Nutritional Adequacy Level of Snack toward Nutritional Status of Early Childhood

By

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ABSTRACT

The research conducted to map the nutritional status and need analysis of local-based snack in Semarang, Indonesia. The amount of early childhood were 200 samples. Identification for the type of snack they consume was obtained by recall for 3 days; followed by calculating nutrition contents and nutritional adequate level of the snack. The correlation of sex and age toward the level of nutritional adequacy was analyzed by Chi Square.

Children in early aged 1 – 5 years, with 7.6% anemia rate, the normal nutritional status prevalence, was wasted, severely wasted and obese were respectively 64.5 %, 14.5 %, 8.5 %, and 12.5 %. Gender did not affect the occurrence of anemia and nutritional status among children in early childhood. Age affected the nutritional status, though did not affect anemia. There were 20 types of snacks they consumed, among them were milk, biscuit, bread, fruit, and wafer. Nutrient content for energy, protein, iron from the snack consumed was respectively 518 kcal, 17.1 g, and 4.2 mg; the contribution of nutrients is high enough to fulfill the nutritional adequacy with 43.5 % energy, 62.3 % protein, and 56.0 % iron. The largest contribution came from the milk; the percentage of energy, protein and iron of the milk were respectively 44.9 %, 62.1 % and 80.5 %. Gender affected the level of adequacy of energy, protein, and iron found in the snack, while age merely affected the level of energy adequacy.

Suggestions: 1) The parents need to provide healthy meals and nutritious snacks, 2) The necessary knowledge, attitudes and skills of snack manufacturing in the early childhood by teachers and parents, and 3) changes in snack consumption behavior among people towards the food consumption which is increasingly diverse, nutritious balanced, and safe for early childhood and family.

Keywords: snacks, early childhood, anaemia, nutritional status, nutritional adequacy level.

INTRODUCTION

The successful development of a nation is determined by the availability of human resources. The qualified human resources are prominent to the national productivity and to strengthen the nation's competitiveness. In order to determine the qualified human resources among the Indonesian people that have a high competitiveness, they need the adequate food. The healthy and qualified young generation will be obtained if each family can be supplied by nutritious food starting from early childhood even when the baby is still in the mother's womb.

In 2006, the Human Development Index of Indonesia ranked only 108 out of 177 countries, left behind other ASIAN countries. One of the educational goals of the World Declaration on Education for All, known as the Basic Action Framework of Education for All is the Early Childhood Education. According to Law no. 20/2003 on National Education System, early childhood education is the developmental efforts which are intended to children from birth to the age of six conducted through the provision of educational stimulation to assist the growth and development of the child physically and mentally in order to have the readiness to enter the further education level.

Based on data from the Department Kesehatan (2007), in 2003, there were about 5 million (27.5%) malnourished children under the age of 5, 3.5 million underweight (19.2%), and 1.5 Million severely underweight (8.3%). Children under the age of 5 who took the early childhood education were also low. According to the Education for All Secretariat (2009), the gross enrollment rate of early childhood education in 2008 only reached 50.62% of the total number of 29,847,830.

Some snacks which are sold at schools including at early childhood education contain illegal food additives such as borax, formalin, rhodamine B, and methanil yellow. These materials can accumulate on the human body and are carcinogenic which in the long term will lead to diseases including cancers and tumors, while in the short-term it will cause dizziness and nausea. The snacks provide children with 36% energy, 29% protein and 52% iron (Februhartanty and Iswarawanti, 2004). The specific objectives to be achieved from the results of the study are: a) to determine the map of early childhood nutritional status and b) to determine the nutritional adequacy level of snack.
RESEARCH METHOD

The research and development approach was used in this research (Sugiyono, 2006). Subjects for children studying at early childhood education (playgroup) were determined by using area probability sampling at 5 districts in Semarang municipality, Indonesia and the number of them were 10 x 20 = 200 children.

Mapping of nutritional status, identification of snack consumption and adequacy analysis of snack in early childhood. The mapping was conducted by examining the Hemoglobin (Hb) levels and nutritional status. Hemoglobin levels were determined by the Cyanmethemoglobin method. If the Hb level is less than 11 mg/100 ml, the children were diagnosed having anemia (Adriani and Wirjatmadi, 2012). While the nutritional status was determined by measuring body weight and height. The indicator used was Body Mass Index for Age (Istiany and Rusilanti, 2013).

<table>
<thead>
<tr>
<th>No.</th>
<th>Body Mass Index for Age</th>
<th>Nutritional status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>&lt;= 3 SD</td>
<td>Severely wasted</td>
</tr>
<tr>
<td>2.</td>
<td>- 3 SD ≤ d ≤ 2 SD</td>
<td>Wasted</td>
</tr>
<tr>
<td>3.</td>
<td>- 2 SD ≤ d ≤ 2 SD</td>
<td>Normal</td>
</tr>
<tr>
<td>4.</td>
<td>&gt; 2 SD</td>
<td>Obese</td>
</tr>
</tbody>
</table>

Source: Istiany and Rusilanti, 2013

Identification of snack consumption among children in their early childhood was conducted with “Recall” method in order to recall snack consumption along 3 days. Nutri-survey was employed to measure the nutritional contents such as energy, protein, and iron from the result of recall; the measurement of adequacy percentage was the next step. Adequacy percentage was calculated based on the nutritional content of food consumption compared to the Recommended Daily Intake of each age group.

The Recommended Daily Intake of energy, protein, and iron for age group of 1-3 years is 1125 kcal, 26 g, and 7 mg, for age group of 4 - 6 years is 600 kcal, 35 g, and 8 mg (Kartono et al.,2012). The basis used in determining the adequacy is the provision of supplementary food to children under 5-years-old which provides 10-20% of the caloric and protein needs for each consumption (Departemen Pendidikan dan Kebudayaan, 2011). Dietary intake of early childhood is 2 times for snacks consumption.

Percentage descriptive analysis was used to map the nutritional status of either its hemoglobin or anthropometry. To determine the influence of gender and age on anemia status, nutritional status and nutrient adequacy levels were analyzed by Chi Square (Sugiyono, 2007).

RESULTS AND DISCUSSION

Results

The early childhood under the study were ranging from 1.7 to 5.0 year-olds. 1-3 year-olds were nearly doubled (163%) compared to 4-5 year-olds. Age distribution above shows that the number of boys are less than girls, in amount of 1.0%, with a sex ratio of 98.0. However, age group of 1-3 year old boys are 6.0% more; while for age group of 4-5 year boys, are 7.0% less than girls.

Anemia status among the children in early childhood in Semarang was quite good; there were around 7.6% children that had it in which the number of girls (1.5%) were less than boys. In the contrary, the percentage of boys who were not anemic were less than 7.6% of girls. Chi-Square test results showed $\chi^2 = 0.709$ and $p = 0.701$, which meant that gender did not affect the status of anemia among the early childhood. Similarly, age did not affect the occurrence of anemia with $\chi^2 = 0.852$ and $p = 0.356$.
The second indicator for measuring the nutritional status is by using Body Mass Index for Age. The results showed that nutritional epidemiological condition has occurred in Semarang, as indicated by the prevalence of underweight (wasted and severely wasted) and excessive nutrients (obese). Underweight was 23.0%, while obese was 12.5%. When it was broken down by gender, boys with obese were more than girls. The opposite occurred in underweight, wasted and severely wasted children are more prevalent in girls than boys. They showed that gender had no effect on the nutritional status among children in early childhood, but were influenced by their ages by \( \chi^2 = 16,367 \) and \( p = 0.001 \). Overall, the nutritional status of girls is better than boys. Early childhood with normal nutrients are bigger for girls. Children who are overweight or obese should be paid more attention. Distribution of nutritional status is described in Figure 2 below.

![Percentage of boys and girls in early childhood](image)

**Figure 2: Distribution of nutritional status among early childhood by gender.**

The frequency of snacks consumed by children in early childhood was 2-3 times per day, either morning, afternoon or night. Totally, there were 20 types of snacks. The five most consumed snacks were milk, biscuit, bread, fruit, and wafer. The more often consumed, the higher the contribution in nutrient intake in early childhood. Ready-served-processed foods such as snacks, packaged beverages and processed meats such as sausages, nuggets were snacks that they often consumed. The snack consumption has become a habit among those in their early childhood which needs to be considered since sometimes the snacks were given a variety of food additives. Traditional snacks such as porridge and sweet potato were less attractive.

Consuming these snacks contributes to nutrient intake to meet daily nutritional needs. Consumption of energy, protein and iron from snacks by children at 1-3 years-old was higher compared to the children at 4-5 years-old, although Recommended Daily Intake for children at 4-5 years-old was higher. Based on the adequacy level, children at 1-3 year-olds consume snacks from 133.1 to 147.2% higher than in children at 4-5 year-old.

<table>
<thead>
<tr>
<th>No</th>
<th>Age</th>
<th>Snack consumption</th>
<th>Adequacy level (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Energy (kcal)</td>
<td>Protein (g)</td>
</tr>
<tr>
<td>1.</td>
<td>1 - 3</td>
<td>530</td>
<td>17.3</td>
</tr>
<tr>
<td>2.</td>
<td>4 - 6</td>
<td>506</td>
<td>16.9</td>
</tr>
<tr>
<td>Average</td>
<td>518</td>
<td>17.1</td>
<td>4.2</td>
</tr>
</tbody>
</table>

Consumption of milk among snack consumption provides 232 kcal energy, 10.6 g protein and 3.4 mg iron. Daily average of milk consumption was 2.3 bottles with 120 ml - 150 ml. Nevertheless, there were 11 children (18.3%) who did not consume milk at all, and 1 (1.7%) child consumes only breast milk.

When it was divided by the type of nutrients, energy adequacy level of snacks among boys (31.5%) who consumed snack more than recommended (> 40% adequacy) was higher than girls (20.5%). There were only 4% of children who consumed snacks less than 20%. Average rate of energy adequacy was 43.5%. It was higher than the upper limit of the 40.0% snacks adequacy. The results of statistical tests for gender and energy adequacy level showed \( \chi^2 = 12,817 \) with \( p = 0.002 \), which meant that gender affected the adequacy of energy. Similarly with age, with a value of \( p = 0.001 \) and \( \chi^2 = 13,332 \).
Table 3: Energy Adequacy Level of Snacks among Children in Early Childhood According to the Gender

<table>
<thead>
<tr>
<th>Energy Adequacy Level</th>
<th>Gender</th>
<th>Total</th>
<th>Average adequacy level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Boys</td>
<td>Girls</td>
<td>n</td>
</tr>
<tr>
<td>Less</td>
<td>5</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>Enough</td>
<td>31</td>
<td>57</td>
<td>88</td>
</tr>
<tr>
<td>Over</td>
<td>63</td>
<td>41</td>
<td>104</td>
</tr>
<tr>
<td>Total</td>
<td>99</td>
<td>101</td>
<td>200</td>
</tr>
</tbody>
</table>

When compared to the energy adequacy level, the protein adequacy level was much higher. The average protein adequacy level of snacks was 62.3%. A total of 81.0% of children in early childhood consumed snacks more than the adequacy level, especially boys. Statistical test results showed $\chi^2 = 6.247$ with $p = 0.044$ which meant that gender affected the protein adequacy level. In the contrary, age did not affect the level of adequacy of protein with $p = 0.614$ and $\chi^2 = 0.974$.

Table 4: Protein adequacy level of snacks among children in early childhood according to the Gender

<table>
<thead>
<tr>
<th>Protein adequacy level</th>
<th>Gender</th>
<th>Total</th>
<th>Average adequacy level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Boys</td>
<td>Girls</td>
<td>n</td>
</tr>
<tr>
<td>Less</td>
<td>7</td>
<td>5</td>
<td>12</td>
</tr>
<tr>
<td>Enough</td>
<td>7</td>
<td>19</td>
<td>26</td>
</tr>
<tr>
<td>Over</td>
<td>85</td>
<td>77</td>
<td>162</td>
</tr>
<tr>
<td>Total</td>
<td>99</td>
<td>101</td>
<td>200</td>
</tr>
</tbody>
</table>

Result for iron adequacy level was similar to the protein adequacy level. The average iron adequacy level was 56.0%, 16% higher than recommended. The good consumption of snacks which was between 20 – 40% was shown by 25.5% respondents with average adequacy level at 29.2%. The same results as in the iron adequacy was influenced by the gender where $\chi^2 = 9462$ with $p = 0.009$. However, age did not affect the value of $\chi^2 = 0.120$ with $p = 0.942$.

Table 5: Iron adequacy level of snacks among children in early childhood according to their gender

<table>
<thead>
<tr>
<th>Iron adequacy level</th>
<th>Gender</th>
<th>Total</th>
<th>Average adequacy level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Boys</td>
<td>Girls</td>
<td>n</td>
</tr>
<tr>
<td>Less</td>
<td>15</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td>Enough</td>
<td>18</td>
<td>33</td>
<td>51</td>
</tr>
<tr>
<td>Over</td>
<td>66</td>
<td>63</td>
<td>129</td>
</tr>
<tr>
<td>Total</td>
<td>99</td>
<td>101</td>
<td>200</td>
</tr>
</tbody>
</table>

The snack consumption in girls showed that the category adequacy level was twice compared to the less, and 13 times compared to the less category. The pattern was different from the iron adequacy level for boys; the highest adequacy level was in the over category. The less and enough category in iron adequacy level was one-fourth of over category.

Statistical test with Chi-Square showed the adequacy level of energy, protein and iron which did not affect nutritional status. The same as with anemia, with $p$ value > 0.05. The details of analysis are shown in Table 6.
The total amount of early childhood in age group 1 – 3 year-olds, in which the youngest was 1.7 years- old, were 62.0%. This shows that the concern of parents is large enough to prepare their children for school since their early childhood. It is in accordance with Law. 20/2003 which states that early childhood education is the developmental efforts which are intended to children from birth to the age of six years conducted through the provision of educational stimulation to assist the growth and development of the child physically and mentally in order to have the readiness to enter the further education level. According to Jalal (2002), early childhood in the process of child development is the most critical period for the development that occurs within the first 4 years that has the critical developments in the next 14 years. Therefore, intellectual stimulation to support the developments is very important. Various studies, including longitudinal studies by Bloom concerning intelligence, indicates that the period of the first 4 years of age, cognitive development reaches about 50 percent, 8 -year period at 80 percent, and 100 percent after for 18 -year-old children (Saidah, 2003).Other research concerning the intelligence indicates the fact that to maximize the intelligence of a child, stimulation should be given the first three years of his life by considering that the numbers of brain cells at that age are twice than brain cells of the adult (Oberlander, 2000).

The percentage of children in early childhood with anemia in Semarang was quite low, that is, 7.6%. This is much lower than the rate of anemia toddlers in Indonesia which is 26.3 percent (Kementerian Kesehatan RI, 2013) and pre-school children in Al-Zahra Kindergarten, Ciharang, Darmaga, and Bogor (46.7%) (Lubis, 2008). The prevalence of anemia in MTsN 1 Malang in the second grade (acceleration) and the third grade students was 1.1% (Widayati, 2009). The results of the study conducted by Jordan found that the prevalence of anemia in infants (n 110) was 51.8 and 26.9% in children under 5-years-old (n 93) (Abdul-Razzak et al., 2012). The results of the study, Levy et al. (2005) suggests that anemia in infants increases the risk of infectious diseases, especially diarrhea and respiratory tract.

Nutritional status among children in their early childhood in Semarang were quite diverse, with a prevalence of obese by 5.0 % and under weight (wasted and severely wasted)by 21.6 %.The amount of malnutrition was higher than the national average level, but lower for obese children in early childhood. According to data from the Basic Health Research in 2010, the number of underweight among young children or toddlers reached 17.9 %, consisting of 4.9 % severely underweight and 13.0 % underweight, while the prevalence of obesity among children under 5-years-old nationally based on the indicators of weight and height reached 14 %. Research in various regions in Indonesia found that prevalence varied. In 2006, the status of poor and lack of nutrition was found in a fisherman’s family in Semarang, prevalence of severely underweight 2.3 % and 6.8 % underweight cases are generally found in children under 5-years-old (Fathonah et al., 2009). In Sawangan Baru, Depok, there were found 25 % of stunted children, 13.75 % underweight and 10 % wasted (Fajal, 2009). In Malabar District of PTPN VIII Banjarsari, Pangalengan, Bandung, West Java, there were a lot of underweight children under 5-years-old which were around 17.2 % (Yulia, 2010). In Karawang, West Java, prevalence of stunted was 22.8 %, wasted was 5 %, and underweight was 14.6 %, and 5.6 % of children were classified as obese (SEAMEOTROPMEDRCRN UJ, 2010). In seven different districts in East Nusa Tenggara, the prevalence of underweight, stunted, and thin, was respectively 39.7 %, 52.5 % and 15.4 % (UNICEF,FAO,WFP and SEAMEO - TROPMEDRCNN University of Indonesia. 2010).The cases of malnutrition and obese also occurred abroad. The children around 3-59 months in South Africa were 26.3 % stunted, 12.0 % underweight and only 1.3 % severely wasted (Chopra, 2003). Prevalence of marasmus (protein-energy malnutrition, PEM) in India was 1.7 % in which 2.3 % for boys and 1.1 % for girls (Singh et al., 2006).

The excessive nutrients or obese was also found among the children in their early childhood, especially boys. Although the malnutrition is still a problem faced by the society, there is a tendency of the increase of infants and children under 2-year-old who has obesity problems, which are 20 % and 12.6 % respectively (Ministry of Health of Republic of Indonesia, 2010). This condition will be a double burden of nutritional development of society in the future. Overweight or obesity increases the risk of health problems such as hypertension, cardiovascular disease and diabetes type 2 (Horodynski, et al, 2010). By gender, obesity cases are found more in boys than in girls. In the contrary, malnutrition cases were found more in girls. This is in accordance with the studies conducted in India which found the rate of malnutrition was significantly higher in girls than boys (P <0.05) (Singh, et al, 2006).

The malnutrition cases are usually caused by poverty, the lack of food availability, bad quality of environment, lack of nutritional knowledge, lack of balanced menu and health (Almatsier, 2002). The study

<table>
<thead>
<tr>
<th>No</th>
<th>Adequacy level</th>
<th>Nutritional status</th>
<th>Anemia</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Energy</td>
<td>4.071</td>
<td>0.667</td>
</tr>
<tr>
<td>2.</td>
<td>Protein</td>
<td>4.111</td>
<td>0.662</td>
</tr>
<tr>
<td>3.</td>
<td>Iron</td>
<td>9.235</td>
<td>0.161</td>
</tr>
</tbody>
</table>

**DISCUSSION**

The prevalence of stunted, wasted, and underweight in the study reached 25.7 %, 6 %, and 32.5 % respectively. Based on the assessment by the Ministry of Health of Indonesia, the prevalence of stunted, wasted, underweight, and severely underweight children in the study was 22.5 %, 6.8 %, 22.3 %, and 10.5 % respectively. The prevalence of stunted, wasted, and underweight in the study was higher than the national average level of 20.6 %, 4.7 %, and 17.9 % respectively. In the same study, the prevalence of severely underweight children was found in the study was lower than the national average level, which was 2.6 %. The prevalence of underweight, stunted, and thin, was respectively 39.7 %, 52.5 % and 15.4 % (UNICEF,FAO,WFP and SEAMEO - TROPMEDRCRN University of Indonesia. 2010). The cases of malnutrition and obese also occurred abroad. The children around 3-59 months in South Africa were 26.3 % stunted, 12.0 % underweight and only 1.3 % severely wasted (Chopra, 2003). Prevalence of marasmus (protein-energy malnutrition, PEM) in India was 1.7 % in which 2.3 % for boys and 1.1 % for girls (Singh et al., 2006).

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Table 6: The Result of statistics analyzed

<table>
<thead>
<tr>
<th>No</th>
<th>Adequacy level</th>
<th>Nutritional status</th>
<th>Anemia</th>
</tr>
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<tr>
<td>1.</td>
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</tr>
<tr>
<td>3.</td>
<td>Iron</td>
<td>9.235</td>
<td>0.161</td>
</tr>
</tbody>
</table>
conducted by Sari & Titi (2010) showed that the contribution of snack nutrients has negative correlation to the nutritional status among the students of IbuKartini Junior High School, Semarang. It means that snack consumption becomes one of the factors affecting the nutritional status. The most consumed snack by children in early childhood is milk; the average is 2.2 bottles/day. This high milk consumption is a habitual activity a mother does until the children is 5-years-old. This study about milk consumption was conducted in one of the elementary schools in Medan. The results of study showed that milk consumption quality among students in Public Elementary School 6 was 1.38 glasses/day and in Swasto Santo Thomas Elementary School 2 was 1.95 glasses/day (Simanjuntak, 2005).

However, a new paradigm of milk has been changed. Qur'an surah Al-Baqoroh 233: “Breast feed your child up to 2-year-olds.” This article is in accordance with the human body condition, i.e. after two years, the enzymes (renin and lactase) used to digest the milk (breast milk) will have lower functionality. The content of casein in cow milk is 300 times higher than breast milk. Casein coagulation in the human body can make a big, solid lump and is often difficult for digestion. The results are constipation impaired absorption of other important nutrients. The acidic condition because of milk consumption will cause some problems in metabolism. Routine consumption of milk is closely related to diabetes type 1, cases of allergies and auto-immune reaction. Bovine Growth Hormone (BGH) which is given to cows (cows that grow rapidly) gives an adverse effect in humans because of BGH remains active in the body and is not damaged by pasteurization. BGH increases insulin-like growth factors (insulin-like growth factor / IGF-I). IGF-I makes children grow faster, triggers the transformation of breast cells and normal large intestine become cancer. Pasteurization of milk makes milk calcium deposited on the walls of blood vessels, especially the coronary arteries of the heart (Tan ShotYen, 2012).

The second type of snack is biscuit. Biscuits are crispy, dry, and tasty snacks, so children in early childhood like to consume it and practically used as school lunch, or afternoon and night snack. The same thing happens on bread, wafer, candy, bottled drink and chocolate snack, which is durable, practical and has a long shelf life. The shelf life of bread for three days, but chocolate and wafers can last longer. A variety of street foods mostly taste sweet, which means using a lot of sugar in the manufacturing process. According to Tan (2012), foods that contain a lot of sugar and flour do not give the full flavor and a sense of fullness in the stomach because it is less pulpy, so people tend to consume more food than they need. Based on that reason, that is why western menu (white bread, pastries, sweets, soft drinks) tend to make the body become overweight. The same thing is stated by Barasi (2009), high sugar intake is generally associated with dental caries, especially if they are in the form of sugar that is sticky and consumed in between meals. Consumption of soft drinks containing sugar ‘hidden’ in solution, resulting in excessive energy consumption are instrumental causes of obesity at a young age.

Most of the children in early childhood consume fruit in the afternoon. High consumption of fruit will positively affect the health of the fruit alkaline-forming properties. According to Tan (2009) fruits and vegetables are the only group that form foods alkaline properties which are needed to balance the body’s metabolism. To gaining health, diet should be natural, it means that the digestive function will be healthier if consumed food containing acid-base balance and cycles adapted to meal time’s digestive system. Acid-base balance of food makes the digestive system work naturally resulting in metabolic balance in order to stay healthy and function optimally. Therefore, the body requires more alkaline-forming foods than acid-forming foods. But unlike the fruit which has a limited shelf life when it is peeled and cut it lasts approximately 4 hours. Fruit is best to eat when it is fresh and immediately after peeling. This is done to avoid oxidation by air and heat that can damage and decrease the vitamin content. With cooked, fruits and vegetables organic matter “turned off” to be inorganic, such as in the soil (Tan, 2012).

In addition, fruits contain high fiber foods. Dietary fiber has very important physiological functions in helping to prevent various degenerative diseases. Slotnick and Slacer (2006) said that the consumption of dietary fiber can expedite the process of disposal of feces and reduce the risk of cancer and coronary heart disease. Other type of snacks commonly consumed are the food processed by adding the food additive, such as chips, sausage, candy and boxed beverages. The food additives that are widely used include flavourings, preservatives, and dyes. The continuum usage of food additives will endanger the healthy condition. According to Badan Perencanaan Pembangunan Nasional (2011) in food security situation in the period from 2006 to 2010, it can be seen from the increase of food industry products that are not eligible in each year. If these products are further examined, it can be found that the excessive usage of sweetener and benzoic, misuse of hazardous formalin materials, borax, and dyes are intended other than food are for microbial contamination. Traditional snacks such as porridge, fried snacks, boiled potatoes are consumed only in low frequency. It shows that both parents and children in early childhood are not interested in consuming traditional snacks. In addition, the shelf life of these foods is limited to about 4 hours. According to Moehji (2003) consumption of snacks will make the children feel too full, moreover if these snacks are given repeatedly in a day. Furthermore, Khomsan (2002) stated that snacks sold alongside a road are also vulnerable to food additives that are harmful to the body and are also susceptible to dust and air pollution of motorcycle. The snacks are sometimes not prepared hygienically. These kinds of snacks sooner or later will bring health problems.
CONCLUSION

1. 7.6% of children in early childhood were anaemic, of whom 3.1% were boys and 4.5% were girls. Gender and age did not affect the status of anaemia among the children in early childhood with $p = 0.701$, $p = 0.356$ respectively.

2. Nutritional status in Semarang early childhood is quite diverse, with nutritional prevalence of normal (64.5%), obese (12.5%), thin (14.5%) and very thin children (8.5%). Nutritional status of children in early childhood was not affected by gender with $p=0.415$, but was influenced by the age ($p=0.001$).

3. There were 20 types of snacks consumed by children in early childhoods each day, with the order of the highest frequency of milk, biscuits, bread, fruits and wafers consumption. Other snacks that were consumed were processed foods that contain additives such as chips, sausages, candy and packaged beverages. Traditional snacks such as porridge, fried, boiled potatoes were consumed only in low frequency.

4. The consumption of snacks among the children in early childhood in Semarang based on the content of energy, protein, and iron was respectively for 518 kcal, 17.1 g, and 4.2 mg and contributed to a high enough nutrients to fulfill the nutritional adequacy among children at 1-3 year-old was 47.1% of the energy, 66.4% of protein, and 64.1% of iron. While among children at 4-6 years-old, it contributed 32.0% of energy, 48.8% of protein, and 48.1% of iron. The largest contribution came from the milk in which the percentage of energy, protein and iron of milk at snack consumption were respectively for 44.9%, 62.1% and 80.5%.

5. Average of 43.5% energy adequacy level, protein 62.3%, and iron 56.0%. Gender affects the level of energy, protein, and iron adequacy snack food. But age did not affect energy and protein adequacy level, however iron did affect.

6. The adequacy level of energy, protein and iron did not affect nutritional status and anaemia ($p > 0.05$).

SUGGESTIONS

1. the parents need to provide healthy meals and nutritious snacks,
2. it is necessary to have knowledge, attitudes and skills of making snacks for children in early childhoods by teachers and parents, and
3. further research on the effects of milk consumption toward the growth and health of children in early childhood is necessary.

REFERENCES


