## RELATIONSHIP BETWEEN FAMILY INCOME AND CHILD HEALTH IN INDONESIA

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**ABSTRACT**
This study aims to examine the income-health gradient and empirically test the probability of the dependent variable on the child's health status, especially the role of insurance variables, and maternal variables working on children's health status. The use of these 2 (two) variables aims to reduce the social-economic relationship between family income and children's health status. The results of replication from Park's study (2010) showed different income-health gradient results. In this study the results of income-health gradient occurred in school-age children in the 2000-2007 panel data and income-health gradient occurred in the 2007-2014 panel data for preschool and school-aged children, in contrast to Park's (2010) income-health gradient results. only occurs in preschoolers. The role of insurance variables has not been able to reduce the relationship of family income and children's health, while the working mothers variable can reduce the relationship of family income and child health only on the 2000-2007 panel data. Supervision and improvement of insurance facilities by the government as a solution to improve children's health in an effort to break the chain of intergenerational poverty, and increase the program of increasing the proportion of the population with calorie intake below the consumption level of 1400 kcal / capita / day.

**KEYWORDS:** Income-health gradient, insurance, working mother.

## INTRODUCTION

Since the Millennium Declaration was agreed in September 2000 by 189 member states of the United Nations (UN) which aims to bring together world leaders committed to addressing issues of peace, security, development, human rights and fundamental freedoms in one package. To realize the commitment of the Millennium Declaration, the Indonesian government made a number of goals / objectives and accompanied by measurable targets, including in the health sector with the main targets for alleviating poverty. The goals and targets to improve health include: First, the goal of reducing child mortality by targeting a reduction in under-five mortality by two-thirds, between 1990 and 2015. Second, the goal of improving maternal health with a target to reduce maternal mortality between 1990 and 2015 amounting to three-quarters.

Investment in the health sector as one of the efforts to improve the quality of human resources has experienced rapid development, this shows that an increase in individual awareness of the importance of excellent health to carry out production activities. Health can be seen as capital in improving human resources (Mushkin 1962, pp. 129-157) but

according to Grossman (1972) health is a different capital from other human capital. The difference according to Grossman (1972) lies in the initial health stock inventory that is owned by each individual so that it can determine the amount of time that individuals can use to work and other activities. Health needs are not only limited when individuals get health care at the time of illness, but health care is more needed by individuals in order to maintain health so as to minimize time loss for work. Further impact with loss of working time, the individual will automatically experience a decrease in income.

The positive correlation between income and health proves that the phenomenon of rich people has a better level of health compared to poor people, this is due to limited information about psychosocial and behavioral mechanisms that can explain the relationship of income and health (Nancy E. Adler et al .; 1994) Most of the research on income and health relations sees correlation through the family's socioeconomic status. Research carried out on all social strata aims to explain the mechanism of the relationship of income and health as a whole.

The first time is the empirical model of the relationship between family income and child health (income-health gradient) introduced by Case, Lubotsky, and Paxson (2002). His research explains income-health gradient occurs through the arrival of chronic diseases in children that occur stochastically in families with different socioeconomic conditions. The inability of low-income families to overcome chronic diseases in their family members can adversely affect the educational attainment of their children, this can increase the difference in the quality of human resources in poor families and rich families. If this situation is not addressed then the impact of the conditions of poverty can be inherited between generations.

Other research pioneers, Currie and Stabile (2003) address the causes of income-health gradients in children in Canada through health insurance as an effort to prevent reciprocal relationships between children's health and family income or socioeconomic. The results of his research show that children from poor families are more susceptible to shock or health shocks than children from wealthy families. Although in general all children in Canada have insurance facilities, but this insurance facility has a weakness, namely the prevention of chronic diseases not included in the insurance facility. This is what causes poor families to be more vulnerable in completing treatment of chronic diseases completely because of expensive medical expenses.

Research in Indonesia conducted by Park (2010) uses the Indonesian Household Life Aspect Survey data (IFLS) in 1997 and 2000 using the same methodology as Case, Lubotsky, and Paxson (2002). Park's (2010) study concluded, first, strong income-health gradient occurs in children less than 7 years old (preschool) but at the age of 7-14 years (school age) income-health gradient is getting weaker. Secondly, Park (2010) found evidence that schools contribute to equating health status to children with different socioeconomic backgrounds. Third, access to public health providers was found to play an important role in shaping income-health gradients.

In the previous literature discussions on income-health gradients discussed more about income changes and other aspects that caused family income to rise or fall, while fluctuations in children's health were not observed. On this basis Flecher & Wolfe (2012) made corrective steps in examining fluctuations in children's income and health simultaneously, as an effort to prove that family income is a determinant of health status in children. Improvement steps in Flecher & Wolfe's (2012) study were carried out with 3 (three) steps of improvement, namely: First, using data with a duration of 9 (nine) years. Second, observing fluctuations in family income and children's health. Third, control the disturbing elements that come from the environment such as socio-economic and crime that can affect income and children's health (omitted bias).

This research continues Park's research (2010) using the same data, namely IFLS data. The difference lies in the use of the survey year, if at Park (2010) used the 1997 and 2000 survey years with a duration of 3 (three) years, while in this study used a survey year of 2000, 2007 and 2014 with a duration of 14 (fourteen) years. The difference in the use of survey data in addition to updating the previous data also aims to improve the duration of the study time in accordance with the corrective steps taken by Flecher & Wolfe (2012) and aims to divide the research data into 2 (two) parts based on the age group of children namely preschoolers (0-6 years) using panel data in IFLS in 2000 and 2007 and school age (7-14) using panel data in IFLS in 2007 and 2014.

In addition, this study wants to see changes in income-health gradients in Indonesia due to government programs in the health sector as a result of the Millennium Declaration since September 2000. Government policies in the health sector include: First, the Community Health Insurance program (Jamkemas) in 2008, this program was made to ensure access of the poor to health services. Second, referring to Healthy Indonesia 2010, the Making Pregnancy Safer (MPS) has been launched, which focuses on a systematic and integrated planning approach in clinical and health system interventions and an emphasis on partnership. This MPS is carried out by increasing access and coverage of maternal and newborn health services; build effective partnerships through cross-program and cross-sector collaboration; encourage the empowerment of women and families; and encourage community involvement.

This study aims to empirically test the hypothesis that there is still a link between the health conditions of children and family income in the Indonesian population, where children from higher income families have better health conditions than children from lower income families and examine empirical probability of the dependent variable on the child's health status, especially the role of insurance and the mother working on the child's health status.

## LITERATURE REVIEW

### Concept of Health as Capital and Health Demand.

Grossman (1972) argues that health capital is different from other forms of human capital. Health capital specifically, is influenced by the level of income and level of individual education so that it affects productivity in work and other activities, while a person's health condition which is considered as stock will determine the amount of time an individual can use to generate income and commodities.

Individuals are seen as producers of health with decisions made based on individual choices about health behavior and use. In this model, the individual's initial health status is determined at birth which is called the initial health supply, as time goes by, this initial health supply will depreciate. The depreciation process depends on the investment of the individual in health care.

The results of investments in health by individuals will be marked by how to live their lives, in a healthy or unhealthy state. When health supplies drop to a certain level, death will occur. Health production functions can be formulated as follows:

$$H_t = H\left(X_t, C_t, L_t^l, \eta_t^u, \varepsilon_t^u\right)$$

Where, , $L_t^l$ is the time needed to maintain health, $H_t$ health, , $\eta_t^u$ and $\varepsilon_t^u$ are both observed and unobserved external factors that affect health $(H_t)$ (Note $H_{t-1}$ is the beginning of health starting with the child's weight at birth in the Grossman model).

According to Michael Grossman (1972), individuals have two reasons for the demand for health, namely: first, health as a commodity of consumption, health is something that is

needed by consumers where consumers can carry out economic and non-economic activities without being disturbed by their health. Second, health as an investment, health conditions will determine the amount of time available to someone, the length of time a person is ill will affect the amount of time he can do to work and do other activities. In addition, illness can cause a person to lose his income due to not being able to work while he is sick.

**Income-health gradient.**
On the basis of the concept of health as capital and health demand made by Grossman (1972), Case, Lubotsky, and Paxson (2002) formulated a basic model of calculation for income-healt gradients as follows:

$$H_{it} = \alpha + \beta_1 \log(Y_{it}) + \beta_2 X_{it} + \varepsilon_{it}$$

Where H_it is a child's health condition at a certain time (t), $\log(Y_{it})$ is a log of the average family income (preferably regular or fixed family income). $X_{it}$ is an external factor that affects the health of children, is a factor that influences the state of children's health (H). When $H_{it-1}$ the child's health condition at t-1 can sometimes reduce the level of health that was not previously expected. The error of this demand equation $\varepsilon_{it}$ has 2 components, the components that do not vary from time to time and components that vary from time to time are assumed to be external and uncorrelated.

Calculation of income-healt gradient is formed from a child's health which is influenced by various types of parental characteristics including genetic or behavioral correlations with parents' income. This study explains the relationship between income and health through the characteristics of parents and other children's environments, such as the health of parents and superiors. Case, Lubotsky, and Paxson (2002) research takes the concept of production functions to form the equations they make. Child health status is considered as output while input to produce a child's health status uses family income along with other factors that cause family income to rise or fall.

**METHODS**
The type of data used is panel data derived from The Indonesian Family Life Survey (IFLS) or IFLS. IFLS is an ongoing longitudinal socio-economic survey in Indonesia. The sample represents about 83% of the Indonesian population and contains data on more than 30,000 Indonesians living in 13 provinces in Indonesia. The IFLS data contains survey data on individuals, households and communities, the survey provides information about health care providers and schools. The IFLS survey data has a separate module for children under the age of 15 who provide information about the history of children's education, morbidity, self-medication, hospitalization and outpatient visits. The IFLS data used in this study are the IFLS survey in 2000, 2007 and 2014.
The empirical method of early formation of the income-healt gradient model is formulated by Case, Lubotsky, and Paxson (2002) based on theories about health as capital and health demand made by Grossman (1972). The following is the chronology of the model formation which starts from health utilities in the family, the following explanation:

$$U_t = \left(H_t, X_t, C_t, L_t^l, \eta_t^u, \varepsilon_t^u\right) \tag{1}$$

Where, $U_t$ is a family utility at time t, $H_t$ health of children, $X_t$ is an item that affects the health of children (toys, food, and home), $C_t$ is another commodity consumed by the family, $L_t^l$ is leisure / leisure, $\eta_t^u$ and $\varepsilon_t^u$ are external factors both observed and unobserved.
By following Grossman's steps (1972), children's health can be written as follows:

$$H_t = H\left(X_t, C_t, L_t^l, \eta_t^u, \varepsilon_t^u\right) \tag{2}$$

Where, $L_t^l$ is the time needed to maintain children's health, children's health $H_t$, $\eta_t^\mu$ and $\varepsilon_t^\mu$ are both observed and unobserved external factors that affect children's health $(H_t)$ (Note $H_{t-1}$ is the beginning of a child's health starting with the child's weight at birth in the Grossman model).

From the theoretical concepts Case, Lubotsky, and Paxson (2002) conclude that the concept of production function theory can be applied to income-healt gradients by using children's health status as family output and income along with other causal factors that cause family income to rise or fall as input . Finally, an empirical specification model is formed for income-healt gradients like the following:

$$H_{it} = \alpha Y + \beta Z_{it} + \mu_{it} \tag{3}$$

Where $H_{it}$ is a child's health condition at a certain time (t), Y is the average family income (preferably the average family income) derived from $C_t$ in equation (2). $Z_{it}$ is an external factor that affects children's health, a factor that influences the child's health condition (H) derived from $X_t$ in equation (2). When $H_{it-1}$ the child's health condition at t-1 can sometimes reduce the level of health that was not previously expected. The error of this request equation $\mu_{it}$ has 2 components, the components that do not vary from time to time and components that vary from time to time are assumed to be external and uncorrelated.

In Case, Lubotsky, and Paxson (2002) research using chronic disease as an external factor to identify the occurrence of income-healt gradient because Case, Lubotsky, and Paxson (2002) assess that chronic disease occurs stochastically regardless of the family's socioeconomic level. Therefore, chronic diseases suffered by children can explain the relationship between child health and family income, because with the presence of chronic diseases can show how the ability of family income in completing the stages of treatment of chronic diseases to the child's health condition is healthy again.

The results of Case, Lubotsky, and Paxson (2002) research in the United States of 14 (fourteen) types of chronic diseases have 3 (three) chronic diseases that cause the average decline in children's health status and the largest family income, namely asthma (-0,048) , diabetes (-0.139), and epilepsy (-0.077). The impact of a decline in family income concluded that asthma accounted for around 20 percent, physical disability reached 9.3 percent, and heart conditions reached nearly 5 percent. For chronic diseases that require the longest health recovery time, asthma according to statistical results recorded more than 50 percent for recovery and 40 percent for hospitalization.

While in the study Currie and Stabile (2003) in Canada explain the causes of income-healt gradient through conditions when health shock occurs in children and observe family income responses to different socioeconomic conditions in restoring the child's health after experiencing a health shock.

The results of Currie and Stabile (2003) study conclude 2 (two) forms of panel data results, first by replicating the research of Case, Lubotsky, and Paxson (2002) changes in age groups of children aged 0 to 3 years to children aged 13 to 15 years produce logs income decreased by 0.121 (without the mother's education control variable), after maternal education was included in statistical calculations it produced steep gradient income-healt faster than the calculation of Case, Lubotsky, and Paxson (2002). The results of this study show the fact that even though children in Canada have universal health insurance but not much help when children experience health shock. Second, the analysis of the health shock in 1994 turned out to have a negative relationship with the child's health status in 1998, although in 1994 children experienced chronic health conditions. The results of this study indicate that the health status of children becomes worse because of the state of poor children's health status before the health shock occurs.

In the research of Flecher & Wolfe (2012) to find out the income-healt gradient is done by following the development of school children along with the increasing age of children from kindergarten to grade 8. With this method, Flecher & Wolfe (2012) are able to follow the development of health children and changes in family income for 9 years.

The results of Flecher & Wolfe (2012) research income-healt gradient of kindergarten-elementary school grade 5 shows a good relationship between family income and child health, whereas from grade 5 - grade 8 income-healt gradient is horizontal or decreasing. Furthermore, by replacing current income with average income, the results of the study produce steep gradient income down continuously, especially in grade 5 - grade 8, the difference reaches 0.07 or almost 30 percent higher in class 8. Research Flecher & Wolfe (2012) also examined changes in the child's health status if family income increased with the age of the child, by choosing children who were very healthy and healthy at kindergarten. The results showed that for the whole sample, the marginal effect of increased income found an increase of 5.7% for the possibility of a very healthy health status report in kindergarten children, increasing to 12.1% in grade 8, even for children with poor health status could change status his health is good. The results of this study indicate that income-healt gradient occurs as a result of a decrease in family income as a support for children's health.

Park's research (2010) to explain income-healt gradient uses information from respondents, namely parents of children for children less than 10 years old, while for children aged 10 years the child concerned answers his or her own health status. The results showed that the income-healt gradient for the 0-3 year age group coefficient ranged from -0.043 to -0.066, for the 4-6 year age group the coefficient ranged between -0.030 and -0.039. In general, with increasing age, the income-healt gradient weakens.

The way to determine the size of a different child's health status in the literature is a separate challenge, this is influenced by the availability of data to determine the parameters of the child's health status in each country. In the Case, Lubotsky, and Paxson (2002) studies determine the health status of children by using stunting, wasting, obesity, and some indicators of child development with samples of children aged 5 to 7 years from the National Health Interview Survey (NLSY). However, the availability of data in the United States for stunting and wasting is difficult to obtain, therefore an alternative measure of children's health by using illness and hospitalization, and health status reports of children with chronic diseases. In contrast to Park's (2010) study that used respondents' reports on IFLS data as a determinant of children's health status, although in fact Park (2010) had an alternative in determining the size of a child's health status, namely the availability of data on symptoms of acute childhood health problems such as fever, difficulty breathing, stomach ache, etc., symptoms of this acute health problem according to Cameron and Williams (2009) are determinants of parental assessment of the health of their children. However, because the forms of questionnaires varied in each IFLS survey wave, Park (2010) did not use them as a measure of children's health. In addition, IFLS's data did not obtain information about chronic diseases for other alternatives in determining the child's health status.

The use of the child's health status in the IFLS data actually has 2 (two) alternatives to determine the child's health status, namely first, the health status based on the respondent's answer. Both information from health nurses who came together and examined IFLS survey households. This study uses the first health status measure to determine child health similar to that of Park (2010).

## RESULTS AND DISCUSSION

**Relationship between Family Income and Children's Health using Health Status Based on Respondents' Answers in each Age Group.**

The explanation for reading the table in general is as follows: First, the income variable will be positive if the greater family income results in the child's health status getting better. Second, the gender variables of the child will be positive if girls have better health status. Third, the variable number of children <18 year will be positive if more children are aged

<18 and health status is getting better. Fourth, the variable of the presence of the father and mother if it is positive then shows that the presence of the father or mother makes the child's health status better. Fifth, the location variable if positive means that the family residence in the countryside makes the health station better than urban areas. Sixth, the variable of the relationship between the child and the health respondent will be positive if the child responds to his / her own health status and will be negative if the mother answers the status of her child. Sixth, the variable of mother and father will be positive if the higher level of education causes better health status. Seventh, the insurance variable will be positive if the child has health insurance facilities and his health status is getting better. Eighth, the variable working mother/career will be positive if the mother works causing the child's health status to be better.

Overall, the results of the study from table 1 for the 2000-2007 IFLS data panel show that income-health gradient is strong for school-aged children between the ages of 7 and 14, when compared to pre-school age groups. The estimation results for each control variable show that the correlation of family income and child health occurs for control variables 1-4, especially in school age groups. The addition of control variables 1-4 does not provide a relationship between children's health status and reduced family income for school age children, but for the age of preschool children in control variables 3 and 4 the relationship between children's health status and family income becomes insignificant. This happens significantly according to statistics as a result of the education of parents both father and mother and mother working / career.

**Table 1 Relationship of Child Health Status and Family Income Log (based on answers from respondents (parents, children concerned, and other respondents who know the child's health status)) Ordered Probit Estimates Based on Age Groups (Panels 2000-2007)**

| | Control variable 1 | | Control variable 2 | | Control variable 3 | | Control variable 4 | |
|---|---|---|---|---|---|---|---|---|
| | Preschool 0-6 years | Schooling 7-14 years | Preschool 0-6 years | Schooling 7-14 years | Preschool 0-6 years | Schooling 7-14 years | Preschool 0-6 years | Schooling 7-14 years |
| VARIABLES | HealthStatus1 | | | | | | | |
| Income | 0.0250* | 0.0340*** | 0.0247* | 0.0338*** | 0.0184 | 0.0373*** | -0.00301 | 0.0501** |
| | (0.0135) | (0.00933) | (0.0135) | (0.00934) | (0.0147) | (0.0109) | (0.0337) | (0.0240) |
| Child Gender | 0.0317 | 0.00468 | 0.0314 | 0.00360 | 0.0418 | 0.0143 | 0.0478 | 0.0567 |
| | (0.0431) | (0.0287) | (0.0431) | (0.0288) | (0.0445) | (0.0314) | (0.103) | (0.0742) |
| Number of Children <18 years | -0.0264* | 0.00868 | -0.0266* | 0.00864 | -0.0206 | -0.000484 | -0.0466 | -0.00300 |
| | (0.0145) | (0.0109) | (0.0145) | (0.0110) | (0.0152) | (0.0118) | (0.0368) | (0.0295) |
| Father's presence at home | 0.0341 | -0.0390 | 0.0324 | -0.0389 | 0.0344 | 0.0289 | 0.168 | 0.110 |
| | (0.0576) | (0.0459) | (0.0576) | (0.0460) | (0.0645) | (0.0674) | (0.132) | (0.145) |
| Mother's presence at home | -0.0154 | 0.120** | -0.0129 | 0.122** | -0.00274 | 0.121* | -0.0601 | 0.0301 |
| | (0.0650) | (0.0566) | (0.0654) | (0.0567) | (0.0692) | (0.0722) | (0.152) | (0.161) |
| Location | 0.0959** | -0.0600** | 0.0967** | -0.0603** | 0.0433 | -0.0369 | 0.0490 | -0.0151 |
| | (0.0439) | (0.0295) | (0.0439) | (0.0296) | (0.0466) | (0.0336) | (0.115) | (0.0832) |
| Child Relations with Health respondents | | | 0.0169 | 0.00475 | 0.0168 | 0.00501 | 0.0677 | -0.00783 |
| | | | (0.0378) | (0.00638) | (0.0399) | (0.00700) | (0.111) | (0.0165) |
| Father's education | | | | | 0.0367 | -0.00535 | -0.0124 | -0.0317 |
| | | | | | (0.0225) | (0.0163) | (0.0624) | (0.0393) |
| Mother's Education | | | | | 0.0250 | 0.00151 | 0.0932 | 0.00279 |
| | | | | | (0.0248) | (0.0171) | (0.0570) | (0.0409) |
| Insurance | | | | | | | 0.199 | 0.0580 |
| | | | | | | | (0.149) | (0.0954) |
| Mother works / career | | | | | | | -0.200** | 0.0143 |
| | | | | | | | (0.0852) | (0.0775) |
| Constant | | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| cut1 | -2.747*** | -2.374*** | -2.731*** | -2.365*** | -2.661*** | -2.381*** | -0.887** | -2.038*** |
| | (0.263) | (0.206) | (0.265) | (0.207) | (0.269) | (0.235) | (0.426) | (0.490) |
| cut2 | -0.773*** | -0.915*** | -0.757*** | -0.905*** | -0.702*** | -0.853*** | 1.587 | -0.503 |
| | (0.215) | (0.166) | (0.219) | (0.167) | (0.226) | (0.189) | | (0.419) |
| cut3 | 1.738*** | 1.782*** | 1.755*** | 1.794*** | 1.827*** | 1.946*** | | 2.063*** |
| | (0.217) | (0.185) | (0.222) | (0.186) | (0.229) | (0.214) | | (0.422) |
| sigma2_u | 0*** | 0.0633 | 0 | 0.0650 | 0*** | 0.138 | 0.0394 | 0 |
| | (0) | (0.101) | (0) | (0.102) | (0) | (0.123) | | (0) |
| Observations | 3,403 | 8,488 | 3,403 | 8,488 | 3,207 | 7,687 | 560 | 1,163 |
| Number of id | 3,400 | 8,123 | 3,400 | 8,123 | 3,204 | 7,383 | 560 | 1,155 |

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: processed data using STATA 14.2

**Tabel 2 Relationship of Child Health Status and Family Income Log (based on answers from respondents (parents, children concerned, and other respondents who know the child's health status)) Ordered Probit Estimates Based on Age Groups (Panels 2007-2014)**

| | Control variable 1 | | Control variable 2 | | Control variable 3 | | Control variable 4 | |
|---|---|---|---|---|---|---|---|---|
| | Preschool 0-6 years | Schooling 7-14 years | Preschool 0-6 years | Schooling 7-14 years | Preschool 0-6 years | Schooling 7-14 years | Preschool 0-6 years | Schooling 7-14 years |
| VARIABLES | HealthStatus1 | | | | | | | |
| Income | 0.0497*** | 0.0495*** | 0.0491*** | 0.0487** | 0.0472*** | 0.0436*** | 0.0464 | 0.0702*** |
| | (0.0113) | (0.00739) | (0.0114) | (0.00739) | (0.0131) | (0.00851) | (0.0305) | (0.0259) |
| Child Gender | -0.0512 | -0.00206 | -0.0518 | -0.00457 | -0.0413 | 0.00182 | -0.0469 | -0.0137 |
| | (0.0360) | (0.0232) | (0.0361) | (0.0232) | (0.0381) | (0.0244) | (0.0902) | (0.0702) |
| Number of Children <18 years | -0.00389 | -0.0282*** | -0.00369 | -0.0277*** | -0.00283 | -0.0349*** | 0.0612 | -0.0448 |
| | (0.0163) | (0.0103) | (0.0164) | (0.0103) | (0.0173) | (0.0108) | (0.0457) | (0.0329) |
| Father's presence at home | 0.0403 | 0.0481 | 0.0319 | 0.0466 | 0.0688 | -0.0147 | 0.260* | 0.0391 |
| | (0.0527) | (0.0338) | (0.0532) | (0.0339) | (0.0601) | (0.0454) | (0.136) | (0.147) |
| Mother's presence at home | 0.0631 | 0.131*** | 0.0697 | 0.130*** | 0.0487 | 0.200*** | -0.306** | 0.122 |
| | (0.0526) | (0.0384) | (0.0529) | (0.0383) | (0.0600) | (0.0486) | (0.140) | (0.147) |
| Location | -0.0404 | 0.0110 | -0.0410 | 0.0117 | -0.0580 | 0.0179 | -0.0498 | -0.0747 |
| | (0.0359) | (0.0234) | (0.0360) | (0.0234) | (0.0409) | (0.0257) | (0.0963) | (0.0749) |
| Child Relations with Health respondents | | | 0.0447* | 0.0110** | 0.0511* | 0.0133** | 0.165** | 0.00128 |
| | | | (0.0261) | (0.00516) | (0.0271) | (0.00548) | (0.0666) | (0.0154) |
| Father's education | | | | | -0.0220 | 0.00185 | -0.0750 | 0.0152 |
| | | | | | (0.0199) | (0.0124) | (0.0465) | (0.0358) |
| Mother's Education | | | | | 0.0420** | 0.0171 | 0.112** | -0.00697 |
| | | | | | (0.0208) | (0.0128) | (0.0516) | (0.0378) |
| Insurance | | | | | | | 0.0176 | 0.0484 |
| | | | | | | | (0.0986) | (0.0730) |
| Mother | | | | | | | -0.0949 | 0.164** |

| works / career | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | (0.0905) | (0.0753) |

Tabel 2 (continue)

| Constant | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| cut1 | -2.133*** | -1.829*** | 2.094*** | 1.811*** | -2.114*** | -1.831*** | -1.682*** | -1.753*** |
| | (0.250) | (0.141) | (0.252) | (0.142) | (0.275) | (0.154) | (0.534) | (0.521) |
| cut2 | -0.360** | -0.458*** | -0.316* | -0.440** | -0.303 | -0.473*** | -0.0853 | -0.125 |
| | (0.183) | (0.130) | (0.185) | (0.131) | (0.200) | (0.143) | (0.481) | (0.399) |
| cut3 | 1.931*** | 1.660*** | 1.979*** | 1.679*** | 2.041*** | 1.647*** | 2.340*** | 2.216*** |
| | (0.220) | (0.132) | (0.223) | (0.132) | (0.251) | (0.144) | (0.538) | (0.531) |
| sigma2_u | 0.0317 | 0** | 0.0357 | 0 | 0.0904 | 0*** | 0.0374 | 0.241 |
| | (0.125) | (0) | (0.127) | (0) | (0.157) | (0) | (0.111) | (0.395) |
| Observations | 4,699 | 10,321 | 4,699 | 10,321 | 4,404 | 9,321 | 777 | 1,405 |
| Number of id | 4,597 | 9,531 | 4,597 | 9,531 | 4,316 | 8,636 | 776 | 1,385 |

Robust standard errors in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Source: processed data using STATA 14.2

The estimation results in table 2 for the 2007-2014 IFLS data panel show that income-health gradient is strong in all age groups for control variables 1-4, except for preschool children for control variables 4. This states that all control variables have not been able reduce the relationship between children's health status and family income.

**Probability of Each Independent Variable.**
In this study the probability of each independent variable with the dependent variable was done with the aim to know in detail the relationship between the dependent variable and the independent variable using the marginal effect method.

**Table 3 Conclusions of the Relationship of Child Health Status and Logs of Family Income Results of Ordered Probit Estimates Probability Per Panel Variables 2000-2007 and Panels 2007-2014**

| | Panel Data | Panel Data |
|---|---|---|
| | 2000-2007 | 2007-2014 |
| VARIABLES | HealthStatus1 | HealthStatus1 |
| Income | The greater the income the worse the child's health status | The greater the income the worse the child's health status |
| Child Gender | The health status of boys is better than girls. | The health status of girls is better than boys. |
| Number of Children <18 years | Families who have a greater number of children less than 18 years old tend to have a better level of child health status | Families who have a greater number of children less than 18 years old tend to have a better level of child health status |
| Father's presence at home | Father's presence in your household makes your child's health status worse. | Father's presence in your household makes your child's health status worse. |
| Mother's presence at home | The presence of the mother in the household makes the child's health status better. | The presence of the mother in the household makes the child's health status worse. |
| Location | Family residences in rural have better child health status than living in urban areas. | Family residences in urban areas have worse child health status than living in rural areas. |

Tabel 3 (continue)

| | | |
|---|---|---|
| Child Relations with Health respondents | Respondents from mothers had a better assessment of children's health status than other respondents. | Respondents from mothers had a better assessment of children's health status than other respondents. |
| Father's education | Father's education level is related to the child's health status. | Your education level is related to the child's health status. |
| Mother's Education | The higher the level of education, the mother makes children's health status worse. | The higher the level of education, the mother makes children's health status worse. |
| Insurance | Ownership of insurance facilities does not encourage children's health status better than those without insurance facilities. | Ownership of insurance facilities does not encourage children's health status better than those without insurance facilities. |
| Mother works / career | Mother's status works to encourage better child health status. | The status of working mothers does not encourage better health status of children. |

Source: processed data using STATA 14.2

The probability estimation results of each independent variable in table 3 shows that for the family income variable shows that the greater the level of family income shows the better the level of child health status for the 2000-2007 data panel while for the 2007-2014 data panel otherwise. In the variable the number of children less than 18 years in one family shows that the more children have under the age of 18 years in one family, the children's health status will be better. For location variables or family dwellings in the 2000-2007 data panel, it shows that rural areas are better than urban areas for children's health, but in the 2007-2014 data panel shows that cities make children's health status better than rural ones. This is possible if viewed in terms of completeness of health care facilities.

Parent education contributes to better children's health, then ownership of insurance in health status does not provide a positive relationship to the child's health status. The variables of mothers working on 2000-2007 data showed that they had a positive relationship to better children's health, but the opposite situation occurred in 2007-2014 data.

**CONCLUSION**

Research for children's health status based on respondents' answers which is a replication of Park's (2010) study concluded that for the 2000-2007 panel data produced significant income-health gradients occurred in children aged 7-14 years compared to preschool children. The results of the 2007-2014 panel data resulted in a significant income-health gradient in all age groups of preschool children and the age group of school children was different from the results of the study on panel data 2000-2007. Thus, the results of this study differ from the results of Park's (2010) study, namely significant income-health gradient occurs in the age group of preschoolers, so the role of schools to reduce child health relations and family income in this study is not proven.

The difference in results is due to government programs in the health sector that have not achieved the Millennium Development Goals (MDGs) target, namely the program of the proportion of the population with calorie intake below the minimum consumption level as a parameter in determining the level of food insecurity. This shows that the improvement in income and a decrease in poverty levels has decreased but the level of people's

purchasing power in an effort to meet the nutritional needs of the family has decreased slightly.

To find out in detail how the relationship between the dependent variable and the independent variable, in this study an analysis is done by using the marginal effect so that the probability per dependent variable is known to be related to the independent variable. The study concluded that income variables that consistently have a negative relationship with children's health status. While the variables predicted to reduce the income relationship and the children's health status produce the following conclusions: the variables of parental education show a positive role in each parameter of the child's health status, the results of research variables Insurance has not shown a role to reduce income-health gradient to the maximum, and variable mothers work/career has a positive impact on the 2000-2007 panel data while the 2007-2014 panel data has a negative impact on children's health status.

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