

Material and child health analysis and its intercourse to the availability of health facilities in Papua province

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Abstract. Community access to health in Papua is still inadequate compared to other provinces in Indonesia. This condition has a significant influence on the level of maternal and child health in Papua. This study aims to determine the health conditions of mothers and children and their relationship with the availability of health facilities in Papua. Secondary data from the Ministry of Health and the Central Statistics Agency were adopted for this study. Infant mortality rate (IMR), the maternal mortality rate (MMR), the percentage of mothers who gave birth to live births in health facilities and medical assistance, and the number of available health facilities are the variables used in this study and analysed using descriptive statistical quantitative methods with related references. IMR in Papua still fluctuates due to several causes such as low birth weight, asphyxia, and diarrhea. On the other hand, maternity services show good progress. However, the MMR in Papua Province is still high due to high cases of bleeding from pregnant women and the uneven distribution of health facilities. This study shows a directly proportional relationship between the number of facilities and the health conditions of mothers and children.

1 Introduction

The health aspect is an indicator that can be used to determine an area's level of community welfare. It is because health is a basic human need to be able to live a decent and productive life. Health is also one of the human rights and an element of welfare in the ideals of the Indonesian nation [1]. Therefore, it is necessary to provide health service facilities for the community to guarantee these rights. Law Number 36 of 2009 concerning Health states that health service facilities are tools and/or places used to carry out health service efforts, whether promotive, preventive, curative, or rehabilitative by the Central Government, Regional Government, and/or the community [2].

The future of a healthy society depends on the health of today's children and their mothers, who are the guardians of that future [3]. Therefore, maternal and child health indicators are essential to study so that the factors causing maternal and child mortality can be identified, and the mortality rate can be reduced. Although health issues are complicated because they are closely related to the political and legal conditions prevailing in an area, the welfare of mothers and children must be fought for a better future generation. The health condition of mothers and children can be assessed through various indicators, including the Maternal Mortality Rate (MMR), Infant Mortality Rate (IMR), percentage of children born alive, and access to health facilities. The analysis of these indicators will

also describe the general welfare of the people of a region [4].

The infant mortality rate (IMR) indicates the condition and development of the health sector. This figure can also be used as an indicator of realising the sustainable development goals (SDGs). According to UNICEF, Papua is the province with the highest death rate in Indonesia [5]. Mortality rates can be reduced by improving the quality of infant health care services. Factors causing infant mortality include the prevalence of stillbirth, low birth weight, short birth interval [6], and biodemographic characteristics [7]. In addition, other factors include economic level, mother's education and geographic area (rural/urban) [8].

Increasing population activities in various fields due to population growth also cause health services to be needed [9]. The number of standard health facilities with competent medical personnel and the availability of drug stocks in the regions is still a severe problem in Papua Province [10]. Currently, the availability of health facilities is not evenly distributed in the regions, so public access is still limited. It is increasingly limited by the hours of service of health facilities because not many health facilities provide 24-hour services. There are only forty-six General Hospitals in the province, while there is only one Maternity Hospital [11]. Based on these circumstances, this study would like to determine further whether the availability of health facilities significantly influences the health status of mothers and children.

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This study aims to determine the health conditions of mothers and children in Papua Province and their relationship with the availability of health facilities in each regency in Papua Province. The results of this research analysis are expected to be a consideration for policymakers to improve the health status of mothers and children in Papua Province. In addition, it can be used for development planning, especially to create adequate health facilities that the Papuan people can reach.

2 Methods

The research study area covers one of the provinces in Indonesia, namely Papua Province. The method used in this research is a descriptive quantitative assessment based on several indicators. Data collection refers to documents and publications from government institutions or agencies as described below. Each data is processed with the help of other software, such as Microsoft Excel and SPSS. The data processing results are then used to analyze maternal and child health phenomena in Papua Province in 2018-2020.

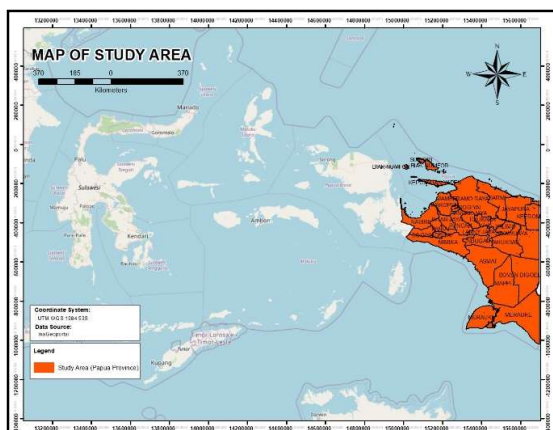


Fig. 1. Map of Study Area. (Source: Data Processing, 2022)

2.1 Infant Mortality Rate (IMR)

According to the Indonesian Central Statistics Agency, the Infant Mortality Rate (IMR) is the number of babies who die before reaching the age of 1 year at a certain time per 1000 live births in the same time period. IMR normative values are as follows: >70 very high, 40–70 high, 20–39 moderate, and <20 low. IMR can be calculated using the formula:

$$IMR = \frac{ND < 1 \text{ year}}{NLB} \times 1000 \quad (1)$$

IMR = infant mortality rate per 1000 live births
 ND < 1 year = number of people who died at the age of <1 year at a certain time
 NLB = number of live births in the same period

The data used in this study comes from the 2015-2045 Indonesian Population Projection of 2015 SUPAS

Results (IMR data for 2020) and Demographic Parameter Estimation: Trends in Fertility, Mortality, and Migration of the 2010 Population Census Results. The IMR data is processed into graphical form in its presentation. Data on the causes of infant mortality come from Indonesia's 2019 health profile. Furthermore, the results are analyzed descriptively using related references.

2.2 Maternal Mortality Rate (MMR)

Maternal Mortality Rate (MMR) shows the number of deaths of women during pregnancy or within 42 days of termination of pregnancy regardless of the duration and place of delivery, caused by the pregnancy or its management, and not due to other causes such as accidents, falls, and others, per 100,000 live births. The Maternal Mortality Rate of Papua Province in 2018-2020 is calculated from data on the number of live births and the number of maternal deaths in 2018-2020 obtained from the publication of the Ministry of Health of the Republic of Indonesia entitled "Indonesian Health Profile" in 2019 and 2020. MMR can be calculated using the formula:

$$MMR = \frac{D_{\text{pregnant}}}{NLB} \times 100.000 \quad (2)$$

D_{pregnant} = number of maternal deaths in pregnancy or birth stage
 NLB = number of live births

2.3 Percentage of Mothers Who Give Birth to Live Born Children in Health Facilities and Assistance for Health Workers

Data on the percentage of mothers who gave birth to live births in health facilities and with the assistance of health workers was obtained from data published in the 2020 Maternal and Child Health Profile. The definition of mother in this case is women aged 15-49 years who have been married. The percentage of mothers who gave birth to live-born children in health facilities is the ratio between the number of mothers who have given birth to live-born children and their last delivery at a health facility with those who have given birth. The health facilities in question include hospitals, maternity hospitals, private practice clinics/midwives/doctors' practices, and public health center (puskesmas/pustu/polindes).

$$P \text{ Salifaskes} = \frac{JPSalifaskes}{JPM15-49} \times 100\% \quad (3)$$

$P \text{ Salifaskes}$ = Percentage of ever-married women aged 15-49 years who last gave birth in a health facility
 $JPSalifaskes$ = Number of ever-married women aged 15-49 years who last gave birth in a health facility
 $JPM15-49$ = Number of ever-married women aged 15-49 years who gave birth in the same period

The percentage of mothers who gave birth to live births with the help of health workers is a comparison between the number of mothers who have given birth to live births and the last delivery was assisted by trained health workers and mothers who have given birth. Health workers in question are trained health workers who have midwifery competence, such as obstetricians, general practitioners, midwives, nurses, and other medical personnel.

$$P \text{ Salinakes} = \frac{JPMoTK}{JP15-49} \times 100\% \quad (4)$$

P Salinakes = Proportion of ever-married women aged 15-49 years whose last delivery was assisted by trained health personnel

JPMoTK = Number of ever-married women aged 15-49 years who have given birth and were assisted by trained health workers

JP15-49 = Number of ever-married women aged 15-49 years who have given birth in the same period

2.4 The Number of Health Facilities

Data on the number of health facilities was obtained through data published in the Infrastructure Statistics of Papua Province in 2019 and 2020. The unit of analysis for the number of health facilities is the regency/city. Data on health facilities used are only those that support the level of maternal and child health. Health facilities that are considered include: Hospitals, Maternity Hospitals, Health Centers, Maternity Hospitals, and Midwives Practice Places. The data is then presented in the form of a bar chart and analyzed descriptively based on related references.

Maternal and child health conditions are based on each regency's data on the MMR and IMR. This data comes from the Papua Health Service Agency Performance Report 2020 [12]. This data is then classified based on the target in Papua with an MMR of 212 and an IMR of 23. The results of the two classifications are combined into Maternal and Child Health conditions. Meanwhile, data on the number of facilities use a total value which is then classified using the Sturges method. The MCH classification data and the number of facilities were then cross-tabbed using SPSS to determine the relationship between the two. The total population is 20 regencies. It is because several regencies do not have data availability.

3 Result & Discussion

3.1 Infant Mortality Rate (IMR)

Figure 1 shows the Papuan infant mortality rate (IMR) which has fluctuated. The decline occurred from 1980 to 2010. Meanwhile, the increase occurred in 2020. Fluctuations occur due to external influences, so further studies are needed to determine the original cause of the fluctuations. According to BPS, these figures are classified as very high (in 1980 and 1990), high (in

2000), and medium (in 2020). Figure 1 also shows that the BMI of men is greater than that of women. This happens because men tend to have a greater risk of death, while women are more immune to disease [13]. In addition, baby girls are more able to survive than baby boys when viewed from the immune system and genetic factors [14].

This can happen due to several factors. Significant factors in neonatal health and infant mortality in Papua are caused by cultural norms and family traditions [15]. This culture makes it taboo for people to give birth to babies with other people by choosing to give birth alone or sometimes assisted by traditional birth attendants. This is in line with Figure 4 with a percentage of <70%. In addition, there is high trust in the family healer and then he is taken to the clinic but generally cannot be helped because it is too severe.

Meanwhile, barriers to the provision of health services are also a contributing factor to infant mortality in Papua [15]. This situation is in accordance with research conducted by Ezech in Nigeria [16]. Barriers to health care providers include incompetent staff and inadequate facilities. The Papua region is generally located in a remote place that is far from access to health, which is one of the causes of this situation. In addition, there are many inland tribes that are thick with cultural beliefs and practices. The low economic condition of the Papuan people makes the infant mortality rate quite high. In addition, Papua Province lacks about 58% of Doctors, 88% of Dentists, 38% of Nurses, and 53% of Midwives in Puskesmas [17].

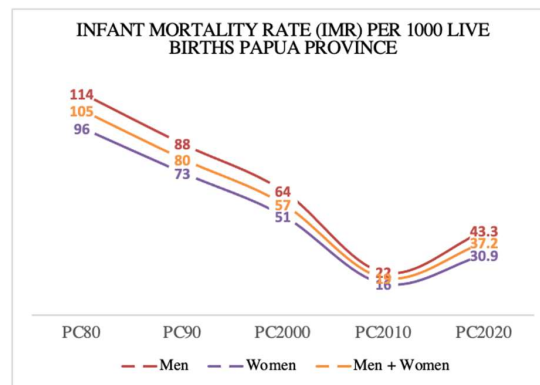


Fig.2. Graph of IMR per 1000 live births in Papua Province. (Source: Data Processing, 2022)

This target shows that the condition of infant mortality in Papua is far below the target. Therefore, government regulations related to improving access and quality of health services need further evaluation. Figures that are far from the target can occur due to several factors. These factors include a health development strategy that tends to be a curative model, the role of the Puskesmas has not been optimal, the distribution of health workers is unequal, and medicines are expensive. In 2019, most infant deaths in Papua were caused by low birth weight, asphyxia, and diarrhea (Table 1). This data shows that most Papuans have difficulty meeting their nutritional needs and clean

water sources. It is also shown in a 2016 study with the result that the nutritional status of chronic energy deficiency in Papua and West Papua is relatively high [18]. In addition, based on the IMR value, Papua is experiencing an intermediate rock phase epidemiological transition which shows a pattern of causes of infectious and non-communicable diseases.

Table 1. The number of deaths by main cause in Papua Province 2019.

Death Cause	Number of Deaths
Low Birth Weight	57
Asphyxia	59
Neonatal (0-28 Day)	
Tetanus Neonatorum	0
Sepsis	9
Congenital abnormalities	5
Others	38
Post Neonatal (29 Day -11 Month)	
Pneumonia	39
Diarrhea	50
Malaria	3
Tetanus	0
Neurological Disorders	0
Gastrointestinal Disorders	1
Others	27
Toddler (12-59 Month)	
Pneumonia	13
Diarrhea	34
Malaria	7
Measles	0
Fever	0
Diphtheria	0
Others	12

(Source: Statistic Data Processing, 2022)

3.2 Maternal Mortality Rate

Figure 2 shows the trend of MMR in Papua Province from 2018–2020. It can be observed from Figure 2 that the MMR in Papua Province in 2018 was 105.20, which means that there were 105 maternal deaths during pregnancy, childbirth, and postpartum caused by pregnancy, childbirth, and postpartum or their management but not due to other causes such as accidents and others. The number of MMR is calculated for every 100,000 live births in Papua Province in 2018. The MMR trend in Papua Province decreased in 2019 but increased again in 2020. Maternal mortality and maternal morbidity have long been a health problem, especially in developing countries. It is related to the condition of public health centers in Papua Province, which do not have sufficient maternal health equipment [19].

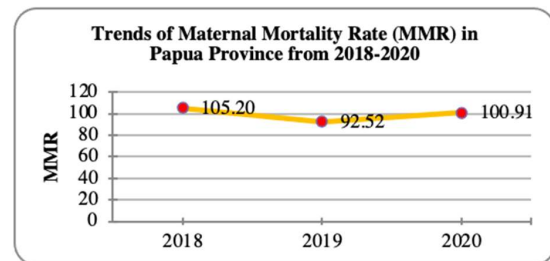


Fig.3. Graph of Trends in Maternal Mortality Rate (MMR) in Papua Province 2018 to 2020. (Source: Data Processing, 2022)

Based on table 2, it can be seen the causes of maternal death in Papua Province in 2019-2020. The cause of the highest number of maternal deaths is bleeding. Problems related to pregnancy and childbirth including maternal mortality are influenced by factors, such as maternal health status and readiness to become pregnant, antenatal care (pregnancy period), delivery assistance, and immediate postnatal care, as well as socio-cultural factors [20]. The limited access of women to quality reproductive health service facilities, especially for poor women in the Disadvantaged, Remote, Border and Archipelago Regions (DTPK), is one of the challenges in dealing with this problem [20]. Another factor influencing maternal mortality in Papua is the trend of marriage under the age of 20 which is quite high [21].

Table 2. The number of maternal mortality by cause in Papua Province 2019 to 2020

Causes of Maternal Death	2019	2020
Bleeding	32	25
Hypertension in Pregnancy	6	10
Infection	8	11
Circulatory System Disorders	2	2
Metabolic Disorder	0	1
Etc.	18	23
Total	66	72

(Source: Statistic Data Processing, 2022)

Socio-cultural factors in Papua are also one of the factors that influence the number of maternal deaths. According to the belief that develops in the Asiki community, the birth process must be carried out in bivouacs or tents and without the assistance of health workers. Prospective mothers who will give birth are only accompanied by their families, and husbands who do not know about accompanying the birth process [22]. Some of them were able to go through the delivery process in a healthy and good way, but not a few also newborn babies and mothers who experienced infections, heavy bleeding to hypothermia, so they had to get further treatment from the clinic.

One of the targets in the third goal of the Sustainable Development Goals (SDGs) is to reduce the maternal mortality rate to less than 70 per 100,000 live births by 2030 [23]. The maternal mortality rate in Papua Province is still higher than the SDGs target. Efforts to

accelerate the decline in MMR are carried out by ensuring that every mother can access quality maternal health services [24]. Efforts have been made to reduce MMR in Papua Province, namely the provision of health facilities in the regencies and the Papua Healthy Card (KSP) program which has reached almost all indigenous Papuans (OAP) [21]. The Asiki Clinic in the Asiki area, Boven Digoel, carries out socialization and education efforts for prospective mothers regarding the birth process. Since the socialization, the number of maternal and child deaths has decreased slowly. Referring to the current conditions, achieving the SDGs target requires challenging work to achieve it.

3.3 Percentage of Mothers Who Give Birth to Live Born Children in Health Facilities and Assistance for Health Workers

Maternal and infant mortality rates have long been a concern because cases are still high, especially in eastern Indonesia. According to McCarthy & Maine (1992), maternal mortality is caused by intermediate determinants, one of which is access to health facilities [25]. The easy access of mothers to health facilities will allow mothers to be helped during childbirth so that the maternal mortality rate can be reduced.

Figure 3 shows that the percentage of mothers giving birth in Papua in 2020 is relatively low compared to other provinces. In addition, it is still far from the strategic plan (Renstra) target (87%). The percentage in Papua Province is still extremely far from the target because of the lack of available health services. Provision of infrastructure and health facilities is become more difficult due to the large area and geographical conditions with mountainous barriers [26]. For example, Intan Jaya Regency, as shown in Figure 5 and Figure 6, has a small number of health facilities. It makes access to health facilities difficult because the available health facilities may be far away for some residents in the regency. In addition, access is also related to the economic capacity to obtain health facilities. The percentage of poor people in Papua Province is 26.64% in 2020 and is the highest in Indonesia [27]. Poverty conditions can result in mothers being unable to access health facilities, especially those requiring high costs [28].

In addition to the availability factor, public awareness is also something that must be considered. Maternal awareness of giving birth in health facilities is still low due to solid cultural attachments [29]. Some tribes have a culture of being alone when giving birth. In addition, trust in traditional medicine and methods is still high. As a result, the population ignores the existence of health services when they are about to give birth. However, in general, there is an increase in the percentage of mothers who give birth in health facilities. The increase that occurred was quite significant in 2019. Then, it slowed down a bit in 2020. It indicates an increase in access to health services and an increase in public awareness of utilizing health services.

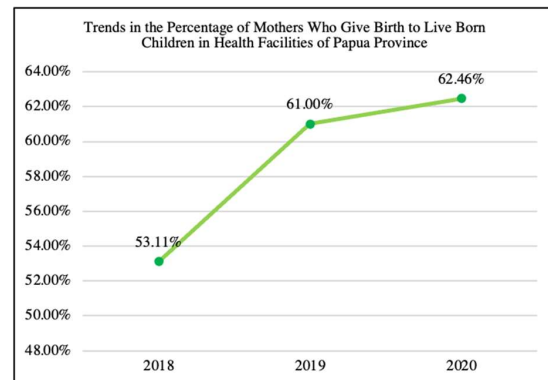


Fig. 4. Graph of Trends in the Percentage of Mothers Who Give Birth to Live Born Children in Health Facilities of Papua Province 2018 to 2020. (Source: Data Processing, 2022).

One of the efforts to reduce maternal mortality is the safe motherhood movement to help women have healthy and safe pregnancies and deliveries and give birth to healthy babies. There are four pillars in the safe motherhood movement. One of the pillars in this safe motherhood is birth attendants with health workers [30]. Delivery without health personnel can result in unsafe risks during the delivery process because there is no guarantee of safety for the mother and the fetus [31].

In general, the percentage tends to increase even though there is a slight decrease in 2020 (Figure 4). The fluctuations are followed by the dynamics of the Maternal Mortality Rate case. This relationship shows the opposite condition. This is in accordance with research conducted by Mardiana, et al. al (2021), the increase in MMR was followed by a decrease in deliveries by health workers [31]. Compared with the percentage of mothers giving birth in health facilities, the percentage of mothers giving birth with the help of health workers is still higher. It means that health workers carry out deliveries even though they are not in health facilities. This is the result of the government's efforts to provide health services, especially in areas that are still underdeveloped and isolated. One of these efforts is a mobile clinic that bringing health workers for rural communities.

However, this figure is still relatively low compared to other provinces in Indonesia. The percentage of mothers who gave birth with the help of health workers in Papua Province in 2020 was the lowest. Most other provinces have percentages above 90%, and even DIY already has a percentage of 100% [30]. This small number is inseparable from the low public awareness regarding professional health workers to assist with childbirth. Many people still believe more in traditional methods and shamans to help with childbirth. Moreover, there are still many tribes in Papua that are attached to their traditional culture.

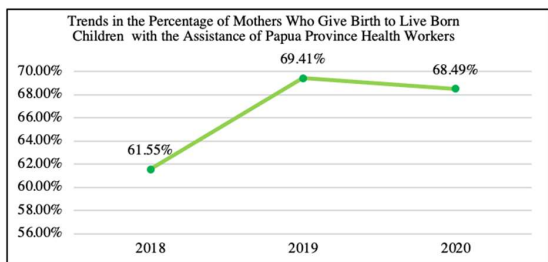


Fig. 5. Graph of Trends in the Percentage of Mothers Who Give Birth to Live Born Children with the Assistance of Papua Province Health Workers 2018 to 2020. (Source: Data Processing, 2022)

3.4 The Number of Health Facilities

Figure 5 shows that the distribution of health facilities in regencies/cities in Papua Province is quite varied. The availability of health facilities in large regencies such as Merauke, Yahukimo, and Mimika is sufficient in quantity. This number is quite large compared to other regencies, but it is not sufficient in terms of the area with limited access. The health facilities available in all regencies are Puskesmas without inpatient services and Puskesmas Pembantu (Pustu). The type and time of service at Puskesmas without inpatient services and Pustu can be said to be limited, especially at Pustu, which is part of the Puskesmas, which was built to expand the reach of health services and is regularly checked by the central Puskesmas unit [32].

It will create difficulties for the local community, especially pregnant women about to give birth. Long distances will make patients late for treatment, which increases maternal and infant mortality risk. This condition is in line with research by Khatimah (2019); health services in Papua with a travel time of approximately 30 minutes are more frequently visited [33]. Although these Puskesmas services are available in all regencies, some have a limited number of Puskesmas, for example, in Intan Jaya, Mamberamo Tengah, and Deiyai regencies. Intan Jaya Regency only has 2 Puskesmas without inpatient services and 2 Pustu, Central Mamberamo Regency only has 5 Puskesmas without inpatient services and 8 Pustu, and Deiyai Regency only has 6 Puskesmas without inpatient services and 5 Pustu. This number is still deficient compared to the total area of these regencies, so it can be said that public access to health services is still limited.

Inpatient Puskesmas facilities are available in almost all regencies/cities in Papua Province, except in Tolikara Regency and Deiyai Regency. This situation shows that the community in Deiyai Regency is in an emergency that requires 24-hour health services and must travel long distances to get health services. Though an emergency occurs during the service hours of the Sub-Puskesmas, the community still must travel long distances because the availability of these Puskesmas is only five units in Deiyai Regency. In contrast to Deiyai Regency, the number of Puskesmas services without hospitalization and Sub-Puskesmas in Tolikara Regency

is three times more. Thus, when the community experiences an emergency, the distance and time travelled will not be as far as the Deiyai community must travel so that help can be given more quickly.

The availability of hospitals as complete health service providers is still very limited in number. Even Maternity Hospitals are only available in Mimika and Intan Jaya Regencies. General Hospitals are available in almost all regencies/cities with a limited number with an average of 1-2 Hospital units for each regency/city. This problem is not only about quantitative numbers but also quality; health services in Papua still need much improvement. Inadequate equipment, minimal experts, and limited drug availability. Health problems in Papua Province are very complex because they are related to other dimensions such as human rights violations, health, and political dimensions [10].

Figure 6 shows the distribution of health facilities in regencies/cities in Papua Province in 2020. Based on the graph, several regencies/cities have a reasonably complete and large number of health facilities, such as Merauke Regency, Yahukimo Regency, and Jayapura. Meanwhile, other regencies have a small number with almost the same average.

The number of available health facilities in Papua Province in 2020 is not much different from 2019; the availability of health facilities that must exist in each regency are Puskesmas without inpatient care and Puskesmas assistants. These two facilities must exist in every regency because these are the simplest and easiest health facilities to access. However, it has drawbacks regarding limited time and services which only serve during working hours. This matter is the concern of every regency because health facilities with accessible services and access should exist to be able to serve the community.

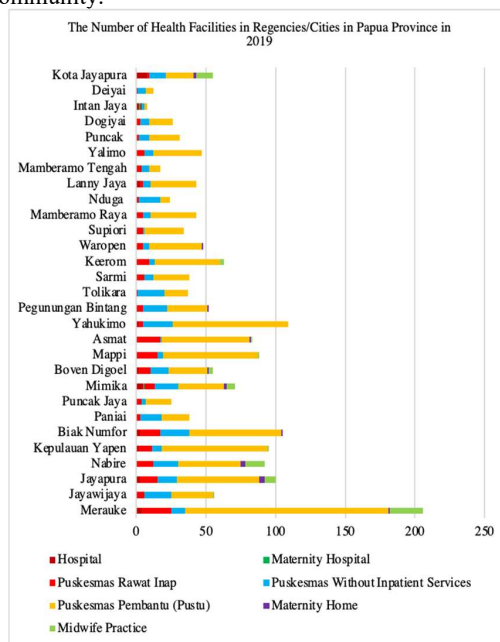


Fig. 6. Graph of Distribution of Number of Health Facilities in Regencies/Cities in Papua Province in 2019. (Source: Data Processing, 2022)

Inadequate health facilities in several regencies can be assumed because of access and areas that are not physically supportive. It will also affect services and the community because health facilities should always be ready under any circumstances and at any time. Areas that do not have adequate health facilities result in difficulties when cases occur that require immediate assistance. In addition, this condition is precarious for treatment in other areas with more difficult access, and the possibility of patients being helped is slight.

The existence of health facilities is essential because health facilities are one of the supporters of health quality in an area. This condition does not directly affect the case but is highly urgent, especially regarding birth and death rates. It is because births and deaths are closely related to first aid, which requires adequate health facilities and supporting access. This effect can be seen in table 3, which shows that poor maternal and child health tend to have few health facilities. Meanwhile, areas with good health quality tend to have small to large numbers of health facilities.

Table 3 also shows that one regency has many facilities with good health conditions. On the other hand, six regencies have few facilities with poor health conditions. Therefore, it is necessary to increase the number of facilities to improve the health conditions of mothers and children in Papua, accompanied by qualified medical personnel, complete equipment, and medicines.

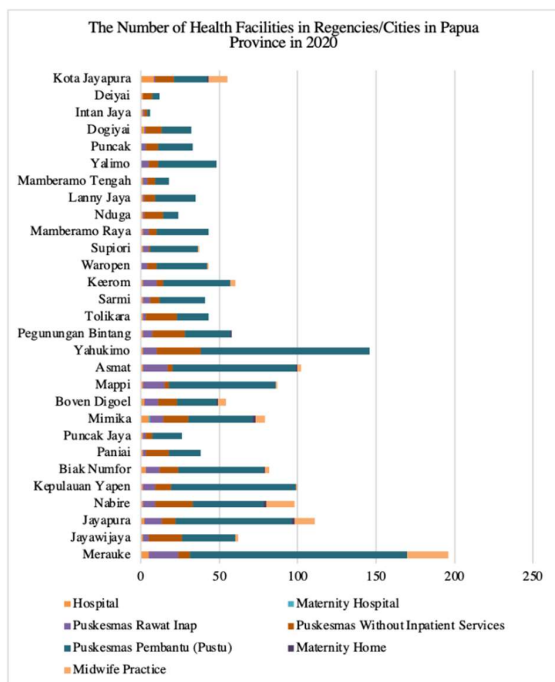


Fig.7. Graph of Distribution of Number of Health Facilities in Regencies/Cities in Papua Province in 2020. (Source: Data Processing, 2022)

Table 3. The Intercourse between the Number of Health Facilities and the Quality of Maternal and Child Health Papua Province in 2020.

Maternal and Child Health	The Number of Health Facilities			Total
	Large	Moderate	Small	
Good	1	6	2	9
Moderate	0	1	4	5
Bad	0	0	6	6
Total	1	7	12	20

(Source: Statistic Data Processing, 2022)

4 Conclusion

The results of this study indicate that, in general, the health conditions of mothers and children in Papua Province are still not stable with poor quality. The infant mortality rate in Papua is still fluctuating. The downward trend occurred from 1980-2010 and then increased from 2010-2020. External factors cause these fluctuations, so further research is needed to determine the original cause of the fluctuation. The maternal mortality rate in Papua is still relatively high (>70 per 100,000 live births) in 2018-2020, with around 100 deaths per 100,000 live births during pregnancy, childbearing, and postpartum. The maternal mortality rate is mainly caused by bleeding and is influenced by local socio-cultural factors.

The percentage of mothers giving birth to live babies in health facilities in Papua is still below the strategic plan. This percentage trend increases in 2018-2020 but is still at 60% (less than 87%). Meanwhile, the percentage of mothers giving birth accompanied by health workers during 2018-2020 has an increasing trend with an average of 68%. This number is still meagre compared to other provinces that have exceeded 90%. The availability of health facilities in Papua Province has not been spread evenly and adequately. Some regencies have complete health facilities, while most others have access to health facilities that are still relatively difficult. The results showed that regencies with adequate health facilities had good health conditions. On the other hand, six regencies with limited facilities have poor health conditions. This condition means that although the availability of health facilities is not the only indicator, the availability of health facilities is crucial because it is related to the birth and death rates of mothers and babies.

This health condition can be used for development planning purposes. There is a need to accelerate the program for Papua Province so that it can meet the target or at least be on par with other provinces. Further studies can use other health indicators by the strategic plan or SDGs targets. It can be analyzed whether other indicators have met the target or are still below the target, such as the IMR and MMR.

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