nporary Issues in Childhood ... ISBN: 978-1-53617-348-2
Ratan Ghosh and K. Bose ©2020 Nova Science Publishers, Inc.

Chapter 8

SOCIAL ECONOMIC STATUS IS ASSOCIATED WITH NUTRITIONAL STATUS OF CHILDREN IN WEST SUMATRA, INDONESIA

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ABSTRACT

Nutritional status is a strong indicator that can be used to show the level of social and economic development of a country. Several classical studies by Martorell (1986) and Tanner et al., (1982) conducted in various countries have shown that there are differences in average height and growth rates that differ between children from poor families compared to children from rich families in the same nation. If the difference in growth of rich family children is caused by genetic factors is 2-3 cm, the difference caused by the economic unequal gap in the same nation is around 10-12

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cm. In studies comparing the growth rates of various nations, it was found that children from rich families in nations in Latin America, Africa, and India, had growth rates that were not different from those of European families. Whereas in Asian children, genetic differences still play an important role, Asian children experience better growth in line with secular trends but their optimal growth potential is still lower than the average growth. This difference is more evident after children reach puberty. Mortorell (1986) and Tanner (1982) has become the basis of various studies that prove the relationship between height and economic status. A report from Ghana by Hong (2007) shows that children at the lowest socioeconomic status of 20% in their community have a double risk of suffering stunting from the richest 20% in the same area and this result was not controlled by age, gender, order of children in the family, length of breastfeeding, birth weight, age at delivery, body mass index, education, access to clean water, toilet washing facilities, residence, and geographical area. Furthermore, a study in Angola (Kennedy et al., 2005) shows that at the same economic level there was no difference in the prevalence of stunting both in rural and urban areas.

Stunting during the early period of life is critical, because the first few years in life are a particularly important period in human development. The development of cognitive abilities begins in this period (Mendez and Adair, 1999; Grantham Mcgregor, 2007). Stunting during infancy and early childhood adversely affects cognitive development. Crookston et al., (2010) found that stunted children aged 6 and 18 months, and were followed up at age 4.5 to 6 years old, have had lower intellectual ability than children who were not stunted. Kar et al., (2008) conducted a study on children aged 5-7 years and found significant differences in cognitive development between stunted children and non-stunted children. A study in Vietnam reported an increase by a standard deviation in height for age Z score (HAZ) leads to an increase by one fourth of a standard deviation of the log score of language ability (Le Thuc Duc, 2009). These were previously confirmed by other studies (Mendez M. A. and Adair L. S., 1999; Walker S. P. et al., 2005; Grantham McGregor et al., 2007, Grantham Mcgregor, S., 2007).

Psychosocial stimulation in early childhood had significant benefits in the improvement of stunted children's psychological development. Stunted children who received stimulation had levels of anxiety, depressive syndrome, and self esteem similar to those of the nonstunted children (Walker S. P. et al., 2006). Maternal role is the key in providing psychosocial stimulation. Improvement of maternal education will increase the possibility of catch-up growth and levels of cognition in later adolescence (Crookston et al., 2010).

This paper describes a study conducted in West Sumatra, Indonesia. The study was done to determine the relationship between socio-economic statuses and nutritional status.

METHODS

The study was conducted in two sub-districts in Padang, capital city of West Sumatra Province in Indonesia. The population was new children enrolled in primary schools. The sample was first grade children and as many as 124 people in selected elementary schools, which was selected through a multistage random sampling. Subdistricts were divided into urban and suburban. Of the 5 sub-districts in the urban setting, North of Padang Utara was chosen. Of the 6 suburban settings, Pauh was chosen. Two elementary schools in Padang Utara were selected and three elementary schools in Pauh were selected for this study. All first grade pupils and their mothers from selected schools were included in the study with exclusive criterias: twins, having physical disabilities, living outside the research area, absent during the study and mothers who are not willing to be interviewed and who are not found at the time of data collection.

All children recieved anthropometric measurements for weight and height assessments. Mothers were interviewed to assess socioeconomic status, family characteristics, and accessibility level of health services and sanitation facilities. Height was measured by using microtoise that has an accuracy up to 0.1 cm.

Data was analysed using SPSS 20.0. To find out the relationship between socio-economic status and nutritional status, chi -square test was used with significancy level of p value <0.05. Pair t test and Pearson correlation were also used.

RESULTS

A total of 153 subjects were eligible in the study but only 80% of all first grade students were included in this study due to absence, living outside the study area, and mothers were not found during home visits.

Characteristics of the Subjects

First grade students in urban areas were relatively younger than first class students in the suburban, with significant differences. The average age of children in both locations is 6.8 years. Mother's age in the urban and in the suburban was similar which was around 51-54% less or equal to 35 years. Mothers in urban areas had higher education; 86% finished high school education or higher. Only 24% of mothers in the suburban area did the same.

Socioeconomic status was measured by using total expenditure per capita per month, amount of food expenditure per capita per month, and percentage of expenditure per capita for food every month. The average total expenditure per capita was higher in urban areas compared to the suburban areas. The average expenditure for food in the urban was 2 times higher than the average amount in the suburban. The percentage of food expenditure in urban areas ranges from 22-27% of total expenditure while in the suburban was even higher, between 37-87%.

Nutritional Status

The average height of children in urban areas was higher than children in the suburban. Boys in urban areas are 3 cm taller than boys in suburban, as shown in Table 1.

The range of boys' height in urban areas was 109.1-129.5 cm and in the suburban was 103.3-118.4 cm. The range of height of first grade girls in urban girls was 108.7-126.2 cm and in the suburban was 104.0-126.0 cm. The statistical test results of the differences between these two groups were very significant ($p = 0.000025$).

The tallest children from the high expenditure group was 10.1 cm taller than children from lower expenditure in urban area, whereas in suburban, the difference was 6.1 cm. Children from families with low food expenditure in urban areas are 4.1 cm taller than their peers in the same group in the suburban, while children with high expenditures in urban were 2.9 cm taller with their peers in the suburban.

Table 1. Differences of nutritional status and height based on gender and expenditure between urban and suburban

Characteristics	Urban	Suburban	p
Height: Boys	115.9 ± 4.3	112.8 ± 4.6	<0.01
Girls	116.8 ± 3.7	111.6 ± 4.3	<0.0001
High total expend	116.4 ± 4.10	116.1 (± 3.21)	<0.05
Low total expend	112.0 ± 5.72)	112.4 (± 3.79)	<0.05
	p < 0.001	p < 0.001	
High food expend	116.5 ± 4.23	113.6 ± 3.53	<0.001
Low food expend	116.0 ± 4.14	111.9 ± 5.59	<0.001
	p < 0.05	p < 0.05	
Stunting	7 (10.0%)	28 (51.9%)	<0.0001
Normal	63 (90.0%)	26 (48.1%)	

Pearson correlation tests were also done between various indicators of socio-economic status with nutritional status. We found that there was close relationship between economic status and height. Total expenditure, food expenditure, and percentage of food expenditure had a positive linear relationship with height of the children.

Discussion

Total expenditure is a proxy for family socio-economic indicators. In this study, total expenditure per capita per month, total food expenditure and, percentage of food expenditure is significantly lower in suburban families. This is a general description of the situation in developing countries. In India, Venkaiah et al., (2002) reported that 37% of the population in rural areas had poor economic status.

This study reported height differences of children according to gender and location. Boys in urban areas were 3 cm higher compared those in suburban areas while in girls the differences was 5 cm. Girls in urban areas were taller than boys, however, boys were taller than girls in suburban areas. Ulukanligil et al., (2004) found also that boys in school children in urban

areas in Turkey are smaller than girls. Moreover, we found that the tallest boy in urban areas was 11 cm higher than the shortest boy in the suburban area, while the tallest girl in the suburban area was 4 cm shorter than the shortest girl in urban areas. The result of this study was similar with the findings of Hakeem (2001) that showed the better the economic status, the fewer children in the short category. Jalal and Soekirman (1990) concluded that the difference in the growth of children from rich families compared to poor families in the same nation was 10-12 cm.

This study found that the prevalence of stunting in children in suburban areas was 51.9%, compared to 10% in urban areas. Ministry of Health of Indonesia, which conducted periodic Basic Health Surveys, reported that the prevalence of stunting in Indonesia was 36.8%, 35.6% and 37.2% between 2007, 2010 and 2013. Ministry of Health of Indonesia also reported the prevalence of stunting children from families in quintile 1-2 was 41.2% compared to only 27.8% in children from quintile 4-5. The result of this study found that there was a significant difference in the relationship between total food expenditure and percentage of food expenditure with height of the children.

Several determinants, such as distribution of income and nutritional status during infancy, are reported to affect the height of children after they reach pre-adolescence (Thomas and Frakenberg, 2002). Stunting is related with duration of education, improvement in body height, and prolongs the number of classes passed, which means higher levels of education (Alderman et al., 2006). Research in Turkey, Ghana and, Bangladesh also consistently reported a close relationship between the socio-economic level and stunting (Turan et al., 2007; Wamani et al., 2006; Pryer et al., 2003). A study in Mexico by Fernald and Neufeld (2007) showed a relationship between stunting and obesity in children from low socioeconomic levels, mothers with low and short education, numbers of children, and low city mastery. Furthermore, the study by Ulukanligil et al., (2004), which examined differences in height of children living in slums and children living in apartments in urban areas in Turkey, showed that the prevalence of stunting in children living in slums was higher than children living in apartments. However, studies in Trinidad and Tobago reported that

ethnicity, parental height, birth weight, maternal age at delivery, and number of children in the family were associated with height, while economic status was not related (Rona et al., 2004).

This study supported other studies in other developing countries that shows anthropometric index as a strong indicator of growth of children. The use of the anthropometric index as socio-economic indicator is no doubt. The growth of children in achieving optimal growth potential is the result of adequate nutritional needs. This situation can only be achieved if the socio-economic conditions are getting better and more evenly distributed.

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