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## Articles

### Predictors of Length of Care in Tibial Fracture Patients: Analysis of Secondary Data

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35-43



## Predictors of Length of Care in Tibial Fracture Patients: Analysis of Secondary Data

### *Prediktor Lama Perawatan pada Pasien Fraktur Tibia: Analisis Data Sekunder*

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#### ABSTRACT

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**Introduction:** Predicting the length of care becomes important for intervention in the care system. However, it still seems that the ability to predict the length of treatment is not optimal, so that the length of treatment is prolonged. If the ability to predict the length of treatment can be done optimally, it will improve the patient's return time.

**Methods:** This study uses a retrospective study approach.

**Result:** There was no relationship between the predictor of length of stay with a length of treatment.

**Conclusion:** The predictor of length of stay in this study were patients with tibia fractures at RSD dr. Soebandi. Most of the patients with tibial fractures were in the early elderly, with the gender of patients with tibia fractures being mostly male. Most of the patients with tibial fractures have no complications and the type of fracture in patients with tibia fractures is mostly in the fracture of the shaft of the tibia. There was no correlation between the predictors of length of stay and length of stay in patients with tibia fractures.

**Keywords:** Length of care; Predicting length of care; Tibial fracture

#### ABSTRAK

**Pendahuluan:** Memprediksi lama perawatan menjadi penting untuk intervensi dalam sistem perawatan. Akan tetapi, masih terlihat belum optimalnya kemampuan memprediksi lama perawatan sehingga mengakibatkan lama perawatan menjadi memanjang. Apabila kemampuan memprediksi lama perawatan dapat dilakukan dengan optimal maka, akan mempercepat waktu kepulangan pasien.

**Metode:** Penelitian ini menggunakan metode pendekatan retrospective study.

**Hasil:** Tidak terdapat korelasi antara prediktor lama perawatan dengan lama perawatan.

**Kesimpulan:** Prediktor lama perawatan pada penelitian ini yaitu pasien fraktur tibia di RSD dr. Soebandi. Sebagian besar pasien dengan fraktur tibia adalah usia lansia awal dengan jenis kelamin pada pasien dengan fraktur tibia adalah sebagian besar adalah laki-laki. Sebagian besar pada pasien dengan fraktur tibia tidak memiliki komplikasi dan jenis fraktur pada pasien dengan fraktur tibia terbanyak pada fracture of shaft of tibia. Tidak terdapat korelasi antara prediktor lama perawatan terhadap lama perawatan pada pasien dengan fraktur tibia.

**Kata kunci:** Lama perawatan; Prediktor lama perawatan; Fraktur tibia





## INTRODUCTION

Predicting length of stay is becoming increasingly important for the planning and assessment of interventions in health care systems.<sup>1</sup> On the other hand, predicting the length of stay is an effective solution for overcoming capacity management in health services so that it can significantly affect the smooth flow of institutional work, optimize resource consumption and reduce treatment costs.<sup>2</sup> However, it still seems that the ability to predict the length of treatment is not optimal so the length of stay becomes longer.<sup>3</sup> Predictors of length of care can be seen including age, gender,<sup>4</sup> complications, and type of fracture.<sup>3</sup>

Predictors aged 80-89 years with tibial fractures at *George Washington Hospital, Washington DC* had a length of stay of more than 3 days.<sup>5</sup> On the other hand, ages 19-72 for tibial fractures and external to internal fixation changes using an anterolateral thigh flap at the *Hospital affiliated with Soochow University, Wuxi, Jiangsu, China* have an average length of stay ranging from 11-50 days.<sup>6</sup> On the other hand, the highest sex is in men because of the mechanism of injury that results in fractures, namely motor vehicle accidents 43%, most often seen in men and falls from heights that cause fractures 21% in women.<sup>7</sup>

One of the occurrences of complications is the occurrence of infection after surgery which causes wound healing after surgery to take longer. Infection of the surgical wound is the main cause of surgical patient morbidity and mortality.<sup>5</sup> On the other hand, this type of closed fracture is not at risk for infection because there are no wounds or damage to the skin so there is no contamination with the outside environment so that the healing process becomes faster, which is less than 6 days. Meanwhile, in the event of an open fracture the skin tissue will be damaged so that the event of an open fracture has a risk of infection and makes the length of treatment longer than a closed fracture, which is more than 6 days.<sup>8</sup>

The Ministry of Health of the Republic of Indonesia in the 2011 Hospital Information System (SIRS 6) has decided on the ideal standard for hospitalization indicators, one of which is the length of stay, which is 6-9 days.<sup>9</sup> On the other hand, LOS at RSUD Dr. H. Soemarno Sosroatmodjo Kapuas shows the number 6-9 days according to the (RI Ministry of Health) and 3-12 days according to the Barber-Johnson chart.<sup>10</sup>

Apart from being one of the main indicators in providing quality hospital services, the predictor of length of stay can also provide an understanding of whether the ability to predict length of stay that is not optimal can result in the length of stay in the inpatient room being prolonged, so increase treatment costs.<sup>13</sup> The ability to predict the length of stay can provide a clinical indicator of a patient's health status and assist in predicting the level of care required. By having the ability to predict the optimal length of care, it will be an effective solution for health services to take preventive measures and avoid extending the length of care.<sup>1</sup>

## RESEARCH METHOD

The research design uses a quantitative research design using descriptive methods using a retrospective study approach.<sup>14</sup> The location of this research was carried out at RSD dr. Soebandi Jember, East Java, where recording and reporting are based on secondary data from medical records at RSD dr. Soebandi Jember. The research was conducted in July 2022.

The population in this study is the medical record data of tibial fracture patients at RSD dr. Soebandi from 2017-2021, namely 170. The sample in this study amounted to 97 data. The number of lost medical record data is as many as 73 including data that is affected by retention and cannot be accessed. The number of medical record data affected by retention in 2017-2018 was 43, 1 in 2019-2020, and 6 in 2021. The number of inaccessible medical record data in 2017-2018 was 15, 2019-2020 was 4, and in 2021 as many as 4.

The inclusion criteria in this study are 1) Patients with tibial fractures. 2) Data must be complete including (Medical record number, name, gender, date of birth, admission date and discharge date, diagnosis, operation). 3) Medical record data in 2017-2021. Exclusion criteria in this study consisted of 1) Patients with fractures other than tibial fractures. 2) Incomplete data includes (Medical record number, name, gender, date of birth, admission date and discharge date, diagnosis, operation). 3) Missing medical record data in 2017-2021. The sampling technique for this study used a total sampling technique. The statistical test used was the Spearman's rho correlation test.



## RESULTS

**Table 1** Distribution of Predictors of Length of Care Age, Gender, Complications, and Types of Fractures at RSD dr. Soebandi.

No	Variable	Amount	Percentage (%)
1.	Age		
	Childhood	5	5,2
	(5 - 11 years)	6	6,2
	Early adolescence	12	12,4
	(12 - 16 years)	8	8,2
	Late adolescence	20	20,6
	(17 - 25 years)	21	21,6
	Early adulthood	15	15,5
	(26 - 35 years)	10	10,3
	Late adulthood		
	(36 - 45 years)		
	Early elderly		
	(46 - 55 years)		
	Late elderly		
	(56 - 65 years)		
	Old age		
	(> 65 years)		
2.	Gender		
	Man	61	62,9
	Woman	36	37,1
3.	Complications		
	Presence of complication	6	6,2
	No Complications	91	93,8
4.	Fracture Type		
	Fracture _ of the upper end of the tibia	3	3,1
	Fracture _ of shaft of tibia	84	86,6
	Fracture _ of lower end of tibia	10	10,3

Source: Secondary Data, Medical Records for 2017-2021

## DISCUSSION

### Age

Calculations using the Spearman's rho correlation test found that correlations coefficient (0,160) and Sig. (2-tailed) (0,117). Thus, there is no correlation between the predictor variable of the length of stay based on age and length of stay in patients with tibial fractures at RSD dr. Soebandi Jember. Sig. Value (2-tailed) (0,117). These results are in line with research from Tan and Kwek<sup>16</sup> which states that there is no correlation between the predictor variable of the length of stay based on age and length of stay in patients with tibial fractures with  $p = 0,165$ .

In a study conducted at *MOH Holdings, Singapore* with a sample of patients with tibia and femur fractures who were treated for 2 years at an

age that was categorized in pre-pathway and post-pathway. At an age without using *clinical pathways* from (January 2013-December 2014) as many as 43 patients had a length of stay of 11 days, open fractures that received OREF (*Open Reduction External Fixation*) measures were 47%, type III fractures were related to the *length of the hospital*, namely 15 days and the number The required operations are as many as 4 operations. Meanwhile, at the age of using the *clinical pathway* from (January 2015-December 2016) as many as 46 patients had a length of care of 7 days. Furthermore, it was followed by a decrease in the number of open fractures that received OREF to 26%. In addition, there was also a decrease in type III fractures related to the length of hospital, which was 8 days and the number of operations needed, which was 2 operations.<sup>16</sup>

In the research that was carried out by Rozi, et al<sup>3</sup> at the Orthopedic Hospital Prof. Dr. R. Soeharso Surakarta with a sample size of 100, it was found that in this study there was a discrepancy with the initial hypothesis which stated that age had a relationship with the length of stay after surgery because the patient had comorbidities which caused the length of stay to be longer. However, the age variable had no relationship with the postoperative length of stay because in this study patients with fractures and comorbid diseases were not included in the predetermined sample criteria. In research that has been carried out by 4 at RSUD DR. H. Abdul Moeloek Lampung on the age variable there is no relationship with the length of stay because it has a relationship with predetermined sample criteria.

Researchers assume that old age is not related to the length of stay, possibly related to variations in operations performed and possibly related to predetermined sample criteria.

### Gender

Calculations using Spearman's rho correlation test found that, the Correlations *Coefficient* (0,098) and Sig. (2-tailed) (0,338). Thus, there is no correlation in the predictor variable of the length of stay based on sex on length of stay in patients with tibial fractures at RSD dr. Soebandi Jember. Sig. Value (2-tailed) (0,338). This is in line with research from Alfari, et al<sup>4</sup> which states that there is no correlation in the predictor variable of the length of care based on the gender on length of stay in patients with open fractures with a value of  $p = 0,170$ .

In research that has been carried out by Alfari, et al<sup>4</sup> at RSUD DR. H. Abdul Moeloek Lampung in the variable gender there is no relationship between the length of stay because





there is a link to a lifestyle that has a sedentary nature and the physical strength of men is stronger than women.

In a study conducted at *George Washington Hospital, Washington, DC* in 2006-2018 using a database from the *American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP)* with tibial plateau fractures. There were 171 males and 441 females aged 65-79 years who received ORIF (*Open Reduction Internal Fixation*) and without complications had a length of stay that was not prolonged. In the male gender, there were 21 and female sex as many as 85 with ages 80-89 years who received ORIF and there were complications had a length of stay of more than 3 days.<sup>5</sup>

In a study conducted at *MOH Holdings, Singapore* with a sample of patients with tibia and femur fractures who were treated for 2 years, the sexes were categorized as pre-pathway and post-pathway. In gender without using a *clinical pathway* from (January 2013-December 2014) as many as 35 male patients and 8 female patients had a length of stay of 11 days, open fractures that received OREF were 47%, type III fractures were related to the length of a hospital for 15 days and the number of operations required is 4 operations. Meanwhile, for the gender that used the *clinical pathway* from (January 2015-December 2016) as many as 36 male patients and 10 female patients had a length of stay of 7 days. Furthermore, it was followed by a decrease in the number of open fractures that received OREF to 26%. In addition, there was also a decrease in type III fractures related to the *length of hospital*, which was 8 days and the number of operations needed, which was 2 operations.<sup>16</sup>

Researchers assume that, gender is not related to the length of stay related to the sex of men having higher physical strength. However, based on statistical results that have been carried out by researchers, the highest fracture incidence is still in the male sex. On the other hand, the female sex is physically weaker, but based on the statistical results that have been carried out by researchers, the incidence of fractures in the female sex is lower. Thus, when statistical analysis is carried out there is no relationship.

### Complications

Calculations using the Spearman's rho correlation test found that, correlations coefficient (-,044) and Sig. (2-tailed) (0.671). Thus, there is no correlation in the predictor variable of the length of stay based on complications with a length of stay in patients with tibial fractures at RSD dr. Soebandi Jember. Sig. Value (2-tailed) (0.671). On the other hand, this study has a connection with the results

of research from Tan and Kwek,<sup>16</sup> which states that, there is no correlation in the predictor variable of length of stay based on complications with a length of stay in patients with tibia fractures  $p = 0.832$ .

In a study conducted at *MOH Holdings, Singapore* with a sample of patients with tibia and femur fractures who were treated for 2 years for complications that were categorized in pre pathway and post-pathway. In complications without using a clinical pathway from (January 2013-December 2014) as many as 15 patients had a length of stay of 11 days, open fractures that received OREF measures were 47%, type III fractures were related to the length of the hospital, namely 15 days and the number The required operations are as many as 4 operations. Meanwhile, for complications using clinical pathways from (January 2015-December 2016) as many as 14 patients had a length of stay of 7 days. Furthermore, it was followed by a decrease in the number of open fractures that received OREF to 26%. In addition, there was also a decrease in type III fractures related to the length of hospital, which was 8 days and the number of operations needed, which was 2 operations.<sup>16</sup>

In research conducted at *George Washington Hospital, Washington, DC* in 2006-2018 using a database from the *American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP)* with tibial plateau fractures and divided into two age groups, namely the age group 65 -79 years old and 80-89 years old. Those with complications aged 65-79 years who received ORIF and without complications had a length of stay that was not prolonged. Complications aged 80-89 years who get ORIF and there are complications have a length of stay of more than 3 days.<sup>5</sup>

In a study conducted at *NYU Langone Orthopedic Hospital, New York* with a sample of 64 which was divided into three risks of complications, namely a minimum risk of 21, moderate risk of 21, high risk of 22 who received operative fixation. The results showed that there were significant differences in clinical decision-making regarding the length of stay and costs of care in the ICU. A total of 19 patients at minimal risk, 7 patients at moderate risk, and 5 patients at high risk were discharged home.<sup>18</sup>

Researchers assume that complications are not related to the length of stay related to the imbalance in the amount of data on the statistical results that have been examined by researchers. Based on the statistical results, the number of patients who have complications and do not have complications is very far away. Thus, when statistical analysis is carried out there is no relationship.





## Fracture Type

Calculations using Spearman's rho correlation test found that, the Correlations Coefficient (0.006) and Sig. (2-tailed) (0.952). Thus, there is no correlation in the predictor variable of length of stay based on the type of fracture on the length of stay in patients with tibial fractures at RSD dr. Soebandi Jember. Sig. Value (2-tailed) (0.952). This is in line with research from Reahl et al.,<sup>17</sup> which states that there is no correlation between the predictor variable of the length of stay based on the type of fracture and the length of stay in patients with tibial fractures with a value of  $p = 0.049$ .

In a study conducted at *the University of Maryland School of Medicine, Baltimore, MD* with a sample of 429 patients from September 2007-September 2016 and divided into two groups, namely the study group of 110 and the control group of 319. In the study group, 110 patients underwent knee stiffness surgery but no internal fixation measures have a long treatment time. Meanwhile, in the control group of 319 patients who were given internal fixation but did not undergo knee stiffness surgery, the length of stay was not prolonged.<sup>17</sup>

In a study conducted at *MOH Holdings, Singapore* with a sample of patients with tibia and femur fractures who were treated for 2 years at an age that was categorized in pre-pathway and post-pathway. In this type of fracture without using a clinical pathway from (January 2013-December 2014) as many as 19 patients had a length of stay of 11 days, open fractures that received OREF measures were 47%, type III fractures were related to the length of the hospital, namely 15 days and the number of operations required is 4 operations. Meanwhile, for the type of fracture that used a clinical pathway from (January 2015-December 2016) as many as 21 patients had a length of stay of 7 days. Furthermore, it was followed by a decrease in the number of open fractures that received OREF to 26%. In addition, there was also a decrease in type III fractures related to the length of hospital, which was 8 days and the number of operations needed, which was 2 operations.<sup>16</sup>

Researchers assume that the type of fracture is not related to the length of stay related to the imbalance in the amount of data on the statistical results that have been examined by researchers. Based on statistical results, fractures of the upper end of the tibia and fractures of the lower end of the tibia with fractures of the shaft of the tibia have a very large number. Thus, when statistical analysis is carried out there is no relationship.

## CONCLUSION

1. The predictor of length of stay in this study was a patient with a tibial fracture at RSD dr. Soebandi Jember. The majority of patients with tibial fractures are elderly with the sex of the patients with tibial fractures being mostly male. Most of the patients with tibial fractures did not have complications and the most common types of fractures in patients with tibial fractures were fractures of the shaft of tibia.
2. There is no relationship between predictors of length of stay and length of stay in patients with tibial fractures.

## SUGGESTION

Nursing Education Institutions can study online about predicting the length of stay in tibial fracture patients. Health agencies are expected to use clinical pathways so that the length of treatment in patients with tibial fractures does not become prolonged. Future researchers can involve a larger sample by expanding the research location, identifying clinical pathways. In addition, it is hoped that the length of care predictor variable can make the amount of data on each variable evenly distributed so as to avoid an imbalance in the amount of data in statistical results.

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