermore, mother's education and children aged <12 years old tended to consume milk routinely. In the urban communities with greater maternal education and household income, expenditure of milk consumption and propensity to routine milk consuming were higher than in the rural ones. The program of increasing milk consumption for children in growing age especially in rural communities or lower income people should be focused on improving the knowledge of mothers accompanied with special skills in order to obtain employment opportunities to get extra cash income and on giving subsidies to purchase milk in elementary schools with low price.

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