

## Correlation between Parity, Birth Interval, and the Frequency of Antenatal Care towards the Incidence of Low Birth Weight Babies in RSUD Dr. Mohammad Soewandhie Surabaya

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### ABSTRACT

Successful marine biota cultivated in freshwater fish is whitefish, tiger shrimp and vannamei shrimp. While humpback grouper (*Cromileptes altivelis*) prospecting for export market have never been tried. This research would like to know the influence of acclimatization of humpback grouper seed into fresh water towards the survival rate and growth response. It uses complete random design five types of treatment and four times replication using seed samples with long range 12 cm, weight 22 gram. Acclimatization of habitat in salinity 30 ppt to 4 ppt. The treatment is  $A_0$  with the decrease in salinity 0,0 ppt/day (control),  $A_{0,5}$  (0.5 ppt/day),  $A_1$  (1 ppt/day),  $A_{1,5}$  (1.5 ppt/day), and  $A_2$  (2 ppt/day). Data of survival rate were analyzed by t test ( $P \leq 0.05$ ), the result showed the decrease in salinity 0.5 ppt/day 35% was significant different from control of 92.5%, but it was higher compared to three other treatments ( $A_1$ ,  $A_{1,5}$  and  $A_2$ ) which were death before they reached 4 ppt. While the growth rate data were analyzed with Anova followed by Duncan test ( $P \leq 0.05$ ), the result showed  $A_{0,5}$  0.60% was not significant different from control of 0.61% but it was significant different (fastest) compared to three other treatments ( $A_1$ ,  $A_{1,5}$  and  $A_2$ ). The conclusion is humpback grouper can be cultivated in brackish water with 4 ppt (mesohalin) through acclimatization with the decrease in salinity 0.5 ppt/day.

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### Introduction

Low Birth Weight (LBW) is a term used to describe babies who are born weighing less than 2,500 grams without regard to gestational age (University of Rochester Medical Center, 2016). LBW contributes to 60%-80% of all neonatal deaths. Roughly half of all neonatal deaths occur in the first day of life, and around 75%

occur in the first week. The global prevalence of LBW is 15.5%, which amounts to about 20 million LBW infants born each year (WHO, 2016). The percentage of LBW in Indonesia by 2013 was 10.2%; these results have not fulfilled the target of 7%.<sup>3</sup> Based on data obtained from Dinas Kesehatan Provinsi Jawa Timur 2012, the number of babies with LBW

reached 19,712; 3.32% of 594,461 babies who were weighed.

Babies with LBW may additionally experience mental and physical disorders during the growth and development period. Complications such as the increased risk of having coronary heart disease, diabetes, metabolic disturbances, and immunity disorder are also present (National Neonatology Forum, 2010). Each year in Indonesia, an estimated 350,000 babies will be born with a birth weight of less than 2,500 grams, resulting in 350,000 prospective patients with degenerative disease annually (Joeharno & Zaenab, 2006).

LBW is closely related with high birth rates. High parity produces blood vessel defects in the uterus, which can reduce the nutritional circulation to the fetus (Tirta et al., 2012). Additionally, shorter birth intervals can lead to competition between the mother and fetus in receiving adequate nutrition. Such competition can induce maternal malnutrition. As a result, the fetus receives a low supply of oxygen and nutrition, leading to LBW (Handayani & Rozigoh, 2008).

A key strategy that can be implemented to reduce the incidence of LBW babies is early detection during pregnancy. Routine examination during pregnancy, termed as antenatal care (ANC), is one way to prevent the occurrence of LBW babies (Ernawati et al., 2010). The aim of this study was to determine the correlation between parity, birth interval, and the frequency of ANC towards the incidence of LBW babies.

**Materials and Methods**

This research is a retrospective cross-sectional study using simple random sampling, reviewing the total of parity, birth intervals, and frequency of ANC based on medical records. A total of 2157 mothers with single live births in RSUD Dr. Mohammad Soewandhie Surabaya during the period of January and July 2016 were reviewed. Cases involving multigravidity were excluded; leading to a total of 649 mothers who fulfilled the inclusion criteria. Inclusion criteria from this research included: (1) gestational age  $\geq$  37 weeks, (2) mothers who underwent ANC in Dr. Soewandhie Hospital; while the

exclusion criteria included: (1) incomplete medical records, (2) babies with congenital defects, (3) mothers with primipara pregnancy, (4) mothers who have complications of childbirth, such as eclampsia, hypertension, diabetes, hypertiriodism, etc. This research used simple random sampling with 95 mothers as the determined amount of samples. The data was expressed in frequency distribution and percentage; in addition, the data was analyzed using logistic regression test with p-value (p)  $<0.05$  and confidence interval (CI) 95%.

**Results and Discussion**

**A. Result**

Data collection process was taken by considering maternal age, gestational age, birth weight, sex of the baby, parity, birth interval, and frequency of ANC.

**Table 1. Baseline characteristic of mothers with single live births in RSUD Dr. Mohammad Soewandhie Surabaya**

Characteristic	Maternal Characteristic				Total	
	Low Birth Weight		Normal Birth Weight			
	F	%	F	%	F	%
<b>Maternal Age (years)</b>						
< 20	0	0	1	1.05		
20 – 35	20	21.05	43	45.27		
> 35	11	11.58	20	21.05		
<b>Gestational Age (weeks)</b>					95	100
37 - <40	30	31.58	56	58.95		
$\geq$ 40 - <42	1	1.05	8	8.42		
$\geq$ 42	0	0	0	0		

Based on Table 1, results showed that the maternal age between the ages of 20 – 35 years old was the majority in both LBW and NBW cases compared to other maternal age groups. Furthermore, results indicated that a gestational age of 37-<40 weeks had the highest percentage in both LBW and NBW cases than other gestational age groups.

**Table 2. Baseline characteristic of fetuses in RSUD Dr. Mohammad Soewandhie Surabaya**

Fetal Characteristic		
Characteristic	F	%
<b>Body Weight</b>		
≥ 2500 grams (NBW)	64	67.37
1500 – 2499 grams (LBW)	30	31.58
1000 – 1499 grams (VLBW)	1	1.05
< 1000 grams (ELBW)	0	0
<b>Sex of Baby</b>		
Male	47	49
Female	48	51
<b>Total</b>	95	100

Based on table 2, fetal characteristics in the sample used showed that NBW group ( $\geq 2500$  grams) was the majority compared to other groups, while the sex of baby showed that male and female had similar percentage with only a two percent differences.

**Table 3. Parity towards the incidence of Low Birth Weight and Normal Birth Weight Babies**

Number of Parity	Low Birth Weight		Normal Birth Weight		Total	P (logistic regression)	
	F	%	F	%		F	%
<b>High Risk</b>	19	20.30	28	29.50	47	49.80	0.162
<b>Low Risk</b>	12	13.00	36	37.20	48	50.20	
<b>Total</b>	31	33.30	64	66.70	95	100	

Table 3 represented the correlation between parity and birth weight. The results showed that the incidence of LBW in high risk parity was 19 cases, while low risk parity was 12 cases. The incidence of NBW in high risk number of parity was 28 cases, while low risk parity was 36 cases. Based on the table 3, the results showed that  $p=0.162$ , concluding that  $H_0$  is accepted because  $p>0.05$ , meaning there was no correlation between parity and the incidence of LBW babies.

**Table 4. Birth interval towards the incidence of Low Birth Weight and Normal Birth Weight Babies**

Birth Interval	Low Birth Weight		Normal Birth Weight		Total		P (logistic regression)
	F	%	F	%	F	%	
<b>High Risk</b>	19	20	27	28.42	46	48.42	0.574
<b>Low Risk</b>	12	12.63	37	38.95	49	51.58	
<b>Total</b>	31	32.63	64	67.37	95	100	

Table 4 represented the correlation between birth interval and birth weight. The results showed that the incidence of LBW in high risk birth interval was 19 cases, while low risk birth interval was 12 cases. The incidence of NBW in high risk birth interval was 27 cases, while low risk birth interval was 37 cases. Based on the table, the results showed that  $p=0.574$ , concluding that  $H_0$  is accepted because  $p>0.05$ , meaning there was no correlation between birth interval and the incidence of LBW babies.

**Table 5 Antenatal Care towards the incidence of Low Birth Weight and Normal Birth Weight Babies**

Frequency of ANC	Low Birth Weight		Normal Birth Weight		Total		p (logistic regression)
	F	%	F	%	F	%	
<b>High Risk</b>	14	14.74	6	6.31	20	21.05	0.006
<b>Low Risk</b>	17	17.9	58	61.05	75	78.95	
<b>Total</b>	31	32.64	64	67.36	95	100	

Table 5 represented the correlation between frequency of ANC and birth weight. Based on results, it was shown that the incidence of LBW in high risk frequency of ANC was 14 cases, while low risk frequency of ANC was 17 cases. The incidence of NBW in high risk frequency was 6 cases, while low

risk frequency of ANC was 58 cases. Based on the table, the results showed that  $p=0.006$ , concluding that  $H_1$  is accepted because  $p < 0.05$ , meaning there was correlation between frequency of ANC and the incidence of LBW babies.

### **B. Discussion**

Based on table 1, maternal age between 20–35 years old was the majority in both LBW and NBW cases compared to other maternal age groups. Another study in Yogyakarta also showed that the average maternal age was between 20–35 years old (Yanti, 2014). Such results indicate a shift in marriageable age and getting pregnant among a society that used to have traditions in early marriage, such as after first menstruation, after graduating high school, or below 20 years old. This new shift can be due to better education and understanding of the consequences of early marriage and pregnancy (Siantury, 2007).

Furthermore, results showed that gestational age 37–<40 weeks had the highest percentage in both LBW and NBW cases than other gestational age groups. However, similar studies have not been obtained related to gestational age. Also the reason behind 37 – <40 weeks as the majority group is still unclear. Further research is needed to reach a definite conclusion.

Table 2 showed that NBW group ( $\geq 2500$  grams) was the majority compared to the other groups (67.37%). Previous research from RSUD Wonosari Gunungkidul Yogyakarta, Puskesmas Bareng Kabupaten Jombang, and Puskesmas Kota Karang Bandar Lampung had also procured similar results (Vitraningsih et al., 2012; Kolifah et al., 2012; Tirta et al., 2012). Nevertheless, the incidence of LBW was still often found. Therefore, the problem was serious enough to garner attention from various participants ranging from the health department as the policy holder, health care providers, and the role of cadres, society, and families. The table also showed a similar percentage between male and female babies with only two percent difference. The differences could be explained due to a small number of samples used. Nevertheless, this factor was a

limitation to this study because of a balanced ratio of male and female babies.

Based on table 3, this study found no correlation between parity with incidence of LBW babies ( $p=0.162$ ). This result was due to the fact not all mothers with high parity had other aggravating risk factors, such as anemia and nutritional deficiencies (Dewi, 2007).

According to research conducted by Vitraningsih et al (2012), found that women with hemoglobin levels  $<11\text{gr}\%$  had an estimated 5,365 times greater risk for LBW babies than women with hemoglobin levels  $>11\text{gr}\%$ . This was caused when pregnant women suffered from anemia; the oxygen supply to the tissues would decrease and  $\text{CO}_2$  transportation from the tissues would be blocked. This inhibited the growth of both fetus and placenta, which later resulted in fetal death, abortion, birth defects, premature parturition, prolonged labor and other complications (Arisman, 2004).

In addition, every pregnant women needed extra calories and nutrients to supply energy that is vital for the growth and development of the fetus. A pregnant woman gave birth to a healthy baby when the health and nutrition levels were in good condition before and during pregnancy (Departemen Kesehatan Republik Indonesia, 2006). Another factor that influenced LBW incidence was the mother's age. Age is one of several important factors in pregnancy. In developing countries, women generally marry and become pregnant at a young age, risking complications such as giving birth to LBW babies, abortion, and fetal death. This occurs due to competition between the fetus and the mother, the latter also requiring adequate nutrition, as well as hormonal changes during pregnancy (Tirta et al., 2012).

Table 4 stated no correlation between birth interval and incidence of LBW babies ( $p=0.574$ ). A similar study from RSUD Arifin Achmad Riau also stated that there was no correlation with  $p$  value 0.93 (Monita et al., 2016). The research concluded that low risk birth interval (more than equal to two years) than high risk birth interval (less than two years) was more likely. This occurred due to increased awareness to use contraception.

Mothers also received big support from their families not to have many children. Moreover, with good counseling from health providers, mothers were provided with sufficient family planning information as well as risks which might occur from shorter birth intervals.

In the high-risk birth interval group, mothers could anticipate LBW if they did ANC program routinely by controlling body weight, blood pressure, and levels of hemoglobin; had low number of parity; and other factors such as reduced exposure to smoke and good nutritional status (Nur et al., 2016). Good nutrition was required for the fetus to grow, thus nutritional status was also monitored. The nutritional status of the fetus determines the birth weight, while the former was determined by the nutritional status of mothers during pregnancy until delivery (Arisman, 2004).

Analysis between frequency of ANC and incidence of LBW babies showed in Table 5 found a significant correlation ( $p=0.006$ ). Mothers who underwent ANC programs less than four times during their pregnancy had a 0.772 times greater chance in birthing LBW babies than mothers who underwent ANC programs more than four times. Study findings were similar with another research conducted by Tanberika & Rokhanawati (2015), in which mothers who did ANC program less than four times risked birthing LBW babies 2.842 times greater compared to mothers who did ANC program more than four times (Tanberika & Rokhanawati, 2015).

However, this research showed there was a greater low-risk frequency of ANC (more than equal to four times) than high-risk frequency of ANC (less than four times). This indicated the frequency of control and health counseling during pregnancy was quite high. Thus, health providers could provide early detection of problems, diseases and/or complications within an appropriately controlled manner. Adequate frequency of ANC also provided good knowledge to both mothers and their families to maintain the pregnancy, a positive impact on increased maternal and family awareness with

simultaneous decreasing incidence of LBW babies.

The prevention of LBW babies was performed because newborns are part of children aged 0-2 years who are very vulnerable to long-term or even permanent damage or disturbance during physical growth and development. Nevertheless, LBW babies could be treated by giving exclusive breastfeeding (BAPPENAS, 2006).

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