

## FACTORS ASSOCIATED WITH DOWN SYNDROME INCIDENCE IN BATAM CITY STATE SPECIAL SCHOOL.

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### ABSTRACT

**Background :** Down Syndrome is a type of mental retardation caused by genetic material on chromosome 21. This syndrome can occur due to a process called nondisjunction or failure to separate. The purpose of this study was to determine the description of the factors associated with the incidence of Down Syndrome in Batam City State Special School.

**Method :**The research design was carried out descriptively. The sampling technique was total sampling, with a sample size of 200 students. The univariate analysis is presented in the frequency distribution table.

**Result :**The results showed that the factors associated with the incidence of Down syndrome were 184 children (92.0%) who did not have Down syndrome, 20 people (10.0%), the mother's age > 35 years.

**conclusion :** The conclusion is that the majority is in the factor of maternal age. The suggestion of this research is that it can be used as input for more intensive counseling to the public about the factors that will cause Down syndrome by paying attention to the lifestyle of good mothers and fathers. So that it can be detected early and can reduce chromosomal abnormalities in the incidence of Down syndrome.

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**Keywords: Factors, Down Syndrome**

### PRELIMINARY

Developmental disorders in childhood have the potential to occur at the age of 0-12 years. Basically, each stage of development has the potential for different developmental disorders, depending on the developmental phase experienced at each child's age. Childhood is the basis for the physical formation and personality of the next. In other words, childhood is a golden period to prepare an individual to face the demands of the times according to their potential. If there is developmental disruption, whatever its form, detection done as early as possible is an important key to the success of an intervention program or correction of the disorder. The earlier development disorders are detected, the higher the likelihood of achieving intervention goals

(Fadhli, 2010 in Rahmah, 2014). Down syndrome was first described and published by John Langdon Down in 1866. But previously Esquirol in 1838 and Seguin in 1846 had reported a child who had signs similar to Down syndrome. Down Syndrome is the most common chromosomal disorder. It is estimated that the latest incidence rate is 1.0 - 1.2 per 1,000 live births (Soetjningsih, 1995 in Situmorang 2011). According to the World Health Organization (WHO) there is 1 incidence of Down syndrome per 1,000 births to 1 incidence per 1,100 births worldwide. Each year, about 3,000 to 5,000 children are born with this condition and it is believed that about 250,000 families in the United States have Down syndrome.

According to the records of the Indonesia Center for Biodiversity and Biotechnology (ICBB) Bogor, in Indonesia there are more than 300,000 children with Down syndrome. Based on data from Basic Health Research (Riskesdas) in 2013, the number of people with Down syndrome in Indonesia has increased compared to 2010. The data obtained identifies that in 2013 the number of people with Down syndrome has increased by 0.01 compared to 2012. In 2012 2010, this Down syndrome sufferer is in the third position with the most sufferers after the disabled and mute, which is 0.12 and the fourth position is the most sufferers in 2013 which is 0.13 (Hasanah, 2015). Based on data from the National Team for the Acceleration of Poverty Reduction (TNP2K), until 2011 the number of children with special needs in Indonesia reached 18,000, including children with Down syndrome. It is estimated that around 3% - 7% or 5.5 - 10.5 million people with disabilities are children under 18 years of age, either those with disabilities or who fall into the category of children with special needs (Hasanah, 2015). From the initial survey that was carried out in Batam State Special School with 200 students, there were 16 children who had Down syndrome and 184 children who did not have Down syndrome, at SLB Putrakami Batam with 100 students there were 6 children who had Down syndrome and 94 people who do not experience Down syndrome, in the Brilliant Batam Special School Children in Batam with 98 students there are 9 children who have Down syndrome and 89 people who do not have Down syndrome, at SLB Kartini with 129 students there is 1 child with Down syndrome. and 128 people who do not have Down syndrome. The incidence of Down syndrome increases sharply in women who give birth to children after 35 years of age and over. It is necessary to consider other factors that cause gel damage in meiosis I such as: hormonal imbalance during pregnancy, intra-uterine infection and Down syndrome which is inherited from parents (Faradz, 2004 in Rahmah, 2014).

The exact cause of Down syndrome is not known, but research in cytogenetic epidemiological studies supports multiple causes. Approximately 95% of cases of Down syndrome are caused by an extra chromosome 21, which is called trisomy 21 (Hixon and other, 1998 in Rini, 2007). To ensure the fulfillment of the basic rights and needs of persons with disabilities (in this case also including Down syndrome), more and more special schools (SLB) are being established for people with disabilities, including Down syndrome. Not only in urban areas. Various services with various forms of intervention methods are carried out by special schools to support the achievement of basic needs fulfillment and aspects of independence for children with Down syndrome (Hasanah, 2015).

Research Objectives To determine the factors associated with Down Syndrome incidence in SLB Negeri Batam City

#### **RESEARCH METHODS**

The research design was carried out descriptively. The sampling technique was total sampling, with a sample size of 200 students. The univariate analysis is presented in the frequency distribution table. The sampling technique was total sampling with a sample size of 200 medical records. This research was conducted using univariate analysis presented in a frequency distribution table.

#### **RESEARCH RESULT**

From the research that has been carried out at the Batam City State Special School, by looking at the medical record data for children with Down syndrome and without Down syndrome with a total of 200 students, the researchers found 16 (8.0%) children with Down syndrome and 184 children (92, 0%) do not have Down syndrome.

**Table 1 Frequency Distribution of Down Syndrome**

<i>Down Syndrome</i>	<b>N</b>	<b>Percentage (%)</b>
Yes	16	8,0
Not	184	92,0
<b>Total</b>	<b>200</b>	<b>100,0</b>

From table 1, it can be seen that 200 children in Batam City State Special School who have Down syndrome have 16 people (8.0%) and 184 people who do not have Down syndrome (92.0%).

**Table 2 Frequency Distribution based on Maternal Age**

<b>Mother's Age</b>	<b>N</b>	<b>Percentage (%)</b>
≤ 35 Year	180	90,0
>35 Year	20	10,0
<b>Total</b>	<b>200</b>	<b>100,0</b>

From table 2, it can be seen from 200 children in Batam City State Special School, that the most maternal age factor is in the ≤ 35 year age category, namely 180 people (90.0%) and the least is in the > 35 year age category, namely 20 people. (10.0%).

**DISCUSSION**

Based on research that has been conducted in Batam City State Special School, it shows that there is a relationship between Down syndrome and maternal age. The results of this study indicate that there are 8 children (50.0%) who have a maternal age ≤ 35 years and 8 children (50.0%) who have a maternal age > 35 years in 16 people who have Down syndrome. Meanwhile, there were 172 children who did not experience Down syndrome (93.5%) who had a maternal age ≤ 35 years and 12 (6.5%) who had a maternal age > 35 years.

The results of this study are supported by the theory of Prawihardjo (2013) in the period of

healthy reproduction, it is known that the safe age for pregnancy is 20-30 years. Where women are at the age of 20-30 years, physically, especially the reproductive organs, and psychologically as a whole are ready to reproduce. In terms of maternal health aged ≤ 20 years, the uterus and pelvis are not well developed. Conversely, those aged > 35 years, the health and condition of the mother's uterus is not as good as when the mother was 20 - 35 years old, so it is necessary to be aware of the possibility of experiencing difficult labor and pregnancy poisoning. Thus, age greatly affects the reproductive process.

According to Andrianti (2008) the results of this study are in accordance with previous studies where 32.7% of children with Down syndrome were born to mothers aged 36-40 years and there is a strong correlation between maternal age at delivery and the incidence of Down syndrome. This increase was found to be associated with an increase in maternal age which increases the risk of nondisjunction events in the ovum. There are several hypotheses regarding the mechanism of nondisjunction, namely:

**Production Line Hypothesis:** In this hypothesis, mature oocytes in adulthood are identical to oogonia which enter the meiotic phase during fetal time. Oogonia which enter the meiosis stage for a longer period of time are likely to experience defects during the formation of the chiasm. This results in the possibility of a nondisjunction. **Limited Oocyte Pool Model:** In this hypothesis, the number of follicles will decrease with increasing maternal age. When the follicle count is low, this allows oocytes that are not in optimal condition to ovulate.

**Abberant Recombination:** In the study there was an association between maternal age and genetic recombination changes which are two important risk factors in nondisjunction chromosome 21. This altered pattern of genetic recombination was seen in young nondisjunction women. Recombination of chromosome 21 (in the third telomere or pericentromer region)

appears to provide meiotic instability compared to displacement in the middle of the chromosome. In a recent study it was found that sexual intercourse too soon or too long after ovulation increases the risk of having a child with Down syndrome.

Soetjningsih (2017) states that the increase in biological aging of the ovaries is a major factor in the occurrence of aneuploidy conditions in women. This underlies the various changes that occur in older women, including hormonal changes that can cause chromosomal nondisjunction. Several studies have explained the effect of maternal age on the incidence of Down syndrome.

In the results of this study, there is a significant relationship between Down syndrome and maternal age during pregnancy in Batam City State Special School in 2018. Chi-Square test, obtained a value of  $p = 0.000$  ( $p \leq 0.05$ ) with Relative Risk (RR) 7.667 which means maternal age > 35 years has a 7.667 fold risk of experiencing Down syndrome compared to maternal age  $\leq 35$  years. This study is in line with the research conducted by Situmorang (2011) in Surakarta, which states that there is a strong and statistically significant relationship between maternal age and the risk of bearing Down syndrome children. Maternal age > 35 years has 12 times greater risk than maternal age  $\leq 35$  years. From this description, it can be concluded that if the mother's age is > 35 years, the risk of chromosome number abnormalities due to meiotic phase nondisjunction is high.

The results of this study are also in line with research conducted by Harahap (2014) in West Java Province, it was found that mothers who gave birth over the age of 35 had a higher risk of giving birth with Down syndrome children (CI: 1,225 - 20,265,  $p = 0.034$ ). compared with mothers who gave birth at the age of 35 years and under.

And the results of this study are in line with Claresta (2014) at the Fatmawati Hospital, South

Jakarta growth and development polyclinic, which states that there is a relationship between maternal age at pregnancy and the risk of Down syndrome birth, especially in mothers aged > 35 years, the mechanism hypothesis is the increasing age of a mother the greater the likelihood of nondisjunction during gamete cell formation in the mother, so that if pregnancy occurs, it can increase the risk of having a child with Down syndrome.

Rachmawati (2011) states that the increasing age of mothers has a clear relationship with the birth of a child with Down syndrome, but in this study it is not written what age is said to have a relationship with the birth of a Down syndrome child, only said with an increase in the mother's age. However, in a study conducted by Rachmawati (2011), the prevalence of the possibility of nondisjunction being associated with maternal age at pregnancy was stated. That is, at age 35 the likelihood of nondisjunction occurring is 1/400, whereas at age 40 the probability of nondisjunction occurring is 1/110.

Here it is also said that an increase in maternal age has a greater risk for the occurrence of non-disjunction during the formation of gamete cells, one hypothesis is that the egg cell will get older with increasing age of the mother, so there will be abnormal cell division. The results of the above study have the same results as this study, but the difference is that the research conducted by Rachmawati (2011) did not clearly write down how old the mother was at pregnancy associated with Down syndrome in her study, only said the increase in maternal age..

## **CONCLUSION**

Based on the results of research conducted in Batam City State Special School, it can be concluded as follows:

1. It is known that the frequency distribution of Down syndrome is that the majority of 184 children (92.0%) do not have Down syndrome

2. It is known that the frequency distribution of Down syndrome based on maternal age > 35 years is 20 (10.0%)

### **SUGGESTION**

#### 1. For Health Agencies

In this study, it can be used as a means of improving quality, service and can be used as input for more intensive counseling to the public about the factors that will cause Down syndrome by paying attention to the lifestyle of good mothers and fathers. So that it can be detected early and can reduce chromosomal abnormalities in the incidence of Down syndrome.

#### 2. For Educational Institutions

The results of this study are expected to be input, information and in order to increase knowledge, especially for students of the Midwifery D-IV study program.

#### 3. For Batam City State Special Schools

The results of this study are expected to provide information by conducting counseling about the factors that will cause Down syndrome to parents of students in Batam City State Special School. Apart from the factors of maternal age, parity, father's age, and also genetics, there are other factors, namely the poor lifestyle of the mother and father. So that it can reduce the number of Down syndrome.

#### 4. For further researchers

Further research can be carried out with other variables such as the lifestyle of mothers and fathers. Then the number of population and research samples is more so that better results will be obtained.

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