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## Protective Factors Affecting the Growth and Development of Infants

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**ABSTRACT:** This study aims to determine the effect of protective factors on the growth and development of 3-6 olds children. The cross-sectional study design was employed with the population of 100 parents with babies in the general hospital of Semarang Municipality, Indonesia. Operated under simple random sampling, the research hypothesis tested the influence of the protective factors regarding mother's child, growth, and development stimulation, environmental sanitation, and maternal sickness frequency to the growth and development of the infants by using binary logistic regression test. The results showed a significant impact the protective factors to the growth and development.

**KEYWORDS:** Growth and development, Infants, Protective factors.

### I. INTRODUCTION

Children have a characteristic that always grows and develops from the time of conception until the end of adolescence. The process takes place at all times regularly, interconnected and sustainable. The child's developmental period is divided into several stages from the beginning of the womb, infant (less than one year), under-five years, preschool age (5-7 years) and school, and adolescence [1].

Factors affecting the child's growth and development are genetic and environmental factors. The genetic factors determine the potential of the child, while the environmental factors determine the outcome of the potential capability. Environmental factors have an enormous influence on the life stages of children, namely; prenatal, natal, and post-natal. A growth disorder can occur if there are genetic factors and environmental factors are not able to meet the necessary ability of child growth. The role of the environment is also an important factor to meet the basic needs of child development and development of psychosocial needs. This environment consists of the microenvironment (mother/mother substitute), mini-environment (father, brother, sister, socioeconomic status), and macro environment [2].

### II. RESEARCH METHODOLOGY

The design of detailed analytic study applied cross-sectional design with non-experimental research to find out the relationship of protective factors on the growth and development. Population in this investigation is all patient of 100 parents with babies not properly grow and develop in the general hospital of Semarang Municipality, Indonesia. The sampling technique employed simple random sampling method. The research hypothesis is that there is a significant influence on the protective factors to the prevalence of undergrowth and under development in infants. Logistic binary regression was employed to test the hypothesis.

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### III. EXPERIMENTAL RESULTS

The summary of the experiment result is shown in Table 1.

Table 1 Summary of result

No	Variables	Category	p-value
1	Mother's status	Working	0.369
2	Mother's education	Elementary	0.805
3	Nutrition status during pregnancy	Lack	0.288
4	Mother's health during pregnancy	High risk	0.095
5	Weight of baby	Low birth rate weight	0.056
6	Breastfeeding	Not exclusive	0.039
7	Illness frequency	>6 times /six month	0.005
8	Mother's age	Not healthy for reproduction	0.001
9	Environmental sanitation	Not wealthy	0.001
10	Growth and development stimulation	Not conducted	0.001

Table 1 shows that only illness frequency, mother's age, environmental sanitation, and growth & development stimulation were possessing p-value below 0.05 to proceed for the next process as the variables determining infants' growth and development. The mother's age, environmental sanitation, and growth & development were then tested to identify the influence of the increase with the following result.

Table 2. Description of growth variable

No	Variable	B	SE	Wald test	p-value
1.	Mother's age	-1.149	0.514	5.003	0.025
2.	Environmental Sanitation	-1.385	0.497	7.762	0.005
3	Growth and development stimulation	-1769	0.520	5.373	0.020

When inputted into the logistic regression, the following equation is derived:

$$R = \frac{1}{1+e^{-Z}}$$

- R = Probability of event
- Z =  $\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3$
- $\beta_0$  = constant
- e = 2.7182818

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$$R = \frac{1}{1+e^{-(\beta_0 + \beta_1 X_1(\text{mother's age}) + \beta_2 X_2 \text{ growth and development (stimulation)} + \beta_3 X_3(\text{ environmental sanitation}))}}$$

$$R = \frac{1}{1+2.7182818^{-(1.931+(-1.149)+(-1.769)+(-1.385))}}$$

$$R = \frac{1}{1+2.71(-6.234)} = 39.10\%$$

The above equation means that infants aged 3-6 months who are born from mothers with healthy reproductive age between 20 -35 years are stimulated by growth and have good environmental sanitation then have protection against abnormal growth equal to 39.10% while 60.90 % is due to other factors that are not measured in this research. Poor sanitation of the environment will cause the child to be more susceptible to infectious diseases that can ultimately affect the growing status of infants. Healthy reproductive age range would be better in producing sperm cells and eggs to produce quality offspring. Age is the length of individual life counted from birth to birthday. The more age, the maturity level of a person will be more mature in thinking and work. The older the mother's age, the better the nurturing pattern in nutritious feeding and the better health practice

The environmental sanitation, growth & development, and illness frequency when tested to identify the influence to the development of infants generate the following result.

Table 3. Description of development variable

No	Variable	B	SE	Wald test	P-value
1	Environmental Sanitation)	-1.208	0.608	3.956	0.047
2	Growth and development stimulation)	-1.204	0.520	5.373	0.020
3	Illness frequency	-1.107	0.542	4.168	0.041

The table generates the following equations:

$$R = \frac{1}{1+e^{-Z}}$$

R = Probability of Event  
Z =  $\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3$   
 $\beta_0$  = constant  
e = 2.7182818

$$R = \frac{1}{1+e^{-(\beta_0 + \beta_1 X_1(\text{mother's age}) + \beta_2 X_2(\text{environmental sanitation}) + \beta_3 X_3(\text{ illness frequency}) + \beta_4 X_4(\text{growth & development stimulation}))}}$$

$$R = \frac{1}{1+2.7182818^{-(1.823+(-1.748)+(-1.208)+(-1.107)+(-1.204))}}$$

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$$R = \frac{1}{1+2.71^{(-7.09)}} = 43.90 \%$$

The above equation means that infants aged 3-6 months who are born from mothers with healthy reproductive age between 20-35 years old have healthy environmental sanitation, do the falling stimulation and experience the frequency of pain between 3-6 times in 6 months then have protection against unsuitable development of 43.90% while 56.10% due to other factors that are not included in the model.

Environmental health or environmental sanitation has a dominant role in the provision of an environment that supports the child's health and growth process. Environmental health factors are needed to improve the quality of child care, monitor growth, and development and prevent disease [3].

A synergistic interaction between disease and developmental disorders in infants can lead to multiple pathologic mechanisms, either alone or simultaneously, decreased nutritional intake due to lack of appetite, decreased absorption and reduced eating habits during sickness, increased body fluids and nutrients, as well as increased body needs.

Stimulation is an necessity of grinding, by sharpening the ability of infants or children continuously, then the development of personal social will increase. Giving stimulation can be done with exercise or play. Children with directional stimulation will develop faster than infants who are less stimulated.

## IV. CONCLUSION

Mother Age, Environmental Sanitation, Frequency of Pain, Stimulation of Growth and development are the protective factors against the development of 3-6 month infants.

It is advisable to carry out monitoring the growth and development of babies on an ongoing basis, to prepare a safe pregnancy age that is healthy reproduction and always keep the child's health so as not to experience frequent illness as well as always to maintain environmental sanitation because it can affect the process of growth and development of infants.

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