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The Role of Travel Time on Hospital Utilization in the Islands Area: A Cross-Sectional Study in the Maluku Region, Indonesia, in 2018

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Abstract

Background: Maluku region is one of the vulnerable areas in Indonesia, and this region has extreme geographical conditions with thousands of islands. The study aims to analyze the role of travel time to a hospital in the Maluku region in Indonesia. **Material and Methods:** This cross-sectional study analyzed the 2018 Indonesian Basic Health Survey data. The research included 14,625 respondents by stratification and multistage random sampling. The study used hospital utilization as an outcome variable and the travel time to the hospital as an exposure variable. Moreover, the study employed nine control variables: province, residence, age, gender, marital status, education, employment, wealth, and health insurance. The study performed binary logistic regression to interpret the data in the final analysis. **Results:** The result shows a relationship between travel time and hospital utilization. Someone with a travel time of 30 min or less to the hospital has a 1.792 (95% CI 1.756–1.828) higher probability than those with a travel time of more than 30 min. The results of this analysis find that shorter travel time to the hospital has a better possibility of hospital utilization. In addition, the study also found eight control variables to have a significant relationship with hospital utilization. **Conclusion:** Shorter travel time to the hospital is more likely to be utilized in the Maluku region.

Keywords: Health care evaluation, health care, health services, public health, travel time

INTRODUCTION

The health care system uses health care services for various objectives, including curing or treating disease and health conditions, preventing or delaying future health issues, reducing pain, and improving quality of life. A hospital, emergency department, doctor's and dentist offices, and other care facilities are examples of where health services are used.^[1] The hospital provides referral services from lower health care, providing comprehensive curative and rehabilitative services.^[2]

Health care utilization is influenced by the need for care, whether individuals are aware of their need for treatment, whether they desire to receive it, and if it is accessible. Health services have increased following the increasing demands for care in society. Some of the driving variables are aging, population sociodemographic transformations, and variations in the prevalence and incidence of certain diseases.^[3] Several previous studies have identified other factors associated with hospital utilization, such as travel time

and distance. People who reside closer to health facilities had a greater utilization rate than those who live further out. In addition, geographical transportation barriers primarily address the health of the most vulnerable groups living in poverty.^[4]

Indonesia's health care system includes private and government health care providers. In this case, the Indonesian government, the Ministry of Health at the national level, the provincial government at the regional level, and the district level provide public health services.^[5] According to the aim of the World Health Organization (WHO) on universal health coverage,

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Indonesia created a coverage plan named National Health Insurance (NHI). One of NHI's objectives is to enhance equal access to health care throughout the region without putting people at risk of poverty. A previous study has indicated the effectiveness of NHI in increasing public access to health services in Indonesia.^[6]

Maluku Island, including Maluku and North Maluku Province, is part of the Eastern Indonesia region.^[7] Both areas have extreme geographical characteristics, such as archipelagic topography. There are at least 1,286 islands that are part of 11 regencies/cities in Maluku Province. Meanwhile, in North Maluku Province, there are 395 islands spread over ten regencies/cities.^[8] These could be one barrier regarding implementing NHIs associated with the accessibility of hospital utilization.^[9]

In general, several things influenced the utilization of health services: the availability of health services, physical access to health services, financial access, and social access. This study will strengthen concept of utilization physical aspects of health services and their availability affect health services. One indicator of the success of the health care system performance for policymakers is the equity of hospital services.^[10,11] Policymakers are interested in minimizing disparities as small as possible, including the possibility of physical access disparities to hospitals. However, as proof of the delivery of universal coverage, the government must overcome these challenges. Based on the background, the study aims to analyze the role of travel time to a hospital in the Maluku region in Indonesia.

METHODS

Study design and data source

The study conducted a cross-sectional analysis based on the 2018 Indonesian Basic Health Survey data conducted by the Ministry of Health of the Republic of Indonesia. The survey gathered information during May and July 2018 using Household and Individual Instruments interviews.

Participants

The study's participants were ≥ 15 years old and lived in the Maluku region. The study evaluated a weighted sample of 14,625 respondents based on the sampling methodology.

Outcome variable

The study's outcome variable was hospital utilization—whether outpatient or inpatient and the respondent's access to the hospital. Outpatient treatment was limited to the previous month, whereas inpatient treatment was limited to last year. The question was intended for the responder to recollect outpatient and inpatient accurately based on their time preferences recall.^[12]

Exposure variable

The study used the travel time to the hospital as an exposure variable. Travel time is the respondent's acknowledgment of the travel time to the nearest hospital from where he lives. The travel time to the hospital consists of two categories: ≤ 30 min and > 30 min.^[10]

Control variables

The study employed nine control variables: province, type of residence, age, gender, marital status, education level, employment status, wealth status, and health insurance ownership. Moreover, the provinces consist of two areas: Maluku and North Maluku. The study separated the residence types into two kinds: urban and rural.

The study determined age based on the last birthday. However, the researchers divided gender into two groups: male and female. The research also separated respondents into three groups based on their marital status: never in a union, married/living with a partner, and divorced/widowed. On the other side, the study defined education as accepting their most recent diploma. Furthermore, the survey covers four levels of education: no education, primary, secondary, and higher education. The study divided employment status into two groups: unemployed and employed.

The 2018 Indonesian Basic Health Survey employed the wealth index method to determine wealth status. In addition, the survey calculated the wealth index using a weighted average of a household's overall spending. Meanwhile, the study examined direct household expenses such as health insurance, food, accommodation, and other goods to create a wealth index. The survey also divided the income index into five categories: the poorest, poorer, middle, richer, and richest.^[13] Furthermore, the poll identified four forms of health insurance ownership: uninsured, government-run, private-run, and government-run + private-run.

Data analysis

The study used the Chi-square test to offer a bivariate comparison in the initial phases. The authors performed a binary logistic regression in the study's last point. The survey employed the previous test to investigate the multivariate relationship between all independent characteristics and hospital utilization. Throughout the statistical analysis, the authors used the Statistical Package for the Social Sciences (SPSS) version 21 (IBM Corp, Armonk, NY) application.

Ethics approval and consent to participate

The National Ethics Committee granted Ethical Clearance for the 2018 Indonesian Basic Health Survey (Number: LB.02.01/2/KE.024/2018). The survey deleted all the identities of respondents from the dataset.

RESULTS

According to the findings, the average hospital utilization in the Maluku area was 3.3% in 2018. Meanwhile, the average travel time of more than 30 min to the hospital in the Maluku region was 62.4%.

Table 1 displays descriptive statistics of socioeconomic status and respondents' characteristics in eastern Indonesia. The study finds that the poorest ruled in primary health care utilization.

Table 1 shows both travel time to hospital categories dominated by the unutilized hospital group. Based on the province, both travel

Table 1: Descriptive statistic of hospital utilization and respondent characteristics, Maluku Region, 2018 (n=14,625)

Demographic Characteristics	Travel Time		P
	≤ 30 min (n=5,394)	> 30 min (n=9,131)	
Hospital utilization			**< 0.001
Unutilized	94.7%	97.9%	
Utilized	5.3%	2.1%	
Province			0.755
Maluku	55.2%	55.4%	
North Maluku	44.8%	44.6%	
Type of residence			**< 0.001
Urban	61.4%	9.3%	
Rural	38.6%	90.7%	
Age (mean)	(38.49)	(31.31)	**< 0.001
Gender			*0.008
Male	45.6%	47.8%	
Female	54.4%	52.2%	
Marital status			**< 0.001
Never in union	26.0%	21.6%	
Married/Living with a partner	65.1%	70.2%	
Divorced/Widowed	8.9%	8.2%	
Education level			**< 0.001
No education	1.8%	4.6%	
Primary	44.8%	68.0%	
Secondary	38.4%	21.4%	
Higher	15.1%	5.9%	
Employment status			**< 0.001
Unemployed	39.7%	33.1%	
Employed	60.3%	66.9%	
Wealth Status			**< 0.001
Poorest	8.4%	25.8%	
Poorer	14.5%	27.8%	
Middle	22.9%	23.5%	
Richer	26.5%	16.6%	
Richest	27.7%	6.3%	
Health Insurance			**< 0.001
Uninsured	35.6%	41.4%	
Government-run	63.6%	58.2%	
Private-run	0.6%	0.3%	
Government and private-run	0.2%	0.1%	

Note: * $P < 0.010$; ** $P < 0.001$

time to hospital groups were ruled by those who lived in Maluku Province. Based on the type of residence, those who lived in an urban area headed the 30 min or less travel time to a hospital. On the contrary, more than 30 min travel to hospitals is led by those who live in rural areas.

Table 1 indicates that those with 30 min or less travel have an age mean older than more than the 30 min category. According to gender, females led both time-travel groups. Based on marital status, those who married or lived with a partner dominated both categories of travel time to the hospital.

Meanwhile, based on education level, those with primary education occupied both types of travel time to the hospital.

Table 1 indicates employed people ruled in both travel time to hospital categories. Meanwhile, according to wealth status, the richest led in 30 min or less, and on the other side, the poorer led in more than 30 min group. Based on health insurance ownership, those with government-run insurance dominated in both categories of travel time to the hospital.

Table 2 shows the binary logistic regression results of hospital utilization in the Maluku region. The study employed the term “utilized hospital” as a reference in this final level of the investigation.

Table 2 shows a relationship between travel time and hospital utilization in the Maluku region. Someone with a travel time of 30 min or less to the hospital has a 1.792 higher probability than those with a travel time of more than 30 min (adjusted odds ratio (AOR) 1.792; 95% CI 1.756–1.828). The results of this analysis find that shorter travel time to the hospital has a better possibility of hospital utilization.

On the other side, the analysis results also found eight other variables related to hospital utilization. Based on the type of residence, someone living in an urban area is less likely to utilize the hospital than someone who lives in a rural area. Furthermore, the study also found age to be significantly associated with hospital utilization.

Regarding gender, Table 2 shows that males are less likely than females to use the hospital services. According to marital status, someone who has never been in a union is less likely to utilize the hospital than those who are divorced/widowed. Meanwhile, someone married or living with a partner is more likely than a divorced/widowed to use the hospital.

Based on education level, primary education can be 1.869 times than no education to use the hospital (AOR 1.869; 95% CI 1.747–1.999). Secondary education has a possibility of 2.171 times than no education to utilize the hospital (AOR 2.171; 95% CI 2.027–2.326). Moreover, higher education is 2.043 times more likely than no education to use the hospital services (AOR 2.043; 95% CI 1.903–2.194).

Table 2 shows that the employed are less likely than the unemployed to utilize the hospital. According to wealth status, someone in the poorer wealth status has a possibility of 2.097 times more than the most impoverished to use the hospital (AOR 2.097; 95% CI 2.024–2.172). Someone in the middle wealth status has a chance 1.870 times more than the poorest to use the hospital (AOR 1.870; 95% CI 1.805–1.936). Meanwhile, someone with a wealthier status can be 2.123 times more than the poorest to utilize the hospital (AOR 2.123; 95% CI 2.050–2.198). Moreover, the richest have a chance 2.906 times more than the most impoverished to use the hospital (AOR 2.906; 95% CI 2.804–3.012). These results indicate that all wealth statuses are more likely than the poorest to use the hospital.

Table 2: The result of binary logistic regression of hospital utilization in Maluku region, Indonesia, 2018 (n=14,625)

Predictor	Utilized Hospital			
	P	AOR	95% CI	
			Lower Bound	Upper Bound
Travel time: ≤30 min	**< 0.001	1.792	1.756	1.828
Travel time: >30 min	-	-	-	-
Residence: Urban	*0.020	0.977	0.958	0.996
Residence: Rural	-	-	-	-
Age	**< 0.001	1.014	1.013	1.015
Gender: Male	**< 0.001	0.682	0.671	0.694
Gender: Female	-	-	-	-
Marital: Never in union	**< 0.001	0.844	0.810	0.879
Marital: Married/Living with partner	**< 0.001	1.372	1.331	1.415
Marital: Divorced/Widowed	-	-	-	-
Education: No Education	-	-	-	-
Education: Primary	**< 0.001	1.869	1.747	1.999
Education: Secondary	**< 0.001	2.171	2.027	2.326
Education: Higher	**< 0.001	2.043	1.903	2.194
Employment: Unemployed	-	-	-	-
Employment: Employed	**< 0.001	0.924	0.908	0.941
Wealth: Poorest	-	-	-	-
Wealth: Poorer	**< 0.001	2.097	2.024	2.172
Wealth: Middle	**< 0.001	1.870	1.805	1.936
Wealth: Richer	**< 0.001	2.123	2.050	2.198
Wealth: Richest	**< 0.001	2.906	2.804	3.012
Health insurance: Uninsured	-	-	-	-
Health insurance: Government-run	**< 0.001	2.275	2.232	2.319
Health insurance: Private-run	**< 0.001	1.749	1.571	1.948
Health insurance: Government-run and Private-run	**< 0.001	9.097	8.288	9.985

Note: * $P < 0.050$; ** $P < 0.001$; AOR: Adjusted Odds Ratio; CI: confidence interval

Finally, based on health insurance ownership, someone with government-run insurance has a possibility of 2.275 times more than the uninsured to use hospital services (AOR 2.275; 95% CI 2.232–2.319). Someone with private-run insurance has a chance 1.749 times more than the uninsured to utilize the hospital (AOR 1.749; 95% CI 1.571–1.948). Furthermore, someone with government-run and private-run insurance has the possibility of 9.097 times more than the uninsured to utilize hospital services (AOR 9.097; 95% CI 8.288–9.985).

DISCUSSION

The study results show a relationship between travel time and hospital utilization in the Maluku region. The shorter travel time to the hospital has a better possibility of hospital utilization. This finding demonstrates that the closer the distance between the hospital and the faster it is to access, the more people will utilize it. In a research conducted in China, the study divided people's preferences in hospital utilization into four categories: holistic considerations, price, proximity, and quality seekers. People's health-related decisions are influenced by various circumstances, demonstrating preference variability.^[14]

A study in the USA shows a robust transfer system can improve hospital utilization. The study reports two types of transport

evaluated: land and air. The study informs that in hospitals within 50 miles, the difference in average transportation time between air and land is less than 1 h.^[15] This robust transfer system has proven to effectively reduce travel time, although there may be significant cost consequences if implemented in Indonesia that must be borne by the government.

Based on the type of residence, the study found that someone living in an urban area is less likely to utilize the hospital than someone who lives in a rural area. The result contradicts previous studies in Indonesia; adults who live in urban areas use hospitals twice as much as those in rural areas.^[10,16] However, the rural population's lower-income, fewer health resources, and lack of health insurance access remain as significant health and health care usage gaps within and between urban and rural inhabitants.^[17]

Moreover, the study also found several demographic characteristics significantly associated with hospital utilization: age, gender, marital status, education level, employment, and wealth status. They understand the concept of population groups that utilize hospital services to improve existing health programs and develop new evidence-based policies. Results of a study in Cambodia have demonstrated that urban residency, having better educational status, white-collar jobs, and access to electronic media showed a positive association with maternal health

services.^[18] The difference indicates that sociodemographic characteristics are considered to impact how people utilize health services by determining their illness susceptibility, their intention and capacity to access health care, and their perceived requirements.^[19] Several previous studies reported that poverty is a barrier to achieving better health outcomes.^[11,20,21]

The analysis result indicates health insurance can improve hospital utilization in the Maluku region. The situation can be explained that hospital utilization is related to the affordability of health insurance—financial barriers to care, especially among low-income and uninsured people. Thus, ownership of health insurance can increase access to health services. Consistent with findings that revealed adults without insurance have a more challenging time accessing required medical treatment and prescription medicines. They are more likely to delay or skip them due to cost considerations.^[22]

The study evaluates a significant amount of data to portray information in the Maluku region. On the other hand, the authors rely on secondary data, narrowing the scope of the allowed variables. Other characteristics connected to hospital utilization, such as travel cost, lifestyles, and the kinds of diseases that the authors were unable to study, were identified in previous studies.^[1,23]

CONCLUSION

The study concluded a relationship between travel time and hospital utilization in the Maluku region based on the result. The shorter travel time to the hospital has a better possibility of hospital utilization.

Policymakers need to deliver better physical access to improve community access to hospitals. Policymakers can carry out access improvement policies by bringing the hospital closer to the community or improving transportation facilities to the hospital.

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Conflicts of interest

There are no conflicts of interest.

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PERSETUJUAN AMANDEMEN PROTOKOL
PROTOCOL AMENDMENT APPROVAL

No. : LB.02.01/2/KE.024/2018

Ref. : Persetujuan/Approval no : LB.02.01/2/KE.267/2017 tanggal 28 Juli 2017

Komisi Etik Penelitian Kesehatan, Badan Penelitian dan Pengembangan Kesehatan (KEPK-BPPK) dengan berdasarkan Deklarasi Helsinki, telah melakukan telaah, pembahasan dan penilaian melalui proses **expedited**.

memutuskan amandemen protokol penelitian yang berjudul :

Health Research Ethics Committee, National Institute of Health Research and Development (HREC-NIHRD), in accordance with Helsinki Declaration, has conducted a thorough expedited review of research protocol amendment entitled :

"Riset Kesehatan Dasar (RISKESDAS) 2017-2018"

yang akan mengikutsertakan manusia sebagai partisipan/subyek penelitian; dengan Ketua Pelaksana/Peneliti Utama :

in which will involve human participant(s), with Principal Investigator :

drg. Agus Suprpto, M.Kes.

dapat diberikan persetujuan amandemen sesuai surat pengantar no. LB.02.03/1/406/2018 tanggal 16 Januari 2018. Masa berlaku surat persetujuan etik ini adalah :

*has hereby declared the amendment is **approved** for implementation. This letter is valid from/to*

24 Januari 2018 s/d 28 Juli 2018

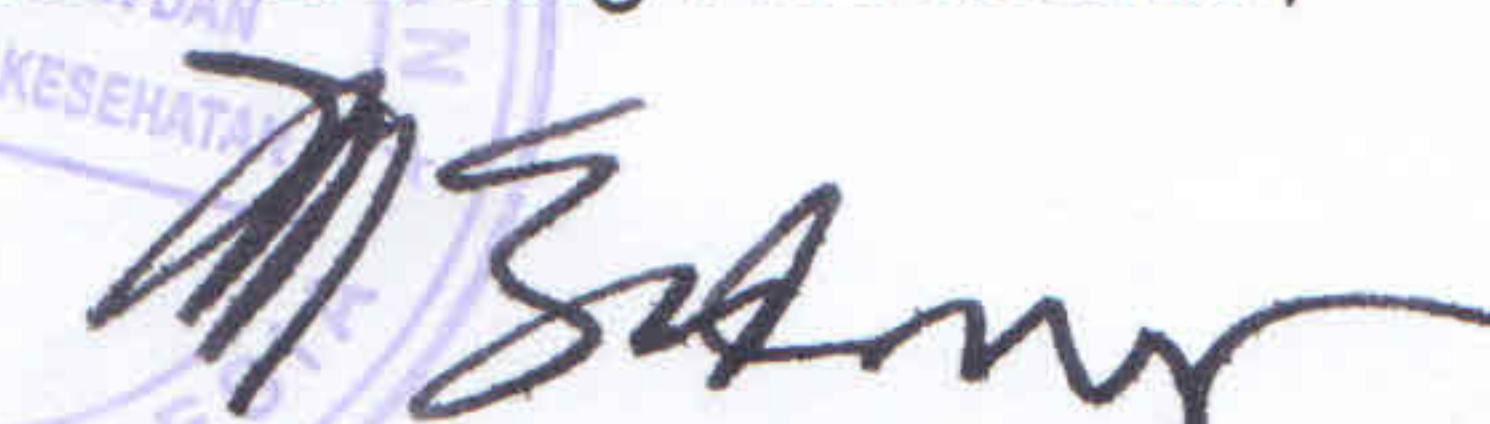
Jika ada perubahan protokol (amandemen) dan/atau perpanjangan penelitian, Ketua Pelaksana/Peneliti Utama harus mengajukan kembali protokol versi terbaru untuk kaji etik penelitian. Pada akhir penelitian, laporan pelaksanaan penelitian juga harus diserahkan kepada KEPK-BPPK.

Should there be any modification (amendment) and/or extention of the study, the Principal Investigator is required to resubmit the latest version of protocol for approval. The final summary reports should also be submitted to HREC-NIHRD.

Chair of HREC-NIHRD :

Jakarta, 24 Januari 2018

Ketua
Komisi Etik Penelitian Kesehatan
Badan Litbang Kesehatan,



Prof. Dr. M. Sudomo

