Original Research

# HOSPITAL UTILIZATION IN MALUKU PROVINCE, INDONESIA

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## ABSTRACT

**Introduction:** Maluku is a region characterized by an archipelago with approximately 1,340 islands and an area of 712,479.69 km2. Most of the site is water (92.4%), while the land area is only around 7.6%. **Aims:** This study aimed to analyze the determinant of hospital utilization in Maluku Province, Indonesia. **Methods:** This cross-sectional study surveyed 788 respondents. The variables examined included hospital utilization, age group, gender, education level, work type, marital status, health insurance, transportation cost, and time travel. The author used binary logistic regression in the final stage. **Results:** The results show that the 30-39 age group was 2.293 times more likely than the $\geq 50$ age group to utilize the hospital (OR 2.293; 95% CI 1.177 – 4.466). Married people were more likely to use the hospital 1.764 times than those with the never-married category (OR 1.764; 95% CI 1.074 – 2.898). Christians were 1.599 times more likely than Muslims to utilize the hospital (OR 1.599; 95% CI 1.146 – 2.231). **Conclusion:** The study concluded that three variables are determinants of hospital utilization among people in Maluku Province, Indonesia. The three were age group, marital status, and religion. The study's results were significant for local policymakers to provide specific directions to accelerate the increase in hospital utility in Maluku Province in Indonesia.

**Keywords:** social determinant, hospital utilization, access pattern, public health.

## INTRODUCTION

A hospital is a setting that provides complete medical services for individuals, such as inpatient, outpatient, and emergency treatment. The hospital utilization was the respondent's recognition of their access to hospitals. The hospital is part of a tiered healthcare system that requires significant funds, professional medical personnel, adequate medical equipment, and good patient safety management. So today's hospitals are synonymous with labor-intensive, capital-intensive, and technology-intensive organizations (Padula et al., 2019).

A hospital is a specialized referral health service requiring higher quality and patient safety. The government built the services on human values, ethics, professionalism, benefits, justice, equality, anti-discrimination, equity, patient protection, security, and social functions. Policymakers must guarantee equal access for everyone according to their needs (Thitithamawat et al., 2018).

We can see hospital performance from several indicators, including 1) The percentage of hospital accreditation assessment elements that meet accreditation standards; 2) The percentage of Minimum Service Standard (MSS) indicators that reach the target; 3) Bed Occupancy Rate (BOR); 4) Average Length of Stay (ALOS); 5) Net Death Rate (NDR); and 6) Community Satisfaction Index (CSI). Patient safety is a global issue that is an essential parameter in hospital services (Wulandari et al., 2019; Wåhlin et al., 2020).

Previous studies report several factors related to hospital utilization. Among them are age, gender, education level, and type of work. Moreover, other factors are marital status, socioeconomic, transportation cost, and health insurance ownership (Wulandari, Laksono, Nantabah, et al., 2022; Laksono et al., 2023; Wulandari

et al., 2023). In addition to the considerations based on these individual assessments, certain other factors influence hospital utilization, notably the disparity in hospital utilization between urban and rural areas, travel cost and time, and geographical disparities between regions are another barrier to hospital access in Indonesia (Li et al., 2018; Dankwah et al., 2019; Mahmudiono and Laksono, 2021; Laksono et al., 2023).

Like many other nations, Indonesia faces the issue of geographical islands, which function as a natural obstacle to providing equitable healthcare to its people. The United Nations Group of Experts on Geographical Names has confirmed that at least 16,056 islands belong to Indonesia. This is out of 17,504 islands (UNGEGN) from the United Nations at the 11th United Nations Conference on the Standardization of Geographical Names in New York 2017 (United Nations Group of Experts on Geographical Names, 2017). Besides the geographical and geological barriers, Indonesia has a diverse tribe of people who speak their language. At least 1,300 people have spread from Aceh to Papua New Guinea (Central Bureau of Statistics of Indonesia, 2011). This situation heightens the Indonesian government's difficulties in ensuring equal access for the population.

The geographic gap in remote and remote areas in Indonesia with more developed regions (Java in particular) is wide (Suharmiati, Laksono and Astuti, 2013). One of them can be seen from the geographical condition of Maluku Province, which consists of a cluster of islands that poses a challenge to the accessibility of health services in the region. Particular interventions are needed so that health services are felt equally by all Maluku residents (Maryani et al., 2020).

Maluku is a region characterized by an archipelago with approximately 1,340 islands and an area of 712,479.69 km$^2$. Most of the site is water (92.4%), while the land area is only around 7.6%. Meanwhile, another fact shows that from the total population in 2018 of approximately 1,749,529 people, it is known that most of them live on small islands. It seems that the objective conditions of the Maluku region are still not supported by the availability of adequate transportation and communication infrastructure (Statistics Indonesia/Badan Pusat Statistik, 2020; Ipa, Laksono and Wulandari, 2023).

By the end of 2021, there will be 30 hospitals in Maluku Province, and a third, ten hospitals, will be in the provincial capital (Central Bureau of Statistics of Maluku Province, 2022). The distribution is unfavorable for the region dubbed the province of a thousand islands. Previously, based on the 2020 Maluku Provincial Health Statistics, 8.52% of people utilized government hospitals, while 2.06% of private hospitals used private hospitals. Access to health facilities, the availability of health workers, and good health services have not been pulled factors for the population in treating health complaints. The report informs that some residents still choose not to seek outpatient treatment. The main reason is that some sick people feel it is enough to self-medicate (62.8%). They self-medicate without going through a doctor's prescription, etc. Some residents of Maluku consider that there is no need for medical treatment (32.66%) (Wulandari et al., 2019; Central Bureau of Statistics of Maluku Province, 2020). According to the background, what factors influence hospital utilization in Maluku Province? The study analyzed the determinants of hospital utilization in Maluku Province society. The study's results are essential for providing specific information for local policymakers to accelerate hospital utilization in all communities in Maluku Province in Indonesia.

## METHODS
### Data Source and Study Design

The study was cross-sectional research. The author used a rapid online survey method using the internet was used to reach people living in all areas of Maluku

Province, Indonesia (n = 788). The study used Google Forms to collect data for one week (6–12 June 2020). We shared the form on social media (Facebook and WhatsApp) and the local Health Service mailing list. The study uses a rapid online survey method to provide local politicians with information quickly and affordably to make immediate corrective actions (Megatsari et al., 2021).

**Variables**

The study employed hospital utilization as a dependent variable. The hospital utilization was the respondent's recognition of their access to hospitals in Maluku Province, both government-run and private-run hospitals, outpatient (last year) and inpatient (previous five years). Hospital utilization consists of two categories, namely, not utilized and utilized.

The predictor variables examined in the study were age, gender, education level, work type, marital status, health insurance, transportation cost, and time travel. The predictors adopt variables that are known from previous studies (Mahmudiono and Laksono, 2021; Laksono et al., 2023). Age is the respondent's admission of the most recent birthday, which has already passed. Gender comprises male and female. Meanwhile, education includes primary education and under, secondary education, and higher education. Work type was the respondent's recognition of the kind of work. Moreover, marital status comprises unmarried, married, and widowed/divorced.

Health insurance is the respondent's recognition of insurance that covers their health. Health insurance consists of three categories: no insurance, government-run insurance, and private-run insurance. Meanwhile, transportation cost is the respondent's acknowledgment of the cost incurred to visit the nearest hospital. Transportation cost consists of two categories, namely ≤ 15,000 IDR (amount to 1 US $) and > 15,000 IDR. Travel time is the respondent's acknowledgment of the time it takes to visit the nearest host. Travel

time consists of two categories, namely ≤ 30 minutes and > 30 minutes.

**Data Analysis**

In the first step, the author used a co-linearity test to ensure no strong relationship between the independent variables. Then, the Chi-Square test was employed to test the association between hospital utilization and the independent variables. In the last step, we conducted the multivariate test using binary logistic regression to determine factors related to hospital utilization.

Moreover, the research used ArcGIS 10.3 (ESRI Inc., Redlands, CA, USA) to create a distribution map of the hospital utilization by regency/city in Maluku Province, Indonesia. The Indonesian Bureau of Statistics provided a shapefile of administrative border polygons for the study.

**Ethical Approval**

The national ethics commission's ethics committee gave the study its seal of approval (Reference Number: RK.04/KEPK/STIK/V/2020). The dataset for the study removed all respondents' names. Respondents have given their written consent to participate in the study.

**RESULTS**

The result informs that the proportion of people who use hospitals is 43.0%. The lowest hospital utilization was in South Buru Regency at 25.0%; meanwhile, the province with the highest hospital utilization was Tual City at 68.4%. Moreover, based on the distribution spatially, as shown in Figure 1, there is no visible tendency for the pattern of hospital utilization in Maluku Province.

Table 1 shows the collinearity test results between the independent variables. The results of the analysis inform that there is no co-linearity between variables. The tolerance value for all variables is more than

0.10, while the variance inflation factor (VIF) value for all variables is less than 10.00. It means there is no strong relationship among independent variables in the regression model.
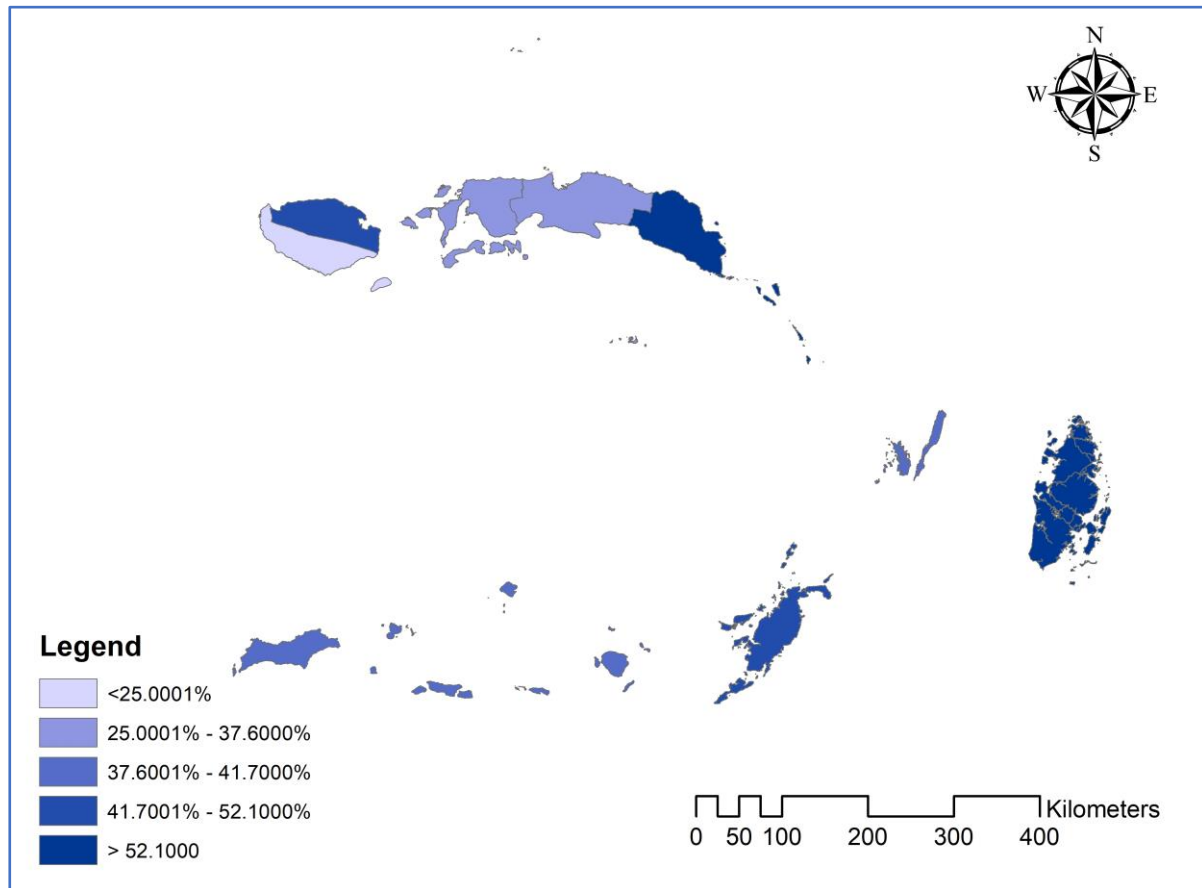


**Figure 1.** Distribution Map of the Hospital Utilization by Regency/City in Maluku Province, Indonesia (n=788)

**Table 1.** Results for The Co-Linearity Test of Hospital Utilization among people in Maluku Province Indonesia, 2020 (n=788)

| Variables | Collinearity Statistics | |
|---|---|---|
| | Tolerance | VIF |
| Age group | 0.405 | 2.471 |
| Gender | 0.889 | 1.125 |
| Marital status | 0.456 | 2.195 |
| Education level | 0.761 | 1.313 |
| Work type | 0.854 | 1.171 |
| Religion | 0.934 | 1.071 |
| Health insurance | 0.753 | 1.328 |
| Transportation cost | 0.549 | 1.821 |
| Travel time | 0.545 | 1.834 |

Dependent Variable: Hospital utilization

Table 2 shows the descriptive statistics of hospital utilization and the respondents' socio-demographics. Regarding the age group, the study shows the utilized categories are led by the 20-29 and 30-39. Based on gender, females dominated the two types of hospital utilization.

**Table 2.** Descriptive Statistics of Hospital Utilization in Maluku Province, Indonesia (n=788)

| Variables | Hospital Utilization | | p-value |
|---|---|---|---|
| | Not utilized (n=449) | Utilized (n=339) | |
| Age group | | | ***< 0.001 |
| • ≤19 | 14.9% | 9.4% | |
| • 20-29 | 43.2% | 35.1% | |
| • 30-39 | 21.4% | 35.1% | |
| • 40-49 | 14.5% | 14.5% | |
| • ≥ 50 | 6.0% | 5.9% | |
| Gender | | | 0.253 |
| • Male | 37.0% | 33.0% | |
| • Female | 63.0% | 67.0% | |
| Marital status | | | ***< 0.001 |
| • Never married | 59.7% | 44.2% | |
| • Married | 38.5% | 53.1% | |
| • Divorced/Widowed | 1.8% | 2.7% | |
| Education Level | | | *0.029 |
| • Primary and under | 3.3% | 1.5% | |
| • Secondary | 35.0% | 28.6% | |
| • Higher | 61.7% | 69.9% | |
| Work type | | | 0.090 |
| • Not work | 47.4% | 38.3% | |
| • Public servant | 38.5% | 41.9% | |
| • Army/Police | 1.3% | 1.8% | |
| • Entrepreneur | 3.8% | 6.8% | |
| • Employee | 8.0% | 10.6% | |
| • Farmer/Fisher/Labor | 0.9% | 0.6% | |
| Religion | | | **0.006 |
| • Muslim | 74.6% | 64.3% | |
| • Christian | 23.8% | 34.2% | |
| • Catholic | 1.6% | 1.5% | |
| Health insurance | | | *0.011 |
| • Uninsured | 34.7% | 24.8% | |
| • Government-run insurance | 62.8% | 72.3% | |
| • Private-run insurance | 2.4% | 2.9% | |
| Transportation cost | | | *0.032 |
| • ≤ 15,000 IDR | 54.3% | 61.9% | |
| • > 15,000 IDR | 45.7% | 38.1% | |
| Time travel | | | **0.009 |
| • ≤ 10 minutes | 57.5% | 66.7% | |
| • > 10 minutes | 42.5% | 33.3% | |

Note: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Table 2 shows that married people dominate the utilized category regarding marital status. According to education level, people with higher education led in the two types of hospital utilization.

Table 2 informs that respondents occupy the not utilized categories with the

work type based on the work type, not the work category. In contrast, the public servant dominated the hospital-utilized group. Based on religion, Muslim respondents dominated the two categories of hospital utilization.

Meanwhile, regarding health insurance, the two categories of hospital utilization were dominated by uninsured respondents. Based on transportation costs, respondents with a transportation cost ≤ of 15,000 IDR led both classes of hospital utilization. Respondents with travel time ≤ 10 minutes dominated the two categories of hospital utilization based on travel time.

The analysis results presented in Table 2 show that seven variables proved significant, and we included them in the last analysis. The seven variables are age group, marital status, education level, religion, health insurance, transportation cost, and time travel.

**Table 3.** The result of Binary Logistic Regression of Hospital Utilization among people in Maluku Province, Indonesia (n=788)

| Predictor | Hospital Utilization | | | |
|---|---|---|---|---|
| | p-value | OR | 95% CI | |
| | | | Lower Bound | Upper Bound |
| Age group: ≤19 | 0.244 | 1.721 | 0.690 | 4.290 |
| Age group: 20-29 | 0.104 | 1.916 | 0.875 | 4.194 |
| Age group: 30-39 | *0.015 | 2.293 | 1.177 | 4.466 |
| Age group: 40-49 | 0.567 | 1.228 | 0.607 | 2.485 |
| Age group: ≥ 50 (ref.) | - | - | - | - |
| Marital status: Never married (ref.) | - | - | - | - |
| Marital status: Married | *0.025 | 1.764 | 1.074 | 2.898 |
| Marital status: Divorced/Widowed | 0.178 | 2.146 | 0.707 | 6.512 |
| Education Level: Primary and under (ref.) | - | - | - | - |
| Education Level: Secondary | 0.400 | 1.590 | 0.539 | 4.689 |
| Education Level: Higher | 0.333 | 1.716 | 0.575 | 5.122 |
| Religion: Muslim (ref.) | - | - | - | - |
| Religion: Christian | **0.006 | 1.599 | 1.146 | 2.231 |
| Religion: Catholic | 0.925 | 0.944 | 0.285 | 3.127 |
| Health insurance: Uninsured (ref.) | - | - | - | - |
| Health insurance: Gov-run insurance | 0.520 | 1.132 | 0.775 | 1.653 |
| Health insurance: Private-run insurance | 0.567 | 1.312 | 0.517 | 3.326 |
| Transportation cost: ≤ 15,000 IDR | 0.785 | 1.057 | 0.712 | 1.567 |
| Transportation cost: > 15,000 IDR (ref.) | - | - | - | - |
| Time travel: ≤ 10 minutes | 0.148 | 1.346 | 0.899 | 2.016 |
| Time travel: > 10 minutes (ref.) | - | - | - | - |

Note: 95% Confidence Interval; *p < 0.05; **p < 0.01; ***p < 0.001

Table 3 shows the result of the binary logistic regression of hospital utilization among people in Maluku Province, Indonesia. Based on the age group, Table 3 displays that 30-39 were 2.293 times more chance than ≥ 50 to utilize the hospital (OR 2.293; 95% CI 1.177 – 4.466). Meanwhile, other age groups did not show any difference compared to the age group ≥ 50 in using the hospital. Table 3 shows that married people could use the hospital 1.764 times more than never-married (OR 1.764; 95% CI 1.074 – 2.898). Meanwhile, respondents with marital status

in the divorced/widowed category did not compare respondents with a never-married group utilizing the hospital in Maluku Province.

Table 3 shows that Christian respondents were 1.599 times more chance than Muslim respondents to utilize the hospital (OR 1.599; 95% CI 1.146 – 2.231). Meanwhile, respondents in the Religion category of Catholics did not show any difference compared to respondents in the Religion category of Muslims in using the hospital. Table 3 also informs that four other variables included in the multivariate test did not prove significant as a determinant of hospital use among people in Maluku Province, Indonesia. The four variables are education, health insurance, transportation costs, and time travel.

## DISCUSSION

The results show that the age group determines hospital utilization among people in Maluku Province, Indonesia. Age is a strong predictor of illness, and the core conditions prevail primarily concerning degenerative diseases in humans (Laksono, Nantabah and Wulandari, 2018; Lee et al., 2021; Rukmini et al., 2022). Different age levels in the aging population have seen significant changes over time around the world. Human life expectancy doubled from the nineteenth to the twentieth centuries, reaching 80 years in the twenty-first century. These circumstances mean economic difficulties and an increase in such health problems. In different facets of life, old age is linked to expanded medical needs (Lee et al., 2021; Wuakua et al., 2021; Yang, Wang and Dai, 2021; Rukmini et al., 2022). The findings confirm some of the results of previous studies in Ghana and China, including Indonesia (Laksono and Wulandari, 2020; Lu et al., 2020; Okai, Abekah-Nkrumah and Asuming, 2020).

The analysis in this study found that marital status is a determinant of hospital utilization among people in Maluku Province, Indonesia. This information is similar to previous studies. Marital status is closely related to the social or psychosocial burden that will affect a person's endurance. Having a partner is one of the protective factors for better health status (Megatsari et al., 2020; Wulandari, Laksono and Nantabah, 2020). Similar to the study results, several surveys informed that marital status is one-factor influencing healthcare facility use (Laksono and Wulandari, 2020; Bitew Workie et al., 2021; Suesse et al., 2021).

The study found that religion is one of the determinants of hospital utilization among people in Maluku Province, Indonesia. Christians proved to have a greater chance of using the hospital than Muslims. Religion as a determinant of hospital utilization is related to health beliefs, which cannot be separated from the background of the adopted religion, including the cultural environment that has influenced religion (Laksono, Wulandari, Nantaba*h, et al.,* 2020). The previous study indicates religious experience also shapes the adherents' concept of illness, taboo, health belief, and treatment-seeking behavior (Laksono, Wulandari, Soedirham, et al., 2020; Masruroh, Yusuf and Laksono, 2021). Including the patient's coping mechanism affects hospital utilization (Masruroh, Yusuf and Laksono, 2021).

The study discovered that health insurance, transportation expenses, and time travel did not influence hospital utilization in Maluku Province, Indonesia. This finding can occur because most respondents believe the degree of ease or challenge of using the hospital is relatively the same, so there is no substantial variation between groups on these variables. The results differ from previous studies that analyzed data at the national level, which informed that health insurance, transportation costs, and time travel were determinants of the utilization of health service facilities (Wulandari and Laksono, 2019; Wong et al., 2020; Laksono, Sillehu and Megatsari, 2021).

Even though Maluku Province is an archipelago, public hospital access is relatively even. Policymakers should instead focus more on social determinants in age, marital status, and religion, which are proven to affect people's hospital access.

**Study Limitation**

The authors conducted the study using a quantitative approach, so the research results tended to be superficial. The study results cannot capture the reasons behind every phenomenon found, especially those related to local values, for example, regarding the disparity of hospital utilization associated with a religious background (Parikh-Patel, Morris and Kizer, 2017; Wei et al., 2018; Masruroh, Yusuf and Laksono, 2021; Wulandari, Laksono, Prasetyo, et al., 2022). For this reason, we need further studies with a qualitative approach to guide more local-specific interventions.

Moreover, the study's constraints prohibit it from investigating the possibility that people are healthier. They don't need hospital care, as demonstrated by a previous study that looked at self-reported health. (SRH) (Wu et al., 2013).

**CONCLUSIONS**

The analysis results concluded three variables proven as determinants of hospital utilization in Maluku Province, Indonesia. The three were age group, marital status, and religion.

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