

Assessing Equality In Hospital Bed Distribution In North Sumatra Of June 2022

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Abstract.

At the end of 2019, an outbreak of a respiratory infection occurred in the city of Wuhan, Hubei province, People's Republic of China. The disease was later named Coronavirus disease-19/COVID-19, becoming a global pandemic. The unpreparedness of the government and health facilities in dealing with the presence of this pandemic exposed problems in the health care system in various parts of the world, namely equality of access to health. Problems in the health care system also affect Indonesia. Apart from the COVID-10 pandemic, in Indonesia research on the equivalence of the distribution of hospital beds and the health care system as a whole has never been conducted or at least has not been published. This research oversight does not only occur in Indonesia, not a single ASEAN member country has ever published research on the equality of the distribution of hospital beds. This research is a descriptive study that aims to assess the equivalence of the distribution of hospital beds in the province of North Sumatra. Almost all regencies/cities in North Sumatra have hospitals, except for Gunungsitoli City, with the majority of hospitals being in Medan City.

Keywords: Service equality, Facilities, and Hospital infrastructure

I. INTRODUCTION

Equality in access to health is one of the components needed to achieve universal health coverage (Blas and Kurup, 2010). One way to measure equity in access to health is to measure the distribution of hospital beds. Equality in the distribution of hospital beds as a health service resource is rarely measured and researched (Ebrahimzadeh et al., 2019). Failure to collect this information results in an unequal distribution of hospital beds in various regions. At the end of 2019, an outbreak of a respiratory infection occurred in the city of Wuhan, Hubei province, People's Republic of China. The disease was later named Coronavirus disease-19/COVID-19, becoming a global pandemic. The unpreparedness of the government and health facilities in dealing with the presence of this pandemic exposed problems in the health care system in various parts of the world, namely equality of access to health. Problems in the health care system also affect Indonesia. Research on the readiness and capacity of the Indonesian health service system in 2021 shows that the Indonesian health service system from various aspects is incapable and unprepared to deal with health disasters such as a pandemic (Mahendradhata et al., 2021). The ratio of health workers, especially doctors in Indonesia is only 0.38 per 1,000 population, and only 1206 specialists in pulmonary disease, of which 22-26% of pulmonary specialists are in DKI Jakarta, which only comprises 3% of Indonesia's population (Mahendradhata et al., 2021). In terms of infrastructure, Indonesia has 2925 hospitals with a total of 388,106 beds.

With this number, the ratio of beds to Indonesia's population is only 1.49 per 1000 population, and the distribution is uneven. Although the ratio of beds to population has increased from 2014 which was 1.26 per 1000 population, this ratio of beds is lower compared to neighboring countries such as Malaysia (1.9 per 1000 population), Thailand (2.1 per 1000 population) or Vietnam (2.6 per 1000 population) (Mahendradhata et al., 2017, 2021). This uneven distribution of beds is indicated by the fact that there are 226 districts/cities that do not meet the 1:1000 population ratio of beds, and there are even 10 districts/cities that do not have any hospitals at all (Mahendradhata et al., 2021). This disparity in the distribution of beds is also evident in the statistics which show that the ratio of beds in DKI Jakarta is 3.1 per 1000 population, much higher than the ratio of national beds and the ratio of beds in North Sumatra which is 1.7 per 1000 population. while the

ratio of beds in West Nusa Tenggara and East Nusa Tenggara is below the WHO standard, which is only 0.9 beds per 1000 population (Indonesian Ministry of Health, 2021).

In addition, Indonesia before the pandemic only had 1910 Intensive Care Units (ICU) consisting of 7904 ICU beds. This number of beds results in a ratio of ICU beds in Indonesia of only 2.7 ICU beds per 100,000 population, much lower than the ratio of ICU beds in other ASEAN countries such as Malaysia (3.4 ICU beds per 100,000 population), Thailand (10.4 ICU beds per 100,000 population), or Singapore (11.4 ICU beds per 100,000 population) (Mahendradhata et al., 2021). Research by Ebrahimzadeh et al. (2019) in Northern Iran regarding the distribution of intensive care beds showed that there were 2 regions namely Rezvanshar and Masal which had no intensive care beds at all and only Rasht and Lahijan areas which had neonatal intensive care beds. However, this study did not assess the distribution of hospital beds for usual (non-intensive) care. Other research shows that 17% of hospitals in Iran are located in the Iranian capital, Tehran, and 22% of hospital beds in Iran are also located in Tehran (Mosadeghrad et al., 2020). Apart from the COVID-10 pandemic, in Indonesia research on the equitable distribution of hospital beds and the health care system as a whole has never been conducted or at least has not been published. This research oversight does not only occur in Indonesia, not a single ASEAN member country has ever published research on the equality of the distribution of hospital beds. Based on this explanation, the researcher is interested in assessing equality in the distribution of hospital beds in North Sumatra Province, Indonesia.

II. METHODS

This research is a descriptive study that aims to assess the equivalence of the distribution of hospital beds in the province of North Sumatra. The approach used by researchers in this study is a cross-sectional approach. The population in this study were all hospitals in North Sumatra Province. Based on data from the Directorate General of Health Services of the Indonesian Ministry of Health, until November 2021 there were 222 hospitals operating in North Sumatra Province. (Directorate General of Health Services of the Ministry of Health of the Republic of Indonesia, 2021) The sampling method used in this research is total sampling. Total sampling is a technique for all members of the population to be the research sample.

The inclusion criteria applied to the population to be sampled include: 1) Is a General Hospital 2) Has a profile in the Directorate General of Health's Hospital Information System or has a system that has been integrated with Siranap 3.0 of the Indonesian Ministry of Health; and 3) Has a hospital class determined by the Ministry of Health of the Republic of Indonesia. The exclusion criteria applied to the population to screen the population for the sample include: 1) The hospital temporarily stops operating or completely stops operating; 2) The hospital does not yet have a class determined by the Indonesian Ministry of Health; 3) Is a Special Hospital or Emergency Hospital; 4) Data is not available or incomplete. Based on data from the Directorate General of Health Services of the Indonesian Ministry of Health, in North Sumatra Province there are 2 class A hospitals, 29 class B hospitals, 122 class C hospitals, 59 class D hospitals, 2 class D Pratama hospitals, and 8 hospitals whose class is not established by the Ministry of Health of the Republic of Indonesia.

III. RESULT AND DISCUSSION

In this study it was found that there were 207 hospitals spread across all districts and cities in North Sumatra consisting of 183 general hospitals, 8 maternal and child hospitals, 6 special eye hospitals, 4 special mental hospitals, 2 each. a special surgical hospital and a special dental and oral hospital, and 1 each for a special lung hospital and a special kidney hospital. The number of these hospitals is less than the number of hospitals in North Sumatra in 2019 and 2020 which reached 217 and 222 hospital (Ministry of Health RI, 2021). Although the number of hospitals in North Sumatra has decreased, North Sumatra is the province with the fourth largest number in Indonesia after the provinces of East Java (395 hospitals), West Java (377 hospitals), and Central Java (319 hospitals) (Ministry of Health RI, 2021). Of all the regencies and cities in North Sumatra, the city of Gunungsitoli is the only area that does not have a regional public hospital. This is due to the Gunungsitoli Regional General Hospital which has changed its name to dr. M. Thomsen Nias is a regional public hospital owned by the Nias district government, not the Gunungsitoli city government (Nias

Regency Government, 2021). Based on data on the distribution of hospital beds in every district/city in North Sumatra as of June 2022, there are 23,223 hospital beds in North Sumatra consisting of 16,839 regular beds, 1,155 ICU beds, 51 ICCU/CVCU beds, 350 beds NICU beds, 90 PICU beds, 535 perinatal beds, 4,056 isolation beds, and 147 HCU beds.

Based on the same data, Medan City is the region with the highest number of hospital beds for almost all types of beds, except perinatal beds. This pattern of concentration of health resources in the provincial capital was also found in a study assessing the equality of the distribution of beds in Gilan Province, Iran (Ebrahimzadeh et al., 2019). Research by Ebrahimzadeh et al. (2019) show that the capital of Gilan Province, The City of Rasht has 64.76% of the total ICU beds in Gilan Province, 23.16% of the total ICCU beds, and 73.68% of the total NICU beds, although the population of Rasht City is only around 37% of the total population of Gilan Province (Ebrahimzadeh et al., 2019). Meanwhile, in this study, although Medan City only comprises 16.48% of the total population of North Sumatra, Medan City has 37.49% of regular hospital beds, 46.58% of ICU beds, 68.63% of hospital beds. ICCU/CVCU, 43.43% NICU beds, and 60% PICU beds, 33.31% isolation beds, and 48.30% HCU beds in North Sumatra. although the population of the city of Rasht is only about 37% of the total population of Gilan Province (Ebrahimzadeh et al., 2019). Meanwhile, in this study, although Medan City only comprises 16.48% of the total population of North Sumatra, Medan City has 37.49% of regular hospital beds, 46.58% of ICU beds, 68.63% of hospital beds. ICCU/CVCU, 43.43% NICU beds, and 60% PICU beds, 33.31% isolation beds, and 48.30% HCU beds in North Sumatra. although the population of the city of Rasht is only about 37% of the total population of Gilan Province (Ebrahimzadeh et al., 2019). Meanwhile, in this study, although Medan City only comprises 16.48% of the total population of North Sumatra, Medan City has 37.49% of regular hospital beds, 46.58% of ICU beds, 68.63% of hospital beds.

ICCU/CVCU, 43.43% NICU beds, and 60% PICU beds, 33.31% isolation beds, and 48.30% HCU beds in North Sumatra. The ratio of ordinary beds in the province of North Sumatra as of June 2022 is 1.14 per 1000 population. This ratio of beds per 1000 population is lower than the ratio of national beds, which is 1.49 per 1000 population (Mahendradhata et al., 2017, 2021). However, this ratio meets WHO standards. However, when viewed based on the ratio of ordinary beds in each district and city, 24 districts and cities do not meet WHO standards for the ratio of beds, where the 24 districts and cities have an ordinary bed ratio of less than 1 per 1000 population, with the lowest ratio reaching 0.18 beds per 1000 population (Tapanuli Tengah). The ratio of ICU beds in North Sumatra province is far above the WHO standard of only 1 per 100,000 population and reaches 7.8 ICU beds per 100,000 population. However, the same problem with the distribution of ordinary beds is also found in the distribution of ICU beds, where 6 districts and 1 city have a ratio of 0 ICU beds per 100,000 population or no ICU beds at all. Of the 7 regencies and cities, 4 of them are located on Nias Island, namely North Nias, West Nias, South Nias and Gunungsitoli City. The closest access to ICU beds in these four areas is RSUD dr. Thomsen Nias which has 23 ICU beds. However, if Nias island is considered as one whole area, then the ratio of ICU beds on Nias island is only 0.025 per 100,000 population, far from WHO standards (Mahendradhata et al., 2017, 2021). Research Phua et al. (2020) concluded that ICU bed capacity is generally lower in areas with lower incomes (Phua et al., 2020). Based on data from the Central Bureau of Statistics of North Sumatra, these four regions are regions with lower minimum wages compared to other regions (Central Bureau of Statistics for North Sumatra Province, 2021).

In addition, the two hospitals on Nias Island, in North Nias and West Nias districts to be precise, the district government's public hospitals are only type D pratama hospitals. these four regions are regions with lower minimum wages compared to other regions (Central Bureau of Statistics for North Sumatra Province, 2021). In addition, the two hospitals on Nias Island, in North Nias and West Nias districts to be precise, the district government's public hospitals are only type D pratama hospitals. these four regions are regions with lower minimum wages compared to other regions (Central Bureau of Statistics for North Sumatra Province, 2021). In addition, the two hospitals on Nias Island, in North Nias and West Nias districts to be precise, the district government's public hospitals are only type D pratama hospitals. Unlike ordinary beds and ICU beds, WHO does not have standard recommendations for the ratio of ICCU/CVCU, NICU, PICU, perinatal, isolation or HCU beds. In the study by Ebrahimzadeh et al. (2019), out of 16 regions in Gilan province, only

2 regions do not have ICCU/CVCU beds, while 14 other regions have at least 4 ICCU/CVCU beds and produce an ICCU/CVCU bed ratio of 3.81 per 100,000 population (Ebrahimzadeh et al., 2019). In this study, only 3 districts (Labuhan Batu, North Tapanuli, and Deli Serdang) and 1 city (Medan) had cardiac intensive care beds (ICCU/CVCU). With only 51 ICCU/CVCU beds for the entire province of North Sumatra, the ratio of ICCU/CVCU beds in North Sumatra is only 0.36 per 100,000 population.

The low ratio of ICCU/CVCU beds does not reflect the need for public health services, which is based on the 2020 Indonesia Health Profile data. In North Sumatra, only 5 cities and 8 districts have direct access to NICU beds with a ratio of NICU beds from 0.76 to 13.20 per 100,000 population. Although Medan City has the highest number of NICU beds in North Sumatra (152 NICU beds), the highest ratio of NICU beds is Binjai City which reaches 13.20 per 100,000, 2 times more than the ratio of Medan City NICU beds (6.18 per 100,000 population). While the research by Ebrahimzadeh et al. Shows that Gilan Province, Iran has a very high NICU ratio, reaching 72.33 per 100,000 population (Ebrahimzadeh et al., 2019). The number of isolation beds in North Sumatra is very high, with a ratio of 27.16 per 100,000 population. The high number of isolation beds is related to the COVID-19 pandemic caused by SARS-CoV 2 which began in 2020 (Azer, 2020). Transmission of SARS-CoV 2 that occurs via airborne aerosols results in patients with COVID-19 having to be treated in isolation rooms (McIntosh, 2021). However, two hospitals on Nias Island, namely in West Nias and South Nias districts, do not have beds. complete isolation. Based on the Lorenz curve in Figures 4.1 to 4.8, various Gini coefficients or Gini indexes for the distribution of hospital beds in North Sumatra are obtained based on the type of hospital bed. The Gini coefficient for the distribution of hospital beds in North Sumatra varies from 0.403 to 0.763, depending on the type of hospital bed. At the Gini coefficient, if the coefficient value is closer to 1, then the distribution is more unequal, and conversely, if the coefficient is closer to 0, it means the distribution is more even.

A Gini coefficient of less than 0.20 is categorized as low inequality, a Gini coefficient ≤ 0.25 is categorized as moderate inequality, a Gini coefficient ≤ 0.35 is categorized as severe inequality, and a Gini coefficient ≥ 0.50 is categorized as extreme inequality (Luebker, 2010). Thus, the inequality in the distribution of hospital beds in North Sumatra is classified as severe inequality to extreme inequality (Luebker, 2010). In this study, the distribution of ICCU/CVCU beds and PICU beds was relatively uneven. In the Lorenz curve of the distribution of ICCU/CVCU beds, it can be seen that the curve does not move up until the cumulative population reaches 65%, meaning that 65% of the population does not have access to available ICCU/CVCU beds. The same is true of the Lorenz curve of the PICU bed distribution, where the curve does not move until the cumulative population reaches 55%, then moves up to the cumulative 7.78% of PICU beds, and about 20% of the population has direct access to 80% of PICU beds. The inequality distribution of hospital beds in North Sumatra is classified as severe inequality to extreme inequality (Luebker, 2010). In this study, the distribution of ICCU/CVCU beds and PICU beds was relatively uneven. In the Lorenz curve of the distribution of ICCU/CVCU beds, it can be seen that the curve does not move up until the cumulative population reaches 65%, meaning that 65% of the population does not have access to available ICCU/CVCU beds. The same is true of the Lorenz curve of the PICU bed distribution, where the curve does not move until the cumulative population reaches 55%, then moves up to the cumulative 7.78% of PICU beds, and about 20% of the population has direct access to 80% of PICU beds. The inequality distribution of hospital beds in North Sumatra is classified as severe inequality to extreme inequality (Luebker, 2010). In this study, the distribution of ICCU/CVCU beds and PICU beds was relatively uneven. In the Lorenz curve of the distribution of ICCU/CVCU beds, it can be seen that the curve does not move up until the cumulative population reaches 65%, meaning that 65% of the population does not have access to available ICCU/CVCU beds.

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IV. CONCLUSION

The main conclusion from this study is that there is severe to extreme inequality in the distribution of hospital beds in North Sumatra.

In addition, it can also be concluded that:

- 1) There are 207 hospitals in North Sumatra consisting of general hospitals and special hospitals (maternal and child hospitals, special mental hospitals, special eye hospitals, special dental and oral hospitals, special surgical hospitals, special pulmonary hospitals , and a special kidney hospital).
- 2) Almost all regencies/cities in North Sumatra have hospitals, except for Gunungsitoli City, with the majority of hospitals being in Medan City.
- 3) There are 23,223 hospital beds in North Sumatra consisting of 16,839 regular beds, 1,155 ordinary intensive beds (ICU), 51 cardiac intensive beds (ICCU/CVCU), 350 neonatal intensive beds (NICU), 90 intensive beds. pediatrics (PICU), 535 perinatal beds, 4,056 isolation beds, and 147 HCU beds.
- 4) The ratio of ordinary beds in North Sumatra is 1.14 per 1000 population, the ratio of ICU beds is 7.80 per 100,000 population, ICCU/CVCU is 0.36 per 100,000 population, NICU is 2.34 per 100,000 population, PICU is 0.60 per 100,000 population, perinatal 3.58 per 100,000 population, isolation 27.16 per 100,000 population, and HCU 0.98 per 100,000 population.
- 5) Ordinary hospital beds are spread across all districts/cities in North Sumatra with the highest ratio in Tebing Tinggi City (4.03 per 1000 population). The area with the highest ratio of ICU beds is Pematang Siantar City (25.48 per 100,000 population). The area with the highest ratio of ICCU/CVCU beds is North Tapanuli District (1.90 per 100,000 population). The area with the highest ratio of NICU beds is Binjai City (13.20 per 100,000 population). The area with the highest ratio of PICU beds is Labuhan Batu District (2.4 per 100,000 population). The area with the highest ratio of perinatal beds is Sibolga City (52.26 per 100,000 population). The area with the highest ratio of isolation beds is Pematang Siantar City (109.69 per 100,000 population).

V. ACKNOWLEDGMENTS

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VI. ETHICAL CONSIDERATIONS

This research has been declared ethically compliant according to the WHO 7 Standards 2011 by the Health Research Ethics Commission (KEPK) University of Prima Indonesia.

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