



# Exposure to Cigarettes in Pregnant Mothers and the Incidences of Low Birth Weight in Labuan Toposo

Rosmala Nur<sup>1,2</sup>(✉) and Rahma Dwi Larasati<sup>1,2</sup>

<sup>1</sup> Public Health Department, Tadulako University, Palu, Indonesia  
nurroskala09@gmail.com

<sup>2</sup> Faculty of Public Health, Tadulako University, Palu, Indonesia

**Abstract.** Low birth weight is the condition of babies body length at born weighing less than 2500 g. Since 2013 the number of low birth weight incidences in Central Sulawesi is still above the national average of 10.6%. Pregnant mothers who are exposed to cigarettes are at greater risk of miscarriage or giving birth to babies with low birth weight. Objective: This study aimed to see the relationship between exposure to cigarettes in pregnant mothers and the incidences of low birth weight. Methods: This study is observational research with a cross-sectional approach design. This study was carried out in Labuan Toposo from April to October 2021. The sample in this study was 25 respondents. Sampling was done using the Simple Random Sampling technique. The data analysis technique used was the Chi-Square Test with an  $\alpha$  value of 0.5. Results: Exposure to cigarettes in pregnant mothers and the incidences of low birth weight obtained a p-value of 0.001. Conclusions: Pregnant mothers who have smoking family members are more at risk of giving birth to babies with low birth weight. Thus, there is a significant relationship between exposure to cigarettes and the incidence of low birth weight. Suggestions: Pregnant mothers should plan their pregnancy as well as possible. Husbands and family members are advised not to smoke inside the house or near them (pregnant mothers) because cigarette smoke inhaled by the mothers can inhibit fetal growth and development.

**Keywords:** Pregnant mothers · Exposure to Cigarettes · Low Birth Weight

## 1 Introduction

The health problem of pregnant mothers is a very complex problem that is interrelated with other problems. Several risk factors for Low Birth Weight are closely related to maternal health problems during pregnancy and childbirth, one of which is exposure to cigarettes (cigarette smoke) in mothers during pregnancy. Exposure to cigarette smoke can affect fetal growth and development in the womb because of the ingredients and substances contained in cigarettes. Tobacco smoke contains more than 7,000 chemicals, including toxic substances and substances that are known to inhibit the distribution of nutrients from mothers to fetuses. This will have an impact on the growth and development of the fetus—the condition and weight of the baby at the time of delivery [1].

© The Author(s) 2023

L. Rosida et al. (Eds.): A-HMS 2022, AHSR 62, pp. 118–124, 2023.

[https://doi.org/10.2991/978-94-6463-190-6\\_16](https://doi.org/10.2991/978-94-6463-190-6_16)

The results of basic health research, show an increase in the prevalence of smokers in Indonesia aged 15 years old and over, which is 34.2% in 2017, 34.7% in 2010, and 36.3% in 2013 [2]. The World Health Organization (WHO) estimates that in 2025 the number of smokers in Indonesia will increase by approximately 45% of the total population.

Exposure to cigarettes that can lead to risk in pregnancy usually occurs because the husbands usually smoke when they are inside the house with their wives and children causing passive smoking for their families, or because the mothers are active smokers themselves. If pregnant women are passive smokers, it can increase the risks of abortion, placental abruption, placenta previa, placental insufficiency, premature birth, fetal defects, and low birth weight [3].

Babies with low birth weight is one of the public health problems that must be paid attention to considering that low birth weight is the main predictor of infant mortality, especially during the early months of life [4]. Babies with low birth weight have a 35% risk of death compared to those born with weights over 2,500 g [5]. Babies with low birth weight can have long-term consequences on their growth and development in the future, namely, they tend to have slower growth and development and lower intellectual appearance. Besides, they also tend to experience mental and physical disorders at the age of growth and development [6].

Neonates with complications are those with diseases and or abnormalities that can cause disability and death such as asphyxia, jaundice, hypothermia, neonatal tetanus, infection (sepsis), birth trauma, low birth weight, respiratory distress syndrome, and congenital abnormalities, as well as others included in the yellow and red classification on examination using the integrated Management Children chart. Complications that are the most common causes of death are asphyxia and low birth weight. These complications can actually be prevented and handled—but are constrained by access to health services, the ability of health workers, socio-economic conditions, the referral systems that have not been running well, delays in early detection, and awareness of parents to seek health care [7].

Babies with low birth weight are one of the determinants of low birth weight problems. Children aged 12–23 months old with low birth weight have a 1.74 times greater risk of becoming stunted compared to those born with normal weight [8]. Low birth weight is closely related to the incidences of morbidity and mortality in fetuses and neonates. This indicator is an outcome indicator of the nutritional conditions of the mothers during pregnancy [9].

Based on the Health Profile of Central Sulawesi (2019), the highest prevalence of babies with low birth weight was in Banggai Laut Regency at 4.4% and the lowest prevalence was in Banggai Kepulauan Regency at 0.8%. The prevalence of babies with low birth weight in Central Sulawesi in 2019 was 2.4%. This low birth weight prevalence was still below the National Medium-Term Development Plan target for low birth weight of 8%. From 13 regencies/cities, the prevalence of babies with low birth weight is still below the target. Although the percentage is still below the target, low birth weight must still be paid attention to and prevented as low birth weight problems will make babies more susceptible to various diseases [10].

## 2 Methods

This study is observational research with a cross-sectional approach design. The researchers observed and measured the independent and dependent variables at the same time. This research was carried out in Labuan Toposo from April to October 2021 by collecting data using observation sheets or questionnaires.

The data used in this study were primary and secondary data. The population in this study was 26 pregnant mothers in Labuan Toposo. However, the total sample in this study was only 25 pregnant mothers in Labuan Toposo. Sampling was done using the Simple Random Sampling technique. The data analysis technique used in this study included univariate analysis used to determine the frequency distribution of the characteristics of pregnant mothers, then continued with bivariate analysis using the Chi-Square Test with an  $\alpha$  value of 0.5 to see the relationship between exposure to cigarettes in pregnant mothers and the incidences of low birth weight in Labuan Toposo.

## 3 Result and Discussion

### 3.1 Results

#### 3.1.1 Univariate Analysis

Based on Table 1, of the 25 pregnant mothers, most of them are 16–21 years old with 9 respondents, and 22–27 years old with 9 respondents. Also, there is 1 pregnant mother who is 46–50 years old. Most of the pregnant mothers have elementary education, with 8 respondents (32%). Also, there is 1 pregnant mother who has SI education. Most of the pregnant mothers are housewives, with 16 respondents (64%). Also, there is 1 pregnant mother who is a civil servant.

Most of the pregnant mothers are in the second trimester of pregnancy, with 12 respondents (48%). Also, there are 4 pregnant mothers (16%) who are in the third trimester of pregnancy. The data in Table 1 further show that pregnant mothers who have smoking family members are 14 respondents (56%), while those who do not have smoking family members are 11 respondents (44%). There are 14 babies (56%) who were born with low birth weight conditions, while the other 11 babies (44%) were born with normal weight.

#### 3.1.2 Bivariate Analysis

Based on Table 2, of the 25 pregnant mothers, those who have smoking family members and gave birth to babies with low birth weight conditions are 12 respondents (85.7%). Meanwhile, pregnant mothers who have smoking family members but gave birth to babies with normal weights are 2 respondents (14.3%). There are 9 (81.8%) pregnant mothers who do not have smoking family members and gave birth to babies with normal weights. Meanwhile, pregnant mothers who do not have smoking family members but gave birth to babies with low birth weight conditions are 2 respondents (18.2%).

Based on the results of the Chi-Square test analysis, a p-value of 0.000 was obtained. This shows that there is a significant relationship between exposure to cigarettes and the incidences of low birth weight in Labuan Toposo.

**Table 1.** Characteristics of Respondent

<b>Characteristics</b>	<b>Amount</b>	<b>%</b>
<i>N</i>		
<i>Age</i>		
16 – 21 Years	9	36
22 – 27 Years	9	36
28 – 33 Years	4	16
40 – 45 Years	2	8
46 – 50 Years	1	4
<b>Total</b>	<b>25</b>	<b>100</b>
<i>Level of Education</i>		
No school	3	12
Primary school	8	32
Junior high school	7	28
Senior High School	6	24
College	1	4
<b>Total</b>	<b>25</b>	<b>100</b>
<i>Profession</i>		
Housewife	16	64
Trader	7	28
Honorary	1	4
Government employees	1	4
<b>Total</b>	<b>25</b>	<b>100</b>
<i>Gestational Age</i>		
First Trimester	9	36
Second trimester	12	48
Third Trimester	4	16
<b>Total</b>	<b>25</b>	<b>100</b>
<i>Smoking Family status</i>		
Yes	14	56
No	11	44
<b>Total</b>	<b>25</b>	<b>100</b>
<i>Incident Of Low Birth Weight</i>		
Low Birth Weight	14	56
Normal	11	44
<b>Total</b>	<b>25</b>	<b>100</b>

**Table 2.** The Relationship Between Smoking Family Status and the Incidence of Low Birth Weight

Variable	Incident of low birth weight						P Value
	Low Birth Weight		Normal		Total		
	n	%	n	%	n	%	
<i>Smoking family Status</i>							
Yes	12	85,7	2	14,3	14	100	0,001
No	2	18,2	9	81,8	11	100	

### 3.2 Discussion

Low birth weight is the result of preterm delivery, intrauterine growth restriction, or a combination of both pathophysiologically. There are many factors that contribute to low birth weight, both maternal and fetal. Birth weight is directly affected by the general level of maternal health status [11]. The maternal environment is the most important determinant of birth weight, as well as factors that prevent normal circulation in the placenta leading to poor nutrition and insufficient oxygen supply to the fetus, thereby limiting fetal growth and development [12]. Maternal risk factors are biologically and socially largely interrelated. Factors that vary from region to region, depend on the geographical, socio-economic, and cultural factors [3].

Cigarette smoke is a substance that is very dangerous for pregnancy and certainly has its own impact on pregnant mothers when they are exposed to it, may it be directly when the mothers themselves are active smokers or indirectly when the mothers are passive smokers [13]. LOW BIRTH WEIGHT will cause the body's organs and their functions to be less than optimal and slower in growth and development, and cause impaired intelligence [14].

Studies have shown that husbands are the biggest source of cigarette smoke at home and few women are also exposed to secondhand smoke when they are at work. Women who are exposed to cigarette smoke are found to be younger, have less education, have lower household incomes and tend to be in low socio-economic status. Women who are exposed to secondhand smoke are also found to have higher parity and lower education [15].

The results of the analysis of this study indicate that there is a relationship between exposure to cigarettes and the incidences of low birth weight in Labuan Toposo. The relationship between exposure to cigarettes and the incidences of low birth weight can occur due to the accumulation of inhaled nicotine and carbon monoxide, reaching the fetus by crossing the placenta, preventing it from receiving the nutrients and oxygen needed to grow and develop. a pregnant mother who is exposed to secondhand smoke due to her husband, who is an active smoker who consumes between 11 and 20 cigarettes a day has a 4.06 times greater risk of low birth weight compared to a pregnant mother who is not exposed to cigarettes [6].

The results of this study are also in line with the results of a study stating that pregnant mothers who are exposed to cigarette smoke have a 5.4 times greater risk of giving birth to babies with low birth weight than those who are not exposed to cigarette smoke [16]. However, this study is not in line with a study by Mahdalena (2014) at RSUD Banjarbaru, where by using the Kruskal-Wallis test obtained a significance value of 0.78. This value is greater than the value of (0.05), then  $H_0$  is accepted, meaning that there is no effect of smoking history on low birth weight babies born at Banjarbaru Hospital [17].

The results of this study are in line with the results of a study conducted at Palu Anutapura Hospital, that respondents who are exposed to cigarette smoke during pregnancy have a 2,219 times greater risk of giving birth to babies with low birth weight than those who are not exposed to cigarette smoke. Based on the results of the interview, this is due to the fact that some of the respondents' family members smoke near the mothers or smoke inside the house and they smoke more than one cigarette per day, where the longer the pregnant mothers are with active smokers inside the house and they are exposed to cigarette smoke of more than 7 h per day, they will be at a higher risk of giving birth to babies with low birth weight [14].

## 4 Conclusion

Based on the results and discussion, the conclusions of this study are:

- a. Pregnant mothers who have smoking family members, may it be their husband, brothers/sisters, or parents are more likely to give birth to a baby in a low birth weight state compared to those who do not have non-smoking family members.
- b. There is a significant relationship between exposure to cigarettes and the incidences of low birth weight in Labuan Toposo.

## 5 Suggestions

- a. Pregnant mothers should plan their pregnancy as well as possible. Husbands and family members are advised not to smoke inside the house or near them (pregnant mothers) because cigarette smoke inhaled by the mothers can inhibit fetal growth and development. Pregnant mothers who are pregnant before 37 weeks should not do activities that are too strenuous that can cause premature rupture of the membranes, and they should frequently check their pregnancy to know the health of the fetus. Also, pregnant mothers should make sure to have good nutritional intake.
- b. For health workers around, it is suggested to further increase the provision of comprehensive socialization to pregnant mothers, their husbands, and family members, as well as the community regarding the dangers of smoking to fetal growth and development and other impacts.

## References

1. A. Narita, "Faktor risiko usia, pekerjaan dan paparan asap rokok pada ibu dengan kejadian berat bayi lahir rendah di kecamatan banyudono kabupaten boyolali," Muhammadiyah Surakarta, 2016.

2. Kementerian Kesehatan RI, “Hasil Utama Riset Kesehatan Dasar,” 2018.
3. H. E. Tamez-Pérez, L. A. Garza-Garza, M. Hernández Coria, A. L. Tamez-Peña, and J. M. Escobedo-Lobatón, “Prevalence of low birthweight and macrosomia in a private clinic in North Mexico,” *Endocrinol. Diabetes y Nutr. (English ed.)*, vol. 64, no. 8, pp. 456–457, 2017, doi: <https://doi.org/10.1016/j.endien.2017.10.008>.
4. Rosmala-Nur *et al.*, “Mother’s behavior in pregnancy-puerperal treatments and reproductive health disorders,” *Medico-Legal Updat.*, vol. 20, no. 1, pp. 1341–1346, 2020, doi: <https://doi.org/10.37506/v20/il/2020/mlu/194489>.
5. N. Ramadhan, “Hubungan Ibu Hamil Perokok Pasif Dengan Kejadian Bayi Berat Lahir Rendah Di Badan Layanan Umum Daerah Rsu Meuraxa Banda Aceh,” *J. STiKES Ubudiyah Banda Aceh*, vol. 1, no. 2, pp. 27–34, 2012.
6. K. S. D. Lestari, I. W. G. A. E. Putra, and I. N. M. Karmaya, “Household Smoke Exposure as Risk Factor of Low Birth Weight among Infants in Gianyar,” *Public Heal. Prev. Med. Arch.*, vol. 3, no. 1, pp. 11–15, 2015, doi: <https://doi.org/10.15562/phpma.v3i1.94>.
7. G. P. D. Sohibien and R. J. Y. Yuhan, “Determinan kejadian berat badan lahir rendah (bblr) di indonesia,” *J. Apl. Stat.*, 2019.
8. Nur Rosmala. D. Larasati, A. Wibowo, and R. Indawati, “DETERMINING THE EFFECT OF LOW BIRTH WEIGHT,” *Int. J. Publich Heal. Clin. Sci.*, vol. 5, no. 4, pp. 1–8, 2018.

**Open Access** This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter’s Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter’s Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

