



Incidence of Cesarean Section Delivery before and during the Covid-19 Pandemic

Nur Fitriah Jumatrin*¹, Herman Herman^{1,2}

¹Departement Vocational of Nursing STIKes Karya Kesehatan, Kendari, Indonesia

²Departement of Bachelor of Nursing STIKes Karya Kesehatan, Kendari, Indonesia

[*nurfitriah.jumatrin@gmail.com](mailto:nurfitriah.jumatrin@gmail.com)

Abstract. Covid-19 disease has changed the health status of the world. Pregnant women are one of the groups at high risk of Covid-19 disease due to changes in the immune system and physiology during pregnancy which is vulnerable to infection. Restrictions on access to health services in a pandemic situation affect health problems that are not identified early, especially the health of pregnant women and the fetus such as preeclampsia, anemia, bleeding, and low birth weight (LBW). Health complications in pregnant women and the fetus have the potential to become a complication during childbirth which has an impact on increasing the rate of Caesarean Section (CS) delivery. This study aimed to describe the incidence of CS deliveries and analysis health problems in pregnant women and fetus before and during the Covid-19 pandemic in Kendari City. The most dominant increase in CS deliveries was during the peak of the Covid-19 pandemic in 2020 and 2021 with 1,593 cases and 1,730 cases, respectively. The highest number of labor complications before the Covid-19 pandemic in 2018 and 2019 came from fetal health problems with 154 (42.8%) cases and 165 (47.6%) cases, respectively. During the Covid-19 pandemic in 2020 and 2021, the highest number of maternal and fetal health problems were 234 (41.1%) cases and 315 (45.1%) cases. The number of CS deliveries with Covid-19 diagnoses in 2020 was 2 (0.4%) cases and in 2021 was 4 (0.6%) cases. The prevalence of CS deliveries before and during the Covid-19 pandemic at the Kendari City Hospital increased by 28%. Indirect effects during the Covid-19 pandemic such as restrictions on access to health services, lack of control over reproductive health, and people's fear of Covid-19 disease were suggested to be triggers for the increase in CS deliveries.

Keywords: Section Caesarean, Pandemic Covid-19, Reproductive Health.

1 Introduction

The Covid-19 disease spread to various countries, both developing and developed countries, and changed the world's health status. The Covid-19 virus was first discovered in China, precisely in the Wuhan area, at the end of 2019. The virus spread so fast and infected tens of millions of people that the World Health Organization (WHO) declared the Covid-19 disease a global pandemic [1,2]. Indonesia was one of

the countries that did not escape the Covid-19 virus attack and based on the Presidential Decree Number 24 of 2021, the Government has declared the Covid-19 disease a national pandemic [3].

Covid-19 disease attacks the immune system and the process of transmitting the virus through the air causes problems with the respiratory tract. Pregnant women are one of the groups at high risk of contracting Covid-19 due to changes in the immune and physiological systems during pregnancy which make them vulnerable to infection. Pregnant women infected with the Covid-19 virus have an impact on increased complications of maternal and fetal health problems such as spontaneous abortion, premature birth, low birth weight (LBW), preeclampsia, intravascular coagulation, impaired uterine growth and kidney failure [4-6]. The Covid-19 disease not only causes health problems but hampers the health service system. Restrictions on health services and people's worry about visiting health facilities because they consider health facilities to be the main place of exposure to the Covid-19 virus, this has an impact on health problems that are not detected from the start, especially the health of pregnant women and fetuses such as preeclampsia, anemia, bleeding and low birth weight (LBW) [4,7,8].

Health problems in pregnant women and fetuses have the potential to complicate childbirth which has an impact on increasing the number of Caesarean Section (CS) deliveries. WHO gives the CS delivery rate in a country at 10-15% [9]. The impact of CS delivery on short-term reproductive health is infection, bleeding, visceral injury, placental accretion and placental abruption. Meanwhile, long-term impacts such as asthma, obesity, miscarriage, ectopic pregnancy, uterine rupture and stillbirth are higher in subsequent pregnancies [10]. This research aimed to describe the incidence of CS deliveries and analyze health problems in pregnant women and fetuses before and during the Covid-19 pandemic, so that it can become a reference for policy making in improving reproductive health services in pandemic situations to reduce maternal and infant morbidity and mortality rates.

2 Methods

Descriptive research design comparing the prevalence of CS delivery before and during the Covid-19 pandemic was employed in this study. The research sample of mothers who had CS deliveries before the 2018-2019 Covid-19 pandemic was 707 and during the 2020-2021 Covid-19 pandemic there were 1,232 at the Kendari City Regional General Hospital (RSUD). The research instrument was the patient's medical records by collecting secondary data. Data analysis used univariate to see frequency (n) and percentage (%).

3 Results

The majority of respondents in the 2018, 2019, 2020 and 2021 age groups were in the 26-30 years' age range, with 101 (28.1%) people, 97 (28%) people, 173 (32.5%)

people and 209 (29%) people. 9%) people. The majority of respondents' education in 2018, 2019, 2020 and 2021 was high school with 159 (44.2%) people, 175 (50.4%) people, 330 (61.9%) people and 364 (52.1%) people (Table 1).

Table 1. Frequency Distribution of Respondents Based on Age and Mother's Education Before and During the Covid-19 Pandemic at Kendari City Hospital [21].

Respondent Characteristics	Before Covid-19		During Covid-19	
	2018 n	2019 %	2020 n	2021 %
Age				
15-20 year	40	11,134	9,8	37 6,9
21-25 year	70	19,485	24,5	118 22,1
26-30 year	101	28,197	28	173 32,5
31-35 year	95	26,474	21,3	106 19,9
36-40 year	41	11,441	11,8	82 15,4
41-45 year	13	3,6	16	4,6 17 3,2
18	2,6			
Education				
Elementary school	45	12,5	36	10,4
Junior high school	88	24,4	64	18,4
Senior High School	159	44,2	175	50,4
Vocational	21	5,8	22	6,3
Bachelor	38	10,6	39	11,2
Masters	9	2,5	11	3,2

The majority of CS birth rates in Kendari City have increased every year, both before the pandemic and during the pandemic. The most dominant increase during the Covid-19 pandemic in 2020 and 2021 was 1,593 cases and 1,730 cases

Table 2. Childbirth Coverage in the Last 5 Years at Kendari City Hospital [21].

No	Years	Labor	Total
		Normal delivery	Section Caesarean
1	2017	708	231
2	2018	891	360
3	2019	1.030	347
4	2020	1.060	533
5	2021	1.031	699

Table 3. SC Indications Based on Childbirth Difficulties Before and During the Covid-19 Pandemic at Kendari City Hospital [21].

Childbirth Complications	Before Covid-19				Covid-19 Pandemi			
	2018		2019		2020		2021	
	n	%	n	%	n	%	n	%
Fetus (Cephalopelvic Disproportion, Malpresentation and breech presentation, A nuchal cord, Premature rupture of membrane, Oligohydramnios, Polyhydramnions, Fetal distress, Macrosomia, Big Giant, Intra Uterine Growth Restriction, Gemeli, Intra Uterine Fetal Death, Long Intranatal Stage (I and II), Placenta previa, Placental abruption)	154	42,8%	165	47,6	201	37,7%	276	39,5%
Mother (Eclampsia/Preeclampsia, Uterine Rupture, Previous CS delivery, Vulvar edema, Uterine Myoma, Bad Obstetric history, Anemia, Asthma, Epilepsy, Ovarian Cysts, Portal Oedema, Ocular Pupillary Edema, Purmonary pneumonia, Pulmonary oedema, Post Hemorrhoid surgery, Extra systole ventricles, Infection, Hepatitis, Hypovolemic shock, Hyperthyroid, Help Sydrome, DM type II, syphilis)	58	16,1	57	16,4	98	18,4	108	15,5
Combination of maternal and fetal health problems	148	41,1	125	36	234	24,9	315	45,1

Childbirth complications are divided into 3 major sections based on indications for delivery, namely health problems originating from the fetus, mother, and a combination of both. The highest complications in childbirth before the Covid-19 pandemic in 2018 and 2019 came from fetal health problems in 154 (42.8%) cases and 165 (47.6%) cases. Meanwhile, during the Covid-19 pandemic in 2020 and 2021, the highest cases came from maternal and fetal health problems, with 234 (41.1%) cases and 315 (45.1%) cases.

Table 4. CS Delivery with Covid-19 Diagnosis During the Covid-19 Pandemic at the Kendari City Hospital [21].

CS delivery	Pandemic Covid-19			
	2020		2021	
	n	%	n	%
Diagnosed with Covid-19	2	0,4%	4	0,6%
Diagnosed without Covid-19	531	99,6%	695	99,4%

The number of CS deliveries diagnosed with Covid-19 in 2020 was 2 (0.4%) cases and in 2021 there were 4 (0.6%) cases.

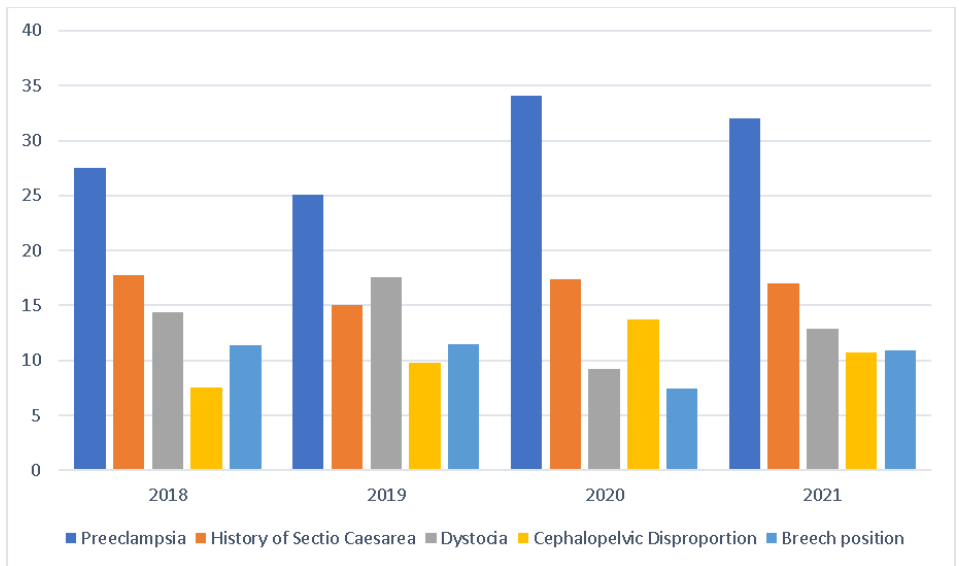


Figure 1. The five main indications for caesarean section CS before dan During Pandemic Covid-19 at the Kendari City Hospital [21].

4 Discussion

4.1 Before Pandemic Covid-19

CS delivery is an alternative action given by medical personnel to save the lives of mothers and babies from health complications that arise during pregnancy. The prevalence of CS deliveries in Indonesia is 18,6%, this figure exceeds WHO recommended standards [9]. Kendari City Hospital is a referral hospital with more adequate health facilities compared to several hospitals in the Kendari city area. The location of the Kendari city hospital is in the capital city of Southeast Sulawesi [11]. Based on research results, the number of SC deliveries at the Kendari City Hospital starting in 2017 was 231 cases out of a total of 939 births. Furthermore, data for the last 2 years, the number of SC deliveries before the Covid-19 pandemic has increased in 2018 and 2019 by 360 cases out of a total of 1.251 births and 347 cases out of a total of 1.377 births.

CS delivery that is not based on medical indications can increase mortality and morbidity rates for mothers and babies in the short term and long term in subsequent pregnancies such as miscarriage, stillbirth, placenta previa, postpartum infections, bleeding, maternal death, and thromboembolism. Babies born via CS delivery tend to have health problems including asthma, type I diabetes, allergies, obesity, and lower general cognitive function and academic performance [9]. The results of research conducted by Islam et al. [9], found that factors influencing the increase in CS births in Indonesia include the decision to give birth through CS without medical indications, age, health insurance, economic status, area of residence, education, number of antenatal visits care, number of parities, individual interests for profit opinions, lack of health workers who are experts in their fields, infrastructure, women's belief that SC birth is safer than normal birth and fear of sexual disorders (vaginal shape) if having a normal birth. Similar research results were also presented by Pandey et al. [12], the increase in CS deliveries in India was due to educational factors, middle and upper economic status, urban areas of residence that had easy access to health services, family support, availability of adequate health services, profits from health facilities (private hospitals) or health workers and the number of antenatal care visits.

4.2 During Pandemic Covid-19

Control the spread of the virus by establishing a lockdown status and implementing self-quarantine and physical distance restrictions to prevent the spread of the disease [12]. The implementation of lockdown has an impact on sexual health and changes in sexual desire in married couples. Married couples spend more time having sex during the Covid-19 pandemic and there is the potential for unplanned pregnancies. Some individuals engage in sex to reduce anxiety and some experience problems related to sexual desire. Apart from that, during the pandemic cases of violence against women increased. Couples who separated due to the lockdown status experienced an increase in sexual violence and paid sex to meet basic needs, reduce anxiety and overcome insufficient income, this is one of the causes of unwanted pregnancies. Based on

research results, before the Covid-19 pandemic the number of pregnancies in 2018-2019 was 707 cases and during the Covid-19 pandemic the number of pregnancies increased by around 28% in 2020-2021 to 1,232 cases. Restrictions on health services during the Covid-19 pandemic are one of the obstacles for women in accessing health services ranging from gynecological examinations to pregnancy examinations [1]. The lack of attention to reproductive health in a pandemic situation has triggered an increase in health problems, including unplanned pregnancies [13]. Based on a survey International Planned Parenthood Federation (2020), data was obtained that around 5,633 clinics and community-based care sites were closed in 64 countries. If the lockdown is implemented for 6-7 months, it is estimated that 47 million women in low and middle income countries will not be able to use modern contraception and around 7 million unwanted pregnancies will occur globally [1].

Choosing the type of delivery in the Covid-19 pandemic situation is the main consideration for health workers and pregnant women in preventing transmission of the Covid-19 disease. At the start of the pandemic, early prevention of vertical transmission of Covid-19 infection to intrapartum and babies led to changes in decision making regarding delivery procedures. CS procedures are carried out for pregnant women diagnosed with Covid-19 with or without medical complications, this has an impact on increasing CS deliveries [6,14]. The results of research by Sarastry et al., [15] found that the type of delivery does not affect the vertical transmission of Covid-19 virus infection to intrapartum and babies, however, CS delivery is still recommended for pregnant women diagnosed with Covid-19 to limit exposure to the virus and prevent complications. the unexpected Covid-19 virus. The number of CS deliveries at the Kendari City Hospital during the Covid-19 pandemic increased in 2020 by 533 cases from a total of 1,593 deliveries and in 2021 by 699 cases from a total of 1,730 deliveries. The research results found that the increase in SC deliveries was not caused by the number of pregnant women diagnosed with Covid-19. The number of pregnant women diagnosed with Covid-19 during the Covid-19 pandemic in 2020 was 2 (0.4%) cases and in 2021 there were 4 (0.6%) cases. The highest increase in CS deliveries based on medical indications was found in the category of medical complications between mother and fetus in 2020 with 234 cases and in 2021 with 315 cases. The increase in the number of SC deliveries is an indirect impact of the Covid-19 pandemic which causes maternal and/or fetal health problems [4].

The Covid-19 pandemic situation affects the health service process. Preventing transmission of the Covid-19 virus includes limiting the provision of health services that are considered non-essential, including antenatal and postnatal care. Based on the results of an online survey in the United States of 4,451 pregnant women, it was found that 1/3 of pregnant women experienced increased stress [1]. Fear, worry and anxiety can cause health problems both physically and psychologically for pregnant women. Stress during pregnancy can cause health problems for the mother and fetus, increasing the risk of preeclampsia, and other physical health problems (Mortazavi et al., 2021). Research conducted by Fakari & Simbar [16], found that stress in pregnant women can increase the risk of preeclampsia, nausea and vomiting, premature labor, and depression. In addition, during the pandemic, almost half of pregnant women experienced problems during pregnancy that were not managed properly, such as

anemia and pregnancy hypertension [17]. During the Covid-19 pandemic, it is estimated that the decline in antenatal and postnatal health services will be around 18% - 51,9% (Roberton et al., 2020). Consultant Obstetrics and Genocology expert at the Lagos University Teaching Hospital said that before the pandemic, pregnant women in the first trimester were advised to have their health checked every 4 weeks, but during the Covid-19 pandemic situation, pregnant women were advised to have their health checked every 8 weeks. Then, obstacles for pregnant women in having health checks during the Covid-19 pandemic include pressure from the family to remain in self-isolation, feelings of anxiety, avoiding health facilities, reduced service time at health facilities, lack of transportation, and a feeling of empathy not wanting to increase the burden on health workers. many of whom fell [1,7]. A decrease in the number of antenatal visits also occurred in the countries of Kenya, Uganda and Tanzania, delays in dealing with health problems of pregnant women and fetuses due to the inadequate number of antenatal visits during pregnancy [1,18]. Reducing the number of antenatal visits allows the detection of several diseases that would endanger the health of the mother and fetus, such as pregnancy hypertension [7].

Medical indications for CS delivery include hypertension of pregnancy (preeclampsia/eclampsia). Preeclampsia is one of the health problems among pregnant women in the world which continues to increase and is most commonly found in urban areas [18]. The research results found that before and during the Covid-19 pandemic, generally CS deliveries were given as medical indications of preeclampsia and a history of previous CS. Research conducted by Papageorghiou et al. [19], suggests that pregnant women who are diagnosed positive for Covid- 19 are one of the triggers for increasing the rate of preeclampsia in pregnant women. The main cause of this increase in numbers is still not known with certainty, but poor lifestyles and limitations in accessing services are factors that contribute to the increase in preeclampsia [1,18]. Pregnant women with a history of childbirth have the potential to have a CS delivery in their next pregnancy. A history of CS delivery can be caused by health problems of the mother, fetus, or both and the patient's request. The results of research conducted by Liu et al. [20] in mainland China found that the SC delivery rate was 54,90% of the total 111.317 deliveries and the majority was 28,43% at the request of the patient. CS delivery at the request of the patient is in first place in the top 5 indications for CS delivery (CPD, Fetal Distress, Previous Caesarea delivery, malpresentation and breech presentation). The increase in demand for CS births by patients is caused by increasing living standards, government policies regarding the number of children, urban areas of residence, the role of the media in changing the public's perception that SC births with technological developments are safer than normal births and avoid some of the possible problems that arise during vaginal births. such as fear of pain during childbirth, pelvic floor collapse, incontinence urine and sexual dysfunction

5 Conclusion

The prevalence of CS deliveries before and during the Covid-19 pandemic in the Kendari City Regional Hospital increased by 28%. Indirect effects in the Covid-19 pandemic situation, such as restrictions on access to health services, lack of reproductive health control and people's fear of the Covid-19 disease, are thought to be factors that trigger an increase in SC deliveries.

References

1. Kotlar, B., Gerson, E., Petrillo, S., Langer, A., Tiemeier, H. The impact of the COVID-19 pandemic on maternal and perinatal health: a scoping review. In *Reproductive Health* 18(1), (2021). <https://doi.org/10.1186/s12978-021-01070-6>
2. Morán Antolín, E., Broullón Molanes, J. R., de la Cruz Conty, M. L., Encinas Pardilla, M. B., Guadix Martín, M. D. P., Sainz Bueno, J. A., Forcén Acebal, L., Pintado Recarte, P., Álvarez Bartolomé, A., Martínez Cendán, J. P., Martínez-Pérez, Ó. SARS-CoV-2 infection and c-section: A prospective observational study. *Viruses*, 13(11), 1–14 (2021). <https://doi.org/10.3390/v13112330>
3. Kementerian Sekretariat Negara RI. Penetapan Status Faktual Pandemi Corona Virus Disease 2019 (Covid-19) di Indonesia. 2019(130826), 130826–130829 (2021).
4. De Sousa, Á. F. L., De Carvalho, H. E. F., De Oliveira, L. B., Schneider, G., Camargo, E. L. S., Watanabe, E., de Andrade, D., Fernandes, A. F. C., Mendes, I. A. C., Fronteira, I. Effects of COVID-19 infection during pregnancy and neonatal prognosis: What is the evidence? *International Journal of Environmental Research and Public Health*, 17(11), 1–17 (2020). <https://doi.org/10.3390/ijerph17114176>
5. Mhajabin, S., Hossain, A. T., Nusrat, N., Jabeen, S., Ameen, S., Banik, G., Tahsina, T., Ahmed, A., Sadeq-Ur Rahman, Q., Gurley, E. S., Bari, S., Chowdhury, A. I., Arifeen, S. El, Mehta, R., Rahman, A. E. Indirect effects of the early phase of the COVID-19 pandemic on the coverage of essential maternal and newborn health services in a rural subdistrict in Bangladesh: Results from a cross-sectional household survey. *BMJ Open*, 12(2), 1–11 (2022). <https://doi.org/10.1136/bmjopen-2021-056951>
6. Ornaghi, S., Fumagalli, S., Guinea Montalvo, C. K., Beretta, G., Invernizzi, F., Nespoli, A., Vergani, P. Indirect impact of SARS-CoV-2 pandemic on pregnancy and childbirth outcomes: A nine-month long experience from a university center in Lombardy. *International Journal of Gynecology and Obstetrics*, 156(3), 466–474 (2022). <https://doi.org/10.1002/ijgo.13990>
7. Knight, M., Bunch, K., Vousden, N., Morris, E., Simpson, N., Gale, C., O'Brien, P., Quigley, M., Brocklehurst, P., Kurinczuk, J. J. Characteristics and outcomes of pregnant women admitted to hospital with confirmed SARS-CoV-2 infection in UK: National population based cohort study. *The BMJ*, 369, 1–2 (2020). <https://doi.org/10.1136/bmj.m2107>
8. Chmielewska, B., Barratt, I., Townsend, R., Kalafat, E., van der Meulen, J., Gurol-Urganci, I., O'Brien, P., Morris, E., Draycott, T., Thangaratinam, S., Le Doare, K., Ladhani, S., von Dadelszen, P., Magee, L., Khalil, A. Effects of the COVID-19 pandemic on maternal and perinatal outcomes: a systematic review and meta-analysis. *The Lancet Global Health*, 9(6), e759–e772 (2021). [https://doi.org/10.1016/S2214-109X\(21\)00079-6](https://doi.org/10.1016/S2214-109X(21)00079-6)
9. Islam, M. A., Shanto, H. H., Jabbar, A., Howlader, M. H. Caesarean Section in Indonesia: Analysis of Trends and Socio-Demographic Correlates in Three Demographic and Health

- Surveys (2007–2017). *Dr. Sulaiman Al Habib Medical Journal*, 4(3), 136–144 (2022). <https://doi.org/10.1007/s44229-022-00011-0>
10. Rahman, M., Khan, N., Rahman, A., Alam, M., Khan, A. Long-term effects of caesarean delivery on health and behavioural outcomes of the mother and child in Bangladesh. *Journal of Health, Population and Nutrition*, 41(1), 1–7 (2022). <https://doi.org/10.1186/s41043-022-00326-6>
 11. BPS Kendari. Kota Kendari dalam Angka 2022. Katalog:1102001.7471. 1–6 (2022).
 12. Pandey, A. K., Raushan, M. R., Gautam, D., Neogi, S. B. Alarming Trends of Cesarean Section—Time to Rethink: Evidence From a Large-Scale Cross-sectional Sample Survey in India. *J Med Internet Res*, 25 (2023). <https://doi.org/doi: 10.2196/41892>
 13. Molla, W., Hailemariam, S., Mengistu, N., Madero, D., Bayisa, Y., Tilahun, R., Wudneh, A., Ayele, G. M. Unintended pregnancy and associated factors during COVID-19 pandemic in Ethiopia: Community-based cross-sectional study. *Women’s Health*, 18 (2022). <https://doi.org/10.1177/17455057221118170>
 14. Gharacheh, M., Kalan, M. E., Khalili, N., Ranjbar, F. An increase in cesarean section rate during the first wave of COVID-19 pandemic in Iran. *BMC Public Health*, 23(1), 1–10 (2023). <https://doi.org/10.1186/s12889-023-15907-1>
 15. Sarastry, R., Layarta, C., Aladini, U., Pramono, B. A. Delivery routes in pregnancy with covid-19 and the risk of intrapartum vertical transmission: A meta-analysis. *Medical Journal of Indonesia*, 30(2), 116–122 (2021). <https://doi.org/10.13181/mji.oa.214779>
 16. Fakari, F. R., Simbar, M. Coronavirus pandemic and worries during pregnancy; a letter to editor. *Archives of Academic Emergency Medicine*, 8(1), 2–3 (2020).
 17. Goyal, M., Singh, P., Singh, K., Shekhar, S., Agrawal, N., Misra, S. The effect of the COVID-19 pandemic on maternal health due to delay in seeking health care: Experience from a tertiary center. *International Journal of Gynecology and Obstetrics*, 152(2), 231–235 (2021). <https://doi.org/10.1002/ijgo.13457>
 18. Pallangyo, E., Nakate, M. G., Maina, R., Fleming, V. The impact of covid-19 on midwives’ practice in Kenya, Uganda and Tanzania: A reflective account. *Midwifery*, 89, 102775 (2020). <https://doi.org/10.1016/j.midw.2020.102775>
 19. Holland, C., Hammond, C., Richmond, M. M. COVID-19 and Pregnancy: Risks and Outcomes. *Nursing for Women’s Health*, 27(1), 31–41 (2023). <https://doi.org/10.1016/j.nwh.2022.11.004>
 19. Papageorghiou, A. T., Deruelle, P., Gunier, R. B., Rauch, S., García-may, P. K. Preeclampsia and COVID-19 : results from the. *January*, 1–17 (2020).
 20. Liu, Y., Li, G., Chen, Y., Wang, X., Ruan, Y., Zou, L., Zhang, W. A descriptive analysis of the indications for caesarean section in mainland China. *BMC Pregnancy and Childbirth*, 14(1), 1–9 (2014). <https://doi.org/10.1186/s12884-014-0410-2>
 21. RSUD Kota Kendari. Data Cakupan Persalinan RSUD Kota Kendari. Kendari (2021)

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.

