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MULTINOMIAL LOGISTIC REGRESSION TO DETERMINE FACTORS INFLUENCING THE SELECTION OF HEALTH CARE FACILITIES IN INDONESIA

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Abstract. Health facilities play a critical role in meeting the community's health needs. The existence of changes in lifestyle resulted in the community suffering from an increasing number of diseases, which increased the community's need for health facilities. There are two kinds of health facilities in Indonesia: government-owned health facilities and private health facilities. Both health facilities have advantages and disadvantages in terms of community service. As a result, Indonesians must make decisions about which health facilities to use in order to address health issues. The purpose of this research is to identify the factors that influence the selection of health facilities in Indonesia. Data from the Indonesia Family Life Survey (IFLS) 2015 were used in this study. This study uses four types of health facilities so the multinomial logistic regression method is appropriate. The findings of this study are all factors used in this study have a significant effect on the selection of health facilities. Jamkesmas ownership factors, gender, age, ability to move, and morbidity are significant on the three categories of response variables, namely public, private, and other health facilities. Askes ownership factor is significant in two categories, namely public and private health facilities. The marital status factor in the married category was significant in three categories, while divorced/widowed category was significant in two categories. While the five categories of education level factors were significant in other health facilities category.
Keywords: Health Facilities, IFLS, Multinomial Logistic Regression.

I. INTRODUCTION

The Health Law No. 36 of 2009 states that health is a human right and one of the elements of welfare that must be realized in accordance with the ideals of the Indonesian nation as outlined in the Pancasila and the 1945 Constitution of the Republic of Indonesia [1]. In meeting the health needs of society, healthcare facilities play a crucial role. With changes in lifestyle influenced by advances in time, the number of diseases suffered by humans has increased, leading to a higher demand for healthcare services [2].

Healthcare facilities are those that provide healthcare services, used for the implementation of health services, whether promotive, preventive, curative, or rehabilitative, carried out by the government, local governments, and/or the community [3]. In Indonesia, healthcare facilities are divided into two types: public healthcare facilities, or government-owned facilities (hospitals, health centers, sub-health centers, etc.), and private healthcare facilities (hospitals, clinics, etc.) [4].

According to Notoatmodjo in [5], an individual's choice of treatment method is related to their response when experiencing pain, such as self-treatment, seeking traditional treatment facilities, buying medicine at a shop, or seeking treatment at modern healthcare facilities provided by the government or private health institutions. According to Andersen in [5], factors that are suspected to influence the choice of healthcare facility for treatment include predisposition (gender, age, marital status, education, employment status, ethnicity, and health beliefs), enabling characteristics (income, insurance, ability to pay for healthcare services, knowledge about health service needs, availability of healthcare facilities, waiting time, accessibility, and availability of healthcare personnel), and need characteristics (individual and clinical assessments of a disease).

In addition, the availability of health insurance through various programs such as social insurance, health insurance for the poor, and other government programs, as well as health insurance provided by private entities, also impacts an individual's choice of healthcare facility [2]. According to Green L.W in [6], there are three main factors in utilizing healthcare facilities: predisposition factors, enabling factors, and reinforcing factors (need). Predisposition factors include gender, age, ethnicity/geography, and religion/beliefs. Enabling factors include cost and insurance coverage. Reinforcing factors (need) include health conditions and perceptions of healthcare services. A study in [4] showed that factors such as activity limitations, gender, and income level had a significant impact on healthcare facility choice, with an accuracy classification of 83.1%.

Logistic regression is defined as the relationship between predictor variables and response variables, where the response is categorical. There are two types of logistic regression: binomial logistic regression, which relates predictor variables to a response variable with two categories, and multinomial logistic regression, which relates predictor variables to a response variable with more than two categories [7]. Binomial logistic regression has been used in research [8] to examine the use of healthcare facilities with two categories. Meanwhile, multinomial logistic regression has been used in studies [9] on learning difficulties in statistics (divided into three categories), [10] on sales revenue (divided into four categories), and [4] on healthcare facility choice (divided into three categories).

Therefore, logistic regression analysis, according to the author, is the most suitable model because the choice of healthcare facility is a categorical answer. More specifically, multinomial logistic regression is appropriate because the categories used in this study consist of four categories: self-treatment, public healthcare facilities, private healthcare facilities, and other healthcare facilities. This research differs from [4], which only divided into three categories and was limited to Southeast Sulawesi Province. Based on this explanation, the purpose of this study is to identify the factors influencing the choice of healthcare facility for treatment in Indonesia using multinomial logistic regression analysis.

II. METHODOLOGY

2.1. Data dan Variables

The secondary data used in this study is data obtained from the 2015 IFLS (Indonesia Family Life Survey) provided by the RAND Corporation. IFLS is a longitudinal survey data covering households, individuals, communities, and facilities in 13 provinces in Indonesia, with a sample size of 16,204 households and 50,148 individual respondents interviewed. The fifth wave of IFLS (IFLS-5) was published in 2014-2015 [11], [12]. The eligible sample for this study consists of 6,776 individual respondents, with 2,442 male respondents and 4,334 female respondents.

In this study, there are two variables used: the response variable and the predictor variable. The response variable (Y) is the choice of healthcare facility someone uses when ill, categorized into four categories. The predictor variable (X) is the variable that is believed to influence an individual's choice of healthcare facility when ill. All variables are shown in Table 1.

2.2. Analysis Steps

Data processing was conducted using R software version 4.2.1 with the nnet package. The analysis steps in this study are as follows [13]:

1. Perform descriptive analysis to provide an overview of the selection of healthcare facilities by the Indonesian population when ill.
2. Detect multicollinearity for each predictor variable using the Variance Inflation Factor (VIF) equation.
3. Build a multinomial logistic regression model. Multinomial logistic regression is a type of logistic regression where the response variable is multinomial or polychotomous (nominal data with more than two categories) and the predictor variables can be either qualitative or quantitative, using the general logistic regression model in [15].

In this study, the response variable is divided into 4 codes: 0, 1, 2, and 3, where generally Y=0 is used as the reference category or control, based on the logit function in [15].

The steps in forming a multinomial logistic regression model are as follows:

1. Estimating Parameters. Parameter estimation in multinomial logistic regression is obtained using the Maximum Likelihood Estimator (MLE) method. This method estimates β by maximizing the likelihood function [15]. If the response variable has four categories, there will be four possible outcomes, with the likelihood function as follows [16], [17]:

$$L(\boldsymbol{\beta}) = \prod_{i=1}^{n} [\pi_0(\boldsymbol{x_i})^{y_{oi}} \pi_1(\boldsymbol{x_i})^{y_{1i}} \pi_2(\boldsymbol{x_i})^{y_{2i}} \pi_3(\boldsymbol{x_i})^{y_{3i}}] \quad (10)$$

$$l(\boldsymbol{\beta}) = \sum_{i=1}^{n} y_{1i} g_1(\boldsymbol{x_i}) + y_{2i} g_2(\boldsymbol{x_i}) + y_{3i} g_3(\boldsymbol{x_i}) - ln\left(1 + e^{g_1(x)} + e^{g_2(x)} + e^{g_3(x)}\right) \quad (11)$$

where $\sum_{i=0}^{3} y_{ji} = 1$. Parameter estimation using the MLE method does not yield explicit results, so the Newton-Raphson iteration method is used to solve it.

2. Significance testing of parameters. The significance test consists of two tests. The first is the simultaneous test, which aims to determine the significance of the β parameters with respect to the response variable as a whole, using the Likelihood Ratio value [18].

Tabel 1. Research Variables

Variable	Description
Self-treatment $(Y = 0)$	Respondents who prefer to treat their illness on their own, by only consuming over-the-counter medicine, traditional medicine, vitamins, or even using traditional methods such as massage.
Public healthcare facility $(Y = 1)$	Respondents who prefer to visit government-owned healthcare facilities to treat the illness they are suffering from.
Private healthcare facility $(Y = 2)$	Respondents who prefer to visit private healthcare facilities to treat the illness they are suffering from.
Other healthcare facilities $(Y = 3)$	Respondents who prefer to visit other healthcare facilities, aside from public and private ones, to treat the illness they are suffering from.
Health insurance ownership (Askes) (X_1)	0: Yes 1: No
Ownership of Jamkesmas (X_2)	0: Yes 1: No
Marriage status (X_3)	0: Not married 1: Married 2: Divorced/Deceased
Sex (X_4)	0: man 1: woman
Age (X_5)	age
Education level (X_6)	0: No School 1: Elementary School (SD) and equivalent 2: Junior High School (SMP) and equivalent 3: Senior High School (SMA) and equivalent 4: Diploma 1/2/3 (D1/D2/D3) 5: Bachelor's Degree (S1)/Master's Degree (S2)/Doctorate (S3)
Ability in daily activities (X_7)	The total score of the respondent's ability to perform various daily activities such as carrying, pulling, walking, sweeping, kneeling, getting up from a chair, getting up from the floor, raising hands above the shoulder, picking up a small coin from the table, dressing, bathing, getting up from bed, eating, using the toilet, shopping, preparing hot meals, taking medication on time and in the correct dosage, doing household chores, and managing finances.
Morbidity (X_8)	The total number of symptoms experienced by the respondent over the past 4 weeks, such as headaches, colds, coughs, difficulty breathing, fever, stomach pain, vomiting, diarrhea, skin infections, eye infections, toothaches, swollen feet, and blisters near the mouth.

3. Multinomial logistic regression modeling for each category of the response variable in each model based on the parameter estimation table.
4. Interpret the model using the odds ratio. The odds ratio is used to indicate the tendency of the relationship between a predictor variable and the response variable.
5. Conduct model fit tests. Model fit tests are performed to determine whether the multinomial logistic regression model is sufficiently accurate in predicting the actual data for the response variable and whether there is no significant difference between the observed results and the predicted probabilities [15].
6. Finally, conclusions and recommendations are drawn from the data analysis results.

III. RESULTS AND DISCUSSION

3.1. Descriptive Analyses

In presenting data in the form of descriptive analysis, the author presents it in a table with descriptive statistics for numerical variables presented in Table 2.

Table 2. Descriptive Statistics of Numerical Variables

Variable	Mean	Max	Min
Age	38,62	106	15
Ability for daily activities	110,36	114	23
Morbidity	3,76	12	1

Based on Table 2, it can be seen that the average age of the respondents is 39 years, and the respondents' ability in daily activities has a maximum score of 114, a minimum score of 23, and an average score of 110. A higher score in daily activity ability indicates better capacity to perform activities. Furthermore, from Table 2, it can be seen that the average number of symptoms experienced by respondents in the past 4 weeks (headache, cold, cough, difficulty breathing, fever, stomach pain, vomiting, diarrhea, skin infection, eye infection, toothache, swollen feet, and blisters near the mouth) is 4 symptoms, with a minimum of 1 symptom and a maximum of 12 symptoms.

Table 3. Treatment Selection Based on Influencing Factors

Var.	Category	Self-treatment		Self-treatment		Self-treatment		Self-treatment	
		Jlh	%	Jlh	%	Jlh	%	Jlh	%
X_1	Does not have Askes	3891	57,42%	660	9,74%	569	8,40%	501	7,39%
	Has Askes	743	10,97%	164	2,42%	174	2,57%	74	1,09%
X_2	Does not have Jamkesmas	2494	36,81%	411	6,07%	565	8,34%	270	3,98%
	Has Jamkesmas	2140	31,58%	413	6,10%	178	2,63%	305	4,50%
X_3	Unmarried	929	13,71%	80	1,18%	94	0,01%	61	0,01%
	Married	3345	49,37%	610	9%	546	0,08%	456	0,07%

	Divorced (living/deceased)	360	5,31%	134	1,98%	103	0,02%	58	0,01%
X_4	Male	1830	27,01%	229	3,38%	242	3,57%	141	2,08%
	Female	2804	41,38%	595	8,78%	501	7,39%	434	6,40%
X_6	No schooling	137	2,02%	43	0,63%	39	0,58%	35	0,52%
	Elementary school or equivalent	1325	19,55%	300	4,43%	189	2,79%	203	2,99%
	Junior high school or equivalent	871	12,85%	147	0,69%	91	1,34%	104	1,53%
	Senior high school or equivalent	1606	23,70%	236	3,48%	241	3,56%	165	2,44%
	D1/D2/D3	185	2,73%	34	0,50%	50	0,74%	14	0,21%
	Bachelor's degree (S1) / Master's degree (S2) / Doctorate (S3)	510	68,34%	64	0,94%	133	1,96%	54	0,79%

In addition to Figure 2 and Table 2, to understand the tendencies of respondents in choosing healthcare facilities for treatment, such as opting for self-treatment, seeking help from medical professionals, or using other treatment methods, Table 3 can be referred to. Based on Table 3, it can be seen that respondents who have symptoms of illness do not directly go to healthcare facilities. Looking at the Askes ownership category, 57.42% or 3,891 respondents who do not have Askes choose self-treatment rather than seeking treatment at a healthcare facility, while 10.97% or 743 respondents who have Askes prefer self-treatment compared to other treatment options.

From Table 3, it can also be seen that based on Jamkesmas ownership, 31.58% or 2,140 respondents with Jamkesmas choose self-treatment, while 36.81% or 2,484 respondents without Jamkesmas opt for self-treatment. In the marital status category, 3,345 respondents (49.37%) who are married, 929 respondents (13.71%) who are unmarried, and 360 respondents (5.31%) who are divorced (either living or deceased) prefer self-treatment over seeking professional medical help. Additionally, in the education level category, 510 respondents (68.34%) with an S1/S2/S3 education background prefer self-treatment rather than seeking professional medical help.

3.2. Multinomial Logistic Regression Analysis

Based on Table 4, it can be seen that the VIF values for all predictor variables are < 5, which allows us to conclude that there is no multicollinearity among the predictor variables.

Therefore, all predictor variables are suitable to be included in the model to assess whether or not they have an effect on the response variable.

Table 4. VIF Values of All Predictor Variables

Predictor Variables	VIF
Askes Ownership	1.42
Jamkesmas Ownership	1.44
Marital Status	1.90
Gender	1.12
Age	2.29
Education Level	2.39
Ability in Daily Activities	1.82
Morbidities	1.09

Table 5. Estimation of Parameters for Healthcare Facility Selection for Treatment

Variable	Public Healthcare Facility			Public Healthcare Facility			Public Healthcare Facility		
	$\hat{\beta}$	W^2	*P-value*	$\hat{\beta}$	W^2	*P-value*	$\hat{\beta}$	W^2	*P-value*
Intercept	0.594	0.738	0.390	1.391	3.772	0.052	2.506	9.345	0.002*
Askes Ownership									
Has Askes	0.241	4.415	0.035*	-0.245	4.861	0.027*	-0.075	0.267	0.605
Jamkesmas Ownership									
Has Jamkesmas	0.199	4.827	2.8e-02*	-0.966	86.851	1.2e-20*	0.137	1.780	1.8e-01*
Marital Status									
Married	0.414	8.427	3.6e-03*	0.115	0.684	4.1e-01*	0.862	28.767	8.2e-08*
Divorced (Living/Deceased)	0.558	7.750	0.005*	0.172	0.683	0.408	0.861	12.640	0.0003*
Gender									
Female	0.521	34.947	3.4e-09*	0.313	12.179	4.8e-04*	0.608	33.688	6.5e-09*
Age	0.016	21.982	2.8e-06*	0.021	35.116	3.1e-09*	-0.014	12.063	5.1e-04*
Education Level									
Elementary school	0.205	1.065	0.301	-0.250	1.353	0.244	-0.443	4.202	0.040*
Junior high school	0.256	1.358	0.243	-0.307	1.627	0.201	-0.710	8.655	0.003*
Senior high school	0.300	1.875	0.170	0.010	0.002	0.964	-0.701	8.539	0.003*
D1/D2/D3	0.339	1.435	0.230	0.368	1.777	0.182	-1.045	8.434	0.003*
S1/S2/S3	0.076	0.089	0.764	0.459	3.393	0.065	-0.579	4.461	0.034*
Ability to perform daily activities	-0.041	56.340	6.1e-14*	-0.041	52.153	5.1e-13*	-0.044	44.472	2.6e-11*
Morbidities	0.131	53.562	2.5-13*	0.141	54.409	1.6e-13*	0.060	7.837	5.1e-03*

(*) Significant at the level 5%

Based on Table 5, the information on parameter estimates and significance tests of the parameters both simultaneously and partially for the multinomial logistic regression model with Y=0, or the self-treatment category as the reference or control category, using all predictor variables, can be seen. The simultaneous test result using all predictor variables shows a chi-square value of 752.98, which is compared with the table chi-square value of 15.51. The decision is to reject H0, with the conclusion that at least one parameter is not equal to zero. The testing then proceeds to a partial parameter test to identify which variables have an effect or whose parameters are not equal to zero. Based on Table 5, it can be seen that the variables Jamkesmas Ownership, Gender, Age, Ability to Perform Activities, and Morbidities are significant across the three response variable categories: Public Healthcare Facility (Faskes Publik), Private Healthcare Facility (Faskes Swasta), and Other Healthcare Facility (Faskes Lainnya). The Askes Ownership variable is only significant for the Public Healthcare Facility

and Private Healthcare Facility categories. The Marital Status variable is significant for the Married category across all three response categories, while the Divorced (Living/Deceased) category is only significant for the Public Healthcare Facility and Other Healthcare Facility categories. As for the Education Level variable, all five education categories are only significant for the Other Healthcare Facility category.

Based on the β values in Table 5, three logit function equations are obtained as follows:

$$g_1(x) = ln\left[\frac{P(Y=1|x)}{P(Y=0|x)}\right] = 0.594 + 0.241x_{11} + 0.199x_{21} + 0.414x_{31} + 0.558x_{32} + 0.521x_{41} + 0.016x_5 + 0.205x_{61} + 0.256x_{62} + 0.300x_{63} + 0.339x_{64} + 0.076x_{65} - 0.041x_7 + 0.131x_8 \quad (17)$$

$$g_2(x) = ln\left[\frac{P(Y=2|x)}{P(Y=0|x)}\right] = 1.391 - 0.245x_{11} - 0.966x_{21} + 0.115x_{31} + 0.172x_{32} + 0.313x_{41} + 0.021x_5 - 0.250x_{61} - 0.307x_{62} + 0.010x_{63} + 0.368x_{64} + 0.459x_{65} - 0.041x_7 + 0.141x_8 \quad (18)$$

$$g_3(x) = ln\left[\frac{P(Y=3|x)}{P(Y=0|x)}\right] = 2.506 - 0.075x_{11} + 0.137x_{21} + 0.862x_{31} + 0.861x_{32} + 0.608x_{41} - 0.014x_5 - 0.443x_{61} - 0.710x_{62} - 0.701x_{63} - 1.045x_{64} - 0.579x_{65} - 0.044x_7 + 0.060x_8 \quad (19)$$

where x_{11} is the variable for having Askes, x_{21} is for having Jamkesmas, x_{31} is for being married, x_{32} is for being divorced (living/deceased), x_{41} is for being female, x_5 is for age, x_{61} is for education level of elementary school or equivalent, x_{62} is for education level of junior high school or equivalent, x_{63} is for education level of senior high school or equivalent, x_{64} is for education level of D1/D2/D3, x_{65} is for education level of S1/S2/S3, x_7 is for ability to perform daily activities, and x_8 is for the morbidities variable.

Based on Table 5, the odds ratio for each coefficient of the three logit functions can be calculated. The odds ratio values are shown in Table 6. In interpreting the model, only the significant odds ratios need to be considered. Based on Table 6, it can be interpreted that respondents who have Askes are 1.27 times more likely to choose treatment at a Public Healthcare Facility than self-treatment, compared to respondents who do not have Askes. Respondents with Jamkesmas are 1.22 times more likely to choose treatment at a Public Healthcare Facility than self-treatment, compared to respondents without Jamkesmas. Respondents who are married are 1.51 times more likely to choose treatment at a Public Healthcare Facility than self-treatment, compared to unmarried respondents. Respondents who are divorced (living/deceased) are 1.75 times more likely to choose treatment at a Public Healthcare Facility than self-treatment, compared to unmarried respondents. Female respondents are 1.68 times more likely to choose treatment at a Public Healthcare Facility than self-treatment, compared to male respondents. As respondents' age increases by one year, they are 1.02 times more likely to choose treatment at a Public Healthcare Facility than self-treatment. As respondents' Ability to Perform Activities score increases by one unit, they are 1.04 times more likely to choose self-treatment compared to treatment at a Public Healthcare Facility. Finally, as the number of symptoms experienced by respondents increases by one unit,

they are 1.14 times more likely to choose treatment at a Public Healthcare Facility than self-treatment.

Tabel 6. Nilai *odds ratio*

Variable	Public Healthcare Facility		Public Healthcare Facility		Public Healthcare Facility	
	$\mathbf{Exp}(\widehat{\boldsymbol{\beta}})$	P-value	$\mathbf{Exp}(\widehat{\boldsymbol{\beta}})$	P-value	$\mathbf{Exp}(\widehat{\boldsymbol{\beta}})$	P-value
Intercept	1.812	0.390	4.017	0.052	12.256	0.002*
Askes Ownership						
Has Askes	1.272	0.035*	0.782	0.027*	0.927	0.605
Jamkesmas Ownership						
Has Jamkesmas	1.221	2.8e-02*	0.380	1.2e-20*	1.147	1.8e-01*
Marital Status						
Married						
Divorced	1.512	3.6e-03*	1.122	4.1e-01*	2.368	8.2e-08*
(Living/Deceased)	1.748	0.005*	1.188	0.408	2.366	0.0003*
Gender						
Female	1.685	3.4e-09*	1.369	4.8e-04*	1.838	6.5e-09*
Age	1.016	2.8e-06*	1.022	3.1e-09*	0.985	5.1e-04*
Education Level						
Elementary school	1.229	0.301	0.778	0.244	0.642	0.040*
Junior high school	1.291	0.243	0.735	0.201	0.492	0.003*
Senior high school	1.350	0.170	1.010	0.964	0.496	0.003*
D1/D2/D3	1.404	0.230	1.445	0.182	0.352	0.003*
S1/S2/S3	1.079	0.764	1.584	0.065	0.560	0.034*
Ability to perform daily activities	0.959	6.1e-14*	0.960	5.1e-13*	0.957	2.6e-11*
Morbidities	1.141	2.5-13*	1.152	1.6e-13*	1.062	5.1e-03*

(*) Significant at the level 5%

Based on Table 6, it can be interpreted that respondents who have Askes are 1.28 times more likely to choose self-treatment over treatment at a Private Healthcare Facility compared to respondents who do not have Askes. Respondents who have Jamkesmas are 2.63 times more likely to choose self-treatment over treatment at a Private Healthcare Facility compared to respondents who do not have Jamkesmas. Respondents who are married are 1.12 times more likely to choose treatment at a Private Healthcare Facility over self-treatment compared to unmarried respondents.

Female respondents are 1.37 times more likely to choose treatment at a Private Healthcare Facility over self-treatment compared to male respondents. As a respondent's age increases by one year, they are 1.02 times more likely to choose treatment at a Private Healthcare Facility over self-treatment. As the Ability to Perform Activities score increases by one unit, respondents are 1.04 times more likely to choose self-treatment over treatment at a Private Healthcare Facility, and as the number of symptoms experienced by respondents increases by one unit, they are 1.15 times more likely to choose treatment at a Private Healthcare Facility over self-treatment.

Additionally, from Table 6, it can be interpreted that respondents who have Jamkesmas are 1.15 times more likely to choose treatment at Other Healthcare Facilities over self-treatment compared to respondents who do not have Jamkesmas. Married respondents are 2.37 times more likely to choose treatment at Other Healthcare Facilities over self-treatment compared to unmarried respondents. Respondents who are divorced (living/deceased) are also 2.37 times more likely to choose treatment at Other Healthcare Facilities over self-treatment compared to unmarried respondents. Female respondents are 1.84 times more likely to choose treatment at Other Healthcare Facilities over self-treatment compared to male respondents. As a respondent's age increases by one year, they are 1.02 times more likely to choose self-treatment over treatment at Other Healthcare Facilities.

Respondents with an Elementary School or equivalent education are 1.56 times more likely to choose self-treatment over treatment at Other Healthcare Facilities compared to respondents with no schooling. Respondents with a Junior High School or equivalent education are 2.03 times more likely to choose self-treatment over treatment at Other Healthcare Facilities compared to respondents with no schooling. Respondents with a Senior High School or equivalent education are 2.02 times more likely to choose self-treatment over treatment at Other Healthcare Facilities compared to respondents with no schooling. Respondents with a D1/D2/D3 education are 2.84 times more likely to choose self-treatment over treatment at Other Healthcare Facilities compared to respondents with no schooling. Respondents with an S1/S2/S3 education are 1.79 times more likely to choose self-treatment over treatment at Other Healthcare Facilities compared to respondents with no schooling. As the Ability to Perform Activities score increases by one unit, respondents are 1.04 times more likely to choose self-treatment over treatment at Other Healthcare Facilities. Lastly, as the number of symptoms experienced by respondents increases by one unit, they are 1.06 times more likely to choose treatment at Other Healthcare Facilities over self-treatment.

Here's how to interpret the probability function: Suppose a respondent does not have Askes but has Jamkesmas, is unmarried, male, 40 years old, has an S1 education level, an activity score of 90, and experiences five symptoms. The results are as follows: the probability of choosing self-treatment is 0.5273; the probability of choosing treatment at a Public Healthcare Facility is 0.3444; the probability of choosing treatment at a Private Healthcare Facility is 0.1249; and the probability of choosing treatment at Other Healthcare Facilities is 0.0034. Therefore, the respondent would be classified by the multinomial logistic regression model into the self-treatment category.

After obtaining a significant model, the next step is to test the model's goodness of fit to determine whether the model does not produce a significant difference between the observations and the predicted results, and also to assess whether the formed multinomial logistic regression model is appropriate. Based on the Hosmer and Lemeshow test for the multinomial logistic regression model, a χ^2 value of 18.632 and a p-value of 0.7713 were obtained. Since the p-value > $\alpha = 5\%$, the decision is to fail to reject H_0. Therefore, it can be concluded that the multinomial logistic regression model is appropriate and does not produce a significant difference between the observations and the predicted results.

IV. CONCLUSIONS

All the factors or variables used in this study have a significant influence on the selection of healthcare facilities for treatment. The variables of Jamkesmas ownership, gender, age, ability to perform activities, and morbidities are significant for all three response variable categories:

Public Healthcare Facility (Faskes Publik), Private Healthcare Facility (Faskes Swasta), and Other Healthcare Facilities (Faskes Lainnya). The Askes ownership variable is significant for two categories: Public Healthcare Facility and Private Healthcare Facility. The Marital Status variable with the category of being married is significant for all three categories, while the category of divorced (living/deceased) is significant for two categories: Public Healthcare Facility and Other Healthcare Facilities. The Education Level variable shows significance in all five categories only for the Other Healthcare Facilities category.

Suggestions for future research include adding other predictor variables into the model, aside from the predictors used in this study, such as employment status, income, waiting time for healthcare services, perceptions of healthcare services, and access to healthcare facilities.

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