



## The Effect of Malnutrition on The Quality of Life of Children Aged 2-4 in Indonesia

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### ABSTRACT

*One of the indicators of a nation's welfare is the quality of life of children. Malnutrition can impair the body's immunity to various diseases, especially infectious diseases which interfere the growth and physical and mental development. As a result, this condition adversely affects the quality of life of children. The aim of research to determine the effect of malnutrition on the quality of life of children aged 2-4. This research uses historical cohort design. Subjects were 120 children within the age range of 2-4 years who live under the jurisdiction of Grabag Public Health Center Central Java Indonesia in 2016. The subjects of the research must meet the inclusion and exclusion criteria. The independent variable is malnutrition experienced by children and it is measured based on Standard Deviation (Z-score) with a standard weight for age (W/A). Quality of life is the perception of parents/primary caregivers of children about the health status of children in terms of physical, psychological, and social development. It is measured by using a questionnaire of PedsQL Generic Core Scale for 2-4 year old children. Analysis of data uses linear regression. Results: Malnutrition has an influence on the quality of life of children  $p = 0.000 < 0.05$  (95% CI = 7.79-13.25) after being controlled by family's economic factors . Malnutrition has an influence on all domains related to the quality of life of children, in physical function ( $p = 0.000$ ; 95% CI = 6.77-16.44), emotional function ( $p = 0.000$ ; CI = 9:09 to 17:15), and social function ( $p = 0.001$ ; CI = 3.27-11.60). Conclusion: There is a significant effect between malnutrition and the quality of life of children. It can be used as input for an increase in promotion and prevention programs for health workers in order to improve the nutritional status of children to prevent poor quality of life.*

**Key Words:** malnutrition, the quality of life, 2-4 year old children.

### INTRODUCTION

Quality of life is overall sense is someone's well-being which includes several including happiness and complete life satisfaction. Quality of life is very broad and considered as subjective matter; therefore, the quality of life is often referred to as subjective health status, functional status and health-related quality of life. Quality of life is also often associated with the ability of physical activity everyday either in healthy or sick condition. Quality of life is the degree to the which a person enjoys the important possibilities of his or her life.<sup>1</sup>Problems in quality of life of the child is intricately complex and is influenced by many factors, such as global condition (government policies and social values), external conditions (neighborhoods, socio-economic status, family, health, and education of parents), the interpersonal condition (social relationships ithin the family, peers), and the personal conditions (age, gender, genetic, hormonal and nutritional status).<sup>2</sup>

Nutritional status is one of the factors which determines the quality of life. Malnutrition can impair the body's immunity to various diseases, especially infectious diseases which interfere the growth and physical and mental development, resulting in the low quality of human.<sup>3</sup> The data show that the percentage of under 5 year-old children with malnutrition in Indonesia was 3.8%.<sup>4</sup>, while the prevalence of malnutrition in children under five by 2014 in Central Java was 0.16%.<sup>5</sup> The study on the nutritional status and quality of life was conducted by Keshavarzi et al. (2015) and Miranty (2015). The results showed that children with malnutrition have a poorer quality of life. 35.7% of children with malnutrition have a good quality of life and 64.3% of those have a poor quality of life.<sup>6,7</sup> The purpose of this study was to determine the effect of malnutrition on the quality of life of children within the age range of 2-4 years.

## METHOD

Subjects were children within the age range of 2-4 years who live under the jurisdiction of Grabag Public Health Center Central Java Indonesia in 2016. The subjects of the research must meet the inclusion in which they are willing to participate in the research as the subjects and exclusion criteria, in which they suffered from serious disease for one last month, congenital defects and the subject is not found. The number of samples 120 (34 children belong to malnutrition group v.s 84 children in normal nutrition group). The independent variable is malnutrition experienced by children and it is measured based on Standard Deviation (Z-score) with a standard weight for age (W/A). Quality of life is the perception of parents/primary caregivers of children about the health status of children in terms of physical, psychological, and social development. It is measured by using a questionnaire of PedsQL Generic Core Scale for 2-4 year old children. The questionnaire contains 21 questions, consisting of: physical (8 items), emotional (5 items), social (5 items), school (3 items). Number zero (never) gets a value of 100, one (very rarely) gets a 75, two (occasionally) gets a 50, three (often) gets 25, and four (always) gets the value zero. The higher the value, the better the quality of life of respondents. External variables studied are sex, mother's education, father's education, social status (parents' occupation), and the economic status (income). Analysis of data uses linear regression. Multivariate analyzes are performed on variables which pass the selection of bivariate i.e. having a p-value <0.250. The model is fit if the model significance  $\leq 0.05$  and partian significance  $\leq 0.1$ .

## RESULT

This research was conducted in Grabag Public Health Center Magelang, Central Java Indonesia in 2016. The total sample of 120 subjects consisting of 34 children with malnutrition and 84 children in normal nutrition. Malnutrition is the main independent variable meanwhile dependent variable are the quality of life of children and external variables including sex, mother's education, father's education, social status (parents' occupation), and the economic status (income). Distribution characteristics of the subjects presented in Table 1 below.

**Table 1.** The frequency distribution of subjects' characteristics based on sex, mother's education, father's education, mother's occupation, father's occupation and family income.

Subjects' Characteristics	Frequency	%
Sex		
-Male	65	54,2%
-Female	55	45,8%
Mother's Education		
-Low	70	58,3%
-High	50	41,7%
Father's Education		
-Low	85	70,8%

-High	35	29,2%
Mother's Occupation		
-Working	90	75,0%
-Jobless	30	25,0%
Father's Occupation		
-Working	2	1,7%
-Jobless	118	98,3%
Income		
< Rp 1.410.000;	54	45,0%
≥ Rp 1.410.000;	66	55,0%

Table 1 shows that most respondents are male (54,2%). The percentage of low education of mothers is 58,3%. The education of father is basically low (70,8%). Most mothers do not work (75,0%), but father mostly work (98,3%). 55,0% respondents have income higher than minimum regional wage.

The result of data normality shows that data are spread in normal distribution, so the analysis will use t-test and linier regression. This test is performed in all aspects of life's quality such physical, emotional and social function as well as the total score of all functions (the overall life's quality). The result of analysis on the effect of malnutrition and other external variable towards the life's quality of the children is presented in Table 2

**Table 2** The result of multivariate analysis on the correlation between malnutrition status and characteristics towards the total score of life's quality

Subjects' Characteristics	Coefficient	CoefficientCorrelation	p	95% CI
Malnutrition	10,52	0,55	0,000	7,79-13,25
Income	4,08	0,23	0,001	1,60-6,55

The result of statistical test using linear regression shows that malnutrition and income significantly affect the total score of life's quality of children. Malnutrition has significant influence on the total score of life's quality with the value of  $p=0,000,0,00$  (95%CI=7,79-13,25). Income has significant influence on the total score of life's quality with the value of  $p=0,001<0,00$  (95%CI=1,60-6,55).

**Table 3.** The effect of malnutrition and other external variables on the physical function of life's quality

Variables	Coefficient	CoefficientCorrelation	P	95% CI
Malnutrition	11,61	0,39	0,000	6,77-16,44
Income	6,36	0,23	0,005	1,98-10,74

Malnutrition and income are two variables having significant influence on the physical function on the life's quality of children. Malnutrition is significant with  $p\text{-value}=0,000<0,000$ (95%CI=6,77-16,44) and income has the value of  $p=0,005$  (95%CI=1,98-10,74).

**Table 4** The effect of malnutrition and other external variables on the emotional function of life's quality

Subjects' Characteristics	Coefficient	CoefficientCorrelation	P	95% CI
Malnutrition	13,12	0,51	0,000	9,09-17,15

Malnutrition has an influence on the emotional function on the life's quality of children with the value of  $p=0,000$  (95%CI=9,09-17,15). Other external variables do not have significant influence.

**Table 5** The effect of malnutrition and other external variables on the social function of life's quality.

Subjects' Characteristics	Coefficient	CoefficientCorrelation	P	95% CI
Malnutrition	8,22	0,33	0,000	4,06-12,38

Malnutrition has an effect on the social function of the quality of life of children with  $p = 0.000$  (95% CI = 4.06 to 12.38). Another external variable is not significant.

Statistical test with multiple linear regression must meet the assumption of a multivariate model. This assumption test is performed to determine homocedasticity, existence, independence, linearity, multivariate normality, and collinearity. In this study, a scatter plot forms a pattern of four vertical lines which meet the four quadrants, so homocedasticity principles are fulfilled. The value of the mean residual is 0.00000; the existence assumption can be fulfilled for each malnutrition variable. Therefore, the variable quality of life is a random variable with the sampling technique which is done randomly. The assumption of independence in this study is fulfilled, and the result of the Durbin-Watson test is 0.850 which is between -2 up to +2. This independence assumption means that the statistical value of the quality of life of each individual does not depend on each other. Measurement of quality of life in this study is performed once, so the assumption of independence can be obtained. The study also meets the linearity assumption. From Anova test results, it is obtained that value of  $p < 0.05$  ( $p = 0.000$ ); thus, the model is linear. The assumption of multivariate normality in this study is fulfilled by considering the histogram. As a result, normal arch curve is obtained. and P-P plot residual of the data does not spread far from the diagonal line and follows the direction of the diagonal. The result shows that the normality assumption is obtained. Collinearity assumption can be seen from the VIF or tolerance. if  $VIF < 10$ , the principle of collinearity is achieved<sup>8</sup> In this study, the value of VIF is 1,047, so collinearity principle is fulfilled.

## DISCUSSION

In general, quality of life of children is influenced by many factors, including global conditions such as government policies and principles in the community which provide child protection. It is also influenced by external conditions including living environment (season, pollution, geographical situation, house density, ventilation), socioeconomic status of the family, health care and education of parents; interpersonal conditions including social relationships within the family (parents, siblings, and other relatives at home), peers; and personal conditions which include physical, mental, and spiritual in children, such as age, gender, genetic, hormonal and nutritional status<sup>2</sup>. This study investigated the effects of malnutrition, sex, mother's education, father's education, mother's occupation, father's occupation, and income to the quality of life of children.

In this study, the subjects of malnutrition are 34 children (28.3%) and of normal nutrition are 86 children (71.7%). The results show that malnutrition has significant influence on all the functions of the quality of life such as physical function, emotional function, and social function. These results are consistent with research Ariani et al (2012) which states that nutritional status has a significant relationship with the quality of life of children with heart disease.<sup>9</sup> According to research conducted by Miranty (2015), the percentage of children with good nutritional status is 75% and they have good quality of life, and 25% of children have poor quality of life.<sup>7</sup> Nutritional status is one of the factors that affects the quality of life of children. Research conducted Wary (2013) also found that children with good nutritional status have a better quality of life compared to children with low nutritional status.<sup>10</sup>

Keshavarzi et al. (2015) mentions that the respondents with malnutrition or at risk of malnutrition have significantly worse quality of life than respondents who have a good nutritional status.<sup>6</sup> Similarly, research conducted by Istutiningrum (2015), which examines the relationship of nutritional status and quality of life suggests that there is a significant relationship between nutritional status and quality of life.<sup>11</sup>

The results of the bivariate analysis show that gender does not have a significant effect on quality of life of children especial in physical function, emotional function, social function, and score of the overall functions in quality of life. This supports research of Budi (2015) which states that there is no difference between the quality of life of boys and girls in the four dimensions of quality of life: physical, emotional, social and school. Parental education is an important factor in the level of the family's social status. Education of

arents affects the child's ability to socialize. Parenting much depends on the education of parents, and parenting influences a child's social interaction skills.<sup>2,12</sup>

Mother and father's education level significantly affects physical function and total scores of quality of life. The results are consistent with the results of research which states that the education of parents influence on the understanding of disease, treatment compliance, parenting, and the child's ability to interact socially, In other words, parents' education has a positive relationship with quality life. This happens because the level of formal education mothers and fathers reflects the level of knowledge of the disease. Parents with high formal education, with the advancement of health information through the media, either printed or audiovisual, and actively participate in socialization about good health in Integrated Mother-Children Health Center or Public Health Center, will have better knowledge about health. Higher education will also affect a person's patterns and ways of thinking, which in turn affects a person's behavior and parenting skill.<sup>2</sup>

A person's socioeconomic status is external factor which also affects the quality of life<sup>2</sup>. Social status can be seen on the status of mother and father work. Research conducted by Puspitarini (2016) shows that based on the statistical data, socioeconomic status is not significantly associated with quality of life. This is in line with research Arnaud et al. (2008) in Puspitarini (2016) which states that a socioeconomic status does not relate to the quality of life of children. In this study, all functions of the quality of life are not affected by mother and father's occupation. In this study, most mothers do not work (75.0%) and most fathers work (98.3%). Data are less varied (homogeneous); thus, the occupations of parents is not quite related to quality of life of 2-4 year old children aged 2-4.<sup>13</sup>

Income which reflects the economic status is one of the external conditions which may affect the quality of life of children. In this study, the majority of respondents have the income equal to or above the minimum wage. All functions of the quality of life better such as physical, emotional, and social functions, as well as the total score of quality of life are significantly affected by family income. This study is in line with research who reports that low family income has a negative impact on the quality of life.<sup>12</sup> Other findings are presented by Glinac et al. (2013) who states that low- and middle-economic status have a lower quality of life than those with high economic status.<sup>14</sup>

Malnutrition is a condition in which the body does not get adequate nutrition. Malnutrition can also be referred to circumstances caused by the imbalance between food intake with nutritional needs to maintain health. This can happen due to the inadequate food intake or an unbalanced diet. In addition, malnutrition also results in malabsorption of food or metabolism failure.<sup>15</sup> In terms of food, pre-school children are active consumers. Anggraini (2010) explains that preschool children begin to select the type of food they would like to eat, and say 'no' to the kind of food they do not like. Introducing and giving new types of food to children at this age is much harder than to toddler. Thus, a lot of problems arise, for example, children refuse to eat food they do not like and just want to eat their favorite food. One of the problems happens when a child is reluctant to consume more vegetables and prefer instant foods.<sup>16</sup>

Short-term effects of malnutrition on child development are apathy, speech disorder and other developmental disorders. Meanwhile, long-term impact are decrease in score of intelligence quotient (IQ), decrease in cognitive development, impaired sensory integration, attention deficit disorder, low self-confidence and the decline in academic performance in school. Malnutrition could potentially be the cause of poverty due to the low quality of human resources and productivity.<sup>17</sup> With the declining quality of life, it can be seen that malnutrition affects the quality of life of children. The nutritional status is a personal condition which can affect the quality of life of children<sup>2</sup>.

Income is the second most influential factor in physical function and total scores of quality of life. This study show that the higher the family income the better score of quality of life. The higher level of economic status will improve the attention to the health of children, including the source of funds to provide adequate child nutrition. Besides, it will also affect the health information obtained by the parents, either through

printed or audio-visual media. <sup>2</sup> This study has limitations, so it requires improvement or development for future studies.

## CONCLUSION

Malnutrition has an influence on the quality of life of children after controlled by economic factors family. Malnutrition has an influence on all domains of quality of life of children especially in physical, emotional, social functions. It is important to provide health education to the community about child nutrition which aims at preventing malnutrition and improve the children's quality of life.

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