**THE FACTORS CONCERNING THE INCIDENCE OF ASPHYXIA ON
MATERNITY WOMEN DURING THE COVID19 PANDEMIC AT Dr H ABDUL
MOELOEK LAMPUNG PROVINCE HOSPITAL IN 2020****Ayu Lestari Rahmayanti¹⁾, Yulistiana Evayanti²⁾, Dessy Hermawan³⁾, Ike Ate
Yuviska⁴⁾**¹. Mahasiswa Prodi DIV Dan Profesi Bidan Universitas Malahayati². Dosen Prodi DIV dan Profesi Bidan Universitas Malahayati³ Dosen Fakultas Kedokteran Universitas Malahayati⁴ Dosen Prodi DIII Kebidanan Universitas Malahayati¹Email : layu7116@gmail.com²Email: yulistianaevayanti@gmail.com³Email: hermawan.dessy@gmail.com**Abstract**

The purpose of the study is to identify the factors concerning the incidence of asphyxia on maternity women during the Covid19 pandemic at Dr H Abdul Moeloek Lampung Province Hospital in 2021. The study is a correlational analytical survey with a case-control approach. The population of the study consisted of 244 neonates in which 122 of them became the samples. The objects of this study were maternal age, amniotic fluid, birth weight, umbilical cord entanglement, infection, partum age, newborns diagnosed with asphyxia neonatorum. The study was conducted at Dr H Abdul Moeloek Lampung Province Hospital in July 2021. Data collection technique was through observation sheet. The data analysis was univariate and bivariate.

It was found that there was no relationship among maternal age (p value = 0.708), amniotic fluid (p-value = 0.896), birth weight (p value = 0.000), umbilical cord entanglement (0.370), infection (p value = 0.285) towards the incidence of asphyxia at Dr H Abdul Moeloek Lampung Province Hospital in 2021.

Pregnant women should improve their knowledge about the risk factors of pregnant women and infants that may cause death. They are suggested to diligently check their pregnancy or ANC to know and monitor the condition of their babies.

Keywords: *Maternal age, amniotic fluid, birth weight, umbilical cord entanglement, infection, infection, neonates and asphyxia neonatorum*

1. Introduction

There are many factors affecting the Infant Mortality Rate (Rahma et al, 2014). About 60% of all neonatal deaths are infant deaths in the age less than 7 days old caused by perinatal disorders, one of them is asphyxia (Katiandagho, N., & Kusmiyati, K. (2015). Asphyxia can be caused by several factors, they are: maternal factors, umbilical cord factor and infant factor. Maternal factors that cause asphyxia are age, preeclampsia and eclampsia, abnormal bleeding (placental previa or placental abruption), prolonged or obstructed partum, fever during labor as a sign of severe infection caused by bacteria and parasites such as toxoplasmosis, and sexually transmitted diseases by viruses (such as malaria, syphilis, tuberculosis, HIV), and post-term pregnancy (> 42 weeks of gestation). These conditions cause the mother's blood flow through the placenta decreased, simply the mother's blood flow through the placenta is reduced. As a result, fetal distress occurred and caused asphyxia. The umbilical cord factor is the state of the umbilical cord

that results in decreased blood flow and oxygen to the fetus. It includes the umbilical cord entanglement, short umbilical cord, umbilical cord knot, and umbilical cord prolapse. The baby factor is the baby's condition experiencing asphyxia even though the signs are preceded by fetal distress, for example difficult delivery (breech position, twins, shoulder dystocia, vacuum extraction, forceps), congenital abnormalities, meconium mixed amniotic fluid (greenish color) and premature babies (before 37 weeks of pregnancy). Purnamaningrum, Y. E. (2010).

Coronavirus Disease 2019 (COVID-19) is a disorder of the acute respiratory tract caused by the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) which first occurred in Wuhan, Hubei Province, China in December 2019 and spread rapidly throughout the world (Stratton et al, 2020). According to data from the Indonesian Obstetrics and Gynecology Association (POGI) Jakarta, 13.7% of pregnant women are more easily infected with Covid-19 than those who are not pregnant (Wijaya, 2020)

Physiological changes during pregnancy, such as decreased functional residual volume, increased diaphragm, and changes in immune cells lead to increased susceptibility to viral infections (Dashraath et al., 2020). The corona virus which is responsible for the occurrence of Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS) can also cause poor pregnancy outcomes, such as miscarriage, premature birth, intrauterine growth restriction, and maternal death (Khalisa, D., Riana, E., & Utami, IR (2021). The majority of COVID-19 cases reported in pregnant patients show a mild or asymptomatic course of illness, with only a few cases requiring intensive care unit treatment, and only a few reported cases requiring ventilation. mechanical reported by Sharma, SS, & Sha, Y. (2020).

Transmission or vertical transmission of COVID-19 may occur from mother to fetus. Adequate case studies and research are needed to prove whether or not there is a vertical transmission of COVID-19. Based on research conducted at 50 hospitals in Wuhan City, out of 55 cases of pregnancy infected with COVID-19, 46 neonates who were born did not show any vertical transmission of the SARS-CoV-2 virus from mother to fetus. This is proved by the results of the examination of amniotic fluid, umbilical cord blood, breast milk, and the negative results of a newborn's throat swab. Other studies also stated that vertical transmission of COVID-19 has not been shown to occur. This is shown both from the laboratory results on the mother's sample and also the neonate's sample. On the first day of birth, the amniotic fluid, vaginal secretions, cord blood, placenta, serum, and anal swabs were tested. The results obtained all samples did not find the presence of SARS-CoV-2. Meanwhile, observations made on neonates since the first day of birth to day 14 also showed negative COVID-19 results in throat and anal swabs, serum, and urine samples. (Li, W., Zhou, Q., Tang, Y., Ren, L., Yu, X., Li, Q., ... & Chen, Y. (2020)).

According to Scientific Research conducted by Rasha Khoury et al summarized in the Journal of the American College of Obstetricians and Gynecologists vol 136 no. August 2, 2020, it was explained that out of 241 women with SARS-Cov-2 infection who came to the health center with symptoms for 89.2% obstetric indications. Among the 102 of them, there was asymptomatic women, 91 (89.2%) delivered at term, 11 (10.8%) delivered prematurely less than 37 weeks of gestation, and three (2.9%) delivered prematurely at less than 34 weeks gestation. week. Among the 12 women with critically ill COVID-19, five (41.7%) delivered on time, seven (58.3%) gave birth prematurely at less than 37 weeks' gestation, and three (25%) gave birth prematurely at gestational age less than 34

weeks. From 245 live births, 30% received some form of non-standard resuscitation in the delivery room and 25.7% were admitted to the neonatal intensive care unit (NICU). The majority (62.4%) were hospitalized for less than 2 days. The most common newborn complications are due to prematurity or low birth weight. From 236 live-born neonates confirmed with SARS-CoV-2 test results, 230 (97.5%) tested negative for SARS-CoV-2 infection within 24-96 hours of life. (Khoury, et al, 2020)

During the Covid-19 pandemic, Abdul Moeloek Hospital was also a reference for the management of confirmed Covid-19 patients. From the results of the pre-survey data collection during July-December 2020 there were 549 visits in the PONEK Ward of Dr H Abdul Moeloek Lampung Province Hospital, with 288 partum (52.45%) of the total visits. From 288 deliveries, there were 95 were who were exposed to COVID-19 (32.98%) and 193 people (67.02%) did not have COVID-19. Outcomes of newborns of mothers exposed to COVID-19 experiencing asphyxia were 48 people (50.52%), stillbirth 9 people (9.47%) normal newborns 38 people (40%). Meanwhile, the outcome of newborns in mothers who did not have COVID-19 experienced asphyxia was 88 people (45.59%), stillbirth 16 people (8.29%) normal newborns 84 people (43.52%). Meanwhile, the asphyxia rate at Dr H Abdul Moeloek Hospital, Lampung Province for the July-December 2019 period was 178 babies out of a total of 683 deliveries. (Report of RL RSUD Dr H Abdul Moeloek, 2020) .

2. Literature Review And Hypothesis Development

There is a relationship between birth weight and the incidence of asphyxia in Dr H Abdul Moeloek Lampung Province Hospital in 2021. The birth weight of a baby may affect the delivery process. A woman who has a normal pelvis with a large fetus will still have problems and the potential for prolonged parturition. This condition will have a big influence on the occurrence of asphyxia in the fetus. Other condition that may cause asphyxia is Low Birth Weight (LBW) condition because LBW is an indication for problems in the body system. The instability on LBW is as a result of immaturity of organ systems. (Prawirohardjo, 2010)

3. Research Methodology

The study is a correlation analytic survey research with a case control approach which aims to determine the relationship among maternal age, amniotic fluid, birth weight, umbilical cord entanglement, and infection toward the incidence of asphyxia neonatorum on neonates during the Covid19 pandemic at Dr H Abdul Moeloek Lampung Province Hospital in 2020. The sample of this study included 244 babies born in July to December 2020 either those were exposed or those were not exposed to COVID-19. The analysis carried out was univariate and bivariate with chi square.

4. Result And Discussions

Table 1
**frequency Distribution of asphyxia in maternal women during the Covid19
pandemic at Dr H Abdul Moeloek Hospital**

Variables	Categories	N	%
Asphyxia	Asphyxia	122	50,0
	Non Asphyxia	122	50,0
Maternal Age	Age < 20 yo or age > 35 yo	33	13,5

	Age 20-35 yo	211	86,5
Amniotic fluid	There is meconium	98	40,2
	there is no any meconium	146	59,8
Birth weight	<2500 grams or >4000 grams	45	18,4
	Baby Birth Weight 2500-4000 grams	199	81,6
umbilical cord entanglement	There was umbilical cord entanglement	118	48,4
	There was no umbilical cord entanglement	126	51,6
Infection	Women with Positive Covid19 Rapid Test	87	35,7
	Women with Negative Covid19 Rapid Test	157	64,3
	Total	244	100,0

According to table 1, it is known that the frequency distribution of respondents with asphyxia were 122 (50.0%), 211 respondents (86.5%) were 20-35 year old, 146 respondents (59.8 %) had amniotic fluid without meconium, 199 respondents (81.6%) had baby birth weight of 2500-4000 grams, 126 respondents (51.6%) had no umbilical cord entanglement problem, 157 respondents (64.3 %) showed negative COVID-19 infection from rapid test result, 148 respondents (60.7%).

Table 2

The relationship between maternal age and the incidence of asphyxia at Dr H Abdul Moeloek Hospital in 2021

Maternal Age	Asphyxia Incidence				Amount		<i>P-Value</i>	OR 95% CI
	Asphyxia		Non Asphyxia					
	N	%	N	%	N	%		
< 20 / >35 Years	18	14,8	15	12,3	33	13,5	0,708	1,235 (0,591 - 2,578)
20-35 Years	104	85,2	107	87,7	211	86,5		
Total	122	100,0	122	100,0	244	100,0		

The statistical test obtained p-value = 0.708, which means $p > \alpha = 0.05$ (H_a was rejected and H_o was accepted), it can be concluded that there was no relationship between maternal age and the incidence of asphyxia at Dr H Abdul Moeloek Lampung Province Hospital in 2021.

Table 3

The relationship between Amniotic fluid and the incidence of asphyxia at Dr H Abdul Moeloek Hospital in 2021

Amniotic fluid	Asphyxia Incidence				Amount		<i>P-Value</i>	OR 95% CI
	Asphyxia		Non Asphyxia					
	N	%	N	%	N	%		
With meconium	48	39,3	50	41,0	98	40,2	0,896	,934 (0,560 - 1,559)
Without meconium	74	60,7	72	59,0	146	59,8		
Total	122	100.0	122	100.0	244	100.0

The results of the statistical test showed $p\text{-value} = 0.896$ which meant $p > \alpha = 0.05$ (H_a was rejected and H_o was accepted), it can be concluded that there was no relationship between amniotic fluid and the incidence of asphyxia at Dr H Abdul Moeloek Lampung Province Hospital in 2021.

Table 4
Relationship between birth weight and the incidence of asphyxia at Dr H Abdul Moeloek Hospital in 2021

Birth weight	Asphyxia Incidence				Amount		<i>p-value</i>	OR 95% CI
	Asphyxia		Non Asphyxia					
	n	%	n	%	N	%		
<2500 grams or >4000 grams	34	27,9	11	9,0	45	18,4	0,000	3,899 (1,869 - 8,132)
≥2500-4000 grams	88	72,1	111	91,0	199	81,6		
Total	122	100,0	122	100,0	244	100,0		

The results of statistical tests revealed $p\text{-value} = 0.000$ which denoted $p < \alpha = 0.05$ (H_o was rejected and H_a was accepted), it can be concluded that there was a relationship between birth weight and the incidence of asphyxia at Dr H Abdul Moeloek Lampung Province Hospital in 2021. OR value 2.981 indicated that the respondents with birth weight <2500 grams or >4000 grams had a greater chance 2.981 times of experiencing asphyxia compared to respondents with birth weight ≥2500-4000 grams.

Table 5
The relationship between umbilical cord entanglement and asphyxia at Dr H Abdul Moeloek Hospital in 2021

Umbilical Cord Entanglement	Asphyxia Incidence				Amount		<i>p-value</i>	OR 95% CI
	Asphyxia		Non Asphyxia					
	n	%	n	%	N	%		
Yes	55	45,1	63	51,6	118	48,4	0,370	0,769 (0,465 - 1,272)
No	67	54,9	59	48,4	126	51,6		
Total	122	100,0	122	100,0	244	100,0		

The results of statistical tests showed $p\text{-value} = 0,370$ which denoted $p > \alpha = 0.05$ (H_o was rejected and H_a was accepted), it can be concluded that there was no relationship between umbilical cord entanglement and the incidence of asphyxia at Dr H Abdul Moeloek Lampung Province Hospital in 2021.

Table 6
The relationship between Covid-19 Infection and Asphyxia Incidence at Dr H Abdul Moeloek Hospital in 2021

Covid-19 Infection	Asphyxia Incidence				Amount		<i>P-Value</i>	OR 95% CI
	Asphyxia		Non Asphyxia					
	N	%	N	%	N	%		
Positive	48	39.3	39	32.0	87	35.7	0.285	1.380

Negative	74	60,7	83	68,0	157	64,3		(0,816 -
Total	122	100,0	122	100,0	244	100,0		2,336)

The statistical test results found $p\text{-value} = 0.285$ which indicated $p > \alpha = 0.05$ (H_0 was rejected and H_a was accepted), it can be concluded that there was no relationship between Covid 19 infection and the incidence of asphyxia at Dr H Abdul Moeloek Lampung Province Hospital in 2021.

Discussions

It can be concluded that there was no relationship between maternal age and the incidence of asphyxia at Dr H Abdul Moeloek Lampung Province Hospital in 2021. Age at the time of pregnancy greatly affected the readiness of women to accept responsibility as a mother and readiness to nourish the next generation can be guaranteed, thus the quality of human resources increased. Pregnancy at a young age or adolescence (under the age of 20 years) will result in fear of pregnancy and childbirth, this is because at that age a woman may not be ready to have children and her reproductive organs are not ready to get pregnant. Likewise, pregnancy in older age (over 35 years) will cause anxiety about pregnancy and childbirth and the reproductive organs are too old to get pregnant.

There was no relationship between amniotic fluid and asphyxia at Dr H Abdul Moeloek Lampung Province Hospital in 2021. Not all amniotic fluid potentially causes asphyxia, only in certain condition it may cause asphyxia, namely cloudy and meconium-stained amniotic fluid. If the amniotic fluid is clear and the baby does not have the potential to choke during labor, this will not cause the baby to become asphyxiated. If the amniotic fluid is cloudy or mixed with meconium encountered with fast response and assistance during childbirth to clean the fluid quickly it will not always make the baby asphyxia.

There was a relationship between birth weight and the incidence of asphyxia at Dr H Abdul Moeloek Lampung Province Hospital in 2021. With an OR value of 2,981, it means that infants with birth weight <2500 grams or >4000 grams have a chance of greater risk 2,981 times to experience asphyxia compared to infants with birth weight 2500-4000 grams. Birth weight is something that affects the delivery process, mothers with normal pelvis with large fetal conditions will still have problems and the potential for prolonged labor events. This condition has a big influence with the occurrence of asphyxia in the infant. Another thing that is possible to happen is a risk for problems in the infant body system due to poor body conditions. The unstable state may be as a result of immaturity organ system.

There was no relationship between umbilical cord entanglement and asphyxia incidence at Dr H Abdul Moeloek Lampung Province Hospital in 2021. The conditions of the umbilical cord that results in decreased blood flow and oxygen supply to the fetus are umbilical cord entanglement, short umbilical cord, umbilical cord knot, and umbilical cord prolapse (Purnamaningrum, 2010). There were several situations where the knot was loose loops and can be released but some knots were strong coils and cannot be loosened or released. In the situation where the knot cannot be removed, it requires the speed and skill of the midwife in the delivery process to immediately loosen or cut the umbilical cord quickly and precisely. If this treatment can be done with the right skills and time, it reduces the risk of asphyxia in infants.

There was no relationship between Covid-19 infection and asphyxia at Dr H Abdul Moeloek Lampung Province Hospital in 2021. Based on the results of the study, it was

found that there were 48 (39.3%) respondents were positive for COVID-19 out of 122 respondents experiencing asphyxia. Meanwhile, the rest, 74 (60.7%) respondents, were known resulting negative for COVID-19 rapid test. However, the respondents with rapid positive, all of the babies had asphyxia, amounting to 48 babies. This should be studied further to find out the real cause.

5. CONCLUSION

- There is no relationship between maternal age and the incidence of asphyxia at Dr H Abdul Moeloek Lampung Province Hospital in 2021 (p-value = 0.708).
- There is no relationship between amniotic fluid and asphyxia at Dr H Abdul Moeloek Lampung Province Hospital in 2021 (p-value = 0.896).
- There is a relationship between birth weight and the incidence of asphyxia at Dr H Abdul Moeloek Lampung Province Hospital in 2021 (p-value = 0.000, OR 3.899).
- There is no relationship between umbilical cord entanglement with the incidence of asphyxia at Dr H Abdul Moeloek Lampung Province Hospital in 2021 (p-value = 0.370).
- There is no relationship between Covid-19 infection and the incidence of asphyxia at Dr H Abdul Moeloek Lampung Province Hospital in 2021 (p-value = 0.285).

6. LIMITATION AND STUDY FORWARD

In conducting the study, there were several things that became the limitations of the researchers, namely the process of separating patients with COVID-19 using only antigen and antibody swab tests while the PCR test could be more accurate. However, time allocation for the PCR test results took a long time period so it can't be applied to women who are about to give birth. In addition, the limitations also existed on the research method used, it was limited only on bivariate analysis. It should be further developed to get concise findings.

ACKNOWLEDGEMENT

We would like to say thank you very much to the management of Dr H Abdul Moeloek Lampung Province Hospital for allowing us to do research, especially the medical record staffs who has helped us collecting research data. We profound our gratitude to the midwifery practitioners who has provided a place for me to make observations in handling childbirth during the COVID-19 pandemic. Accepting moral and material supports from any party, we would say many thanks to all those who have helped the study completed.

REFERENCES

- Dashraath, P., Wong, J. L. J., Lim, M. X. K., Lim, L. M., Li, S., Biswas, A., ... & Su, L. L. (2020). Coronavirus disease 2019 (COVID-19) pandemic and pregnancy. *American journal of obstetrics and gynecology*, 222(6), 521-531.
- De Sousa, et all, 2020. Effects of COVID-19 Infection during Pregnancy and Neonatal Prognosis: What Is the Evidence?. Brazil. *International Journal of Enviromental Research and Public Healt*, Juni 2020.
- JNPK-KR, Edisi Revisi 2017. *Paket Pelatihan Klinik Asuhan Persalinan Normal*. Jakarta : JNPK-KR.

- Katiandagho, N., & Kusmiyati, K. (2015). Faktor Faktor Yang Berhubungan Dengan Kejadian Asfiksia Neonatorum. *JIDAN (Jurnal Ilmiah Bidan)*, 3(2), 28-38.).
- Khalisa, D., Riana, E., & Utami, I. R. (2021). Pendidikan Kesehatan Anak di Masa Pandemi COVID-19. *Jurnal Inovasi & Terapan Pengabdian Masyarakat*, 1(1), 29-33.
- Kouri, et all. 2020. Characteristics and Outcomes of 241 Births to Women With Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) Infection at Five New York City Medical Centers. New York. *American College of Obstetricians and Gynecologists. Published by Wolters Kluwer Health, Inc. volume 136 no. 2 Agustus 2020.*
- Li, W., Zhou, Q., Tang, Y., Ren, L., Yu, X., Li, Q., ... & Chen, Y. (2020). COVID-19 evidence and recommendations working group. Protocol for the development of a rapid advice guideline for prevention, management and care of children with 2019 novel coronavirus infection. *Ann Palliat Med*, 9(4), 2251-5.
- Prawirohardjo, Sarwono. Revisi Keempat 2010. *Ilmu Kebidanan*. Jakarta : Yayasan Bina Pustaka.
- Purnamaningrum, Y. E. (2010). Penyakit Pada Neonatus, Bayi dan Balita. *Yogyakarta: Fitramaya*
- Rinaldi, M. R., & Yuniasanti, R. (2020). Kecemasan pada Masyarakat Saat Masa Pandemi Covid-19 di Indonesia. *COVID-19 dalam Ragam Tinjauan Perspektif*, 137-150.
- Rumah Sakit Dr. H. Abdul Moeloek, Laporan RL 1. 2020
- Sharma, S. S., & Sha, Y. (2020). Part A: Special section on COVID-19 research.
- Susilo, A., Rumende, C. M., Pitoyo, C. W., Santoso, W. D., Yulianti, M., Herikurniawan, H., ... & Yuniastuti, E. (2020). Coronavirus disease 2019: Tinjauan literatur terkini. *Jurnal Penyakit Dalam Indonesia*, 7(1), 45-67.
- Yang, et all, 2020. Pregnant women with COVID-19 and risk of adverse birth outcomes in Wuhan, China. *BMC Medicine* (2020) 18:330
<https://doi.org/10.1186/s12916-020-01798-1>