



## INTRODUCTION

Stroke, also known as cerebrovascular disease, is a prevalent global health issue with substantial economic implications for both healthcare systems and affected individuals. Stroke is the third most prevalent cause of mortality in Malaysia. In the year 2019, there were an estimated 50,000 event cases of stroke, resulting in around 20,000 fatalities. The establishment of private hospitals equipped with specialized stroke units has significantly alleviated the strain on the public tertiary hospitals. Despite the existence of numerous epidemiological studies on stroke, there is still a lack of local research examining the cost of acute stroke specifically within private hospitals in Malaysia.

## OBJECTIVES

The aim of this study was to identify and quantify the direct medical cost of acute stroke care during hospitalization at a private hospital in Malaysia.

## METHODS

The retrospective extraction of medical and billing records was conducted on a sample of 180 patients who were admitted to a private hospital in Malaysia for acute stroke between January and December 2022. This study encompassed individuals diagnosed with either acute ischemic or hemorrhagic strokes. The direct medical costs associated with acute stroke care encompass several components such as medication, medical supplies and equipment, laboratory investigations, medical imaging investigations, rehabilitation services, consultations, nursing care, unit costs of treatment per bed, inpatient registration, dialysis, and special diagnostic procedures. Furthermore, relevant data pertaining to the patient's demographic characteristics, duration of hospitalization, classification of stroke, and method of payment were extracted. USD 1.0 is equivalent to approximately MYR 4.73. Data was analysed by Statistical Package for the Social Sciences (SPSS) version 16.0 using various descriptive and inferential statistical tests. Ethical approval has obtained from KPJ Healthcare University.

## RESULTS

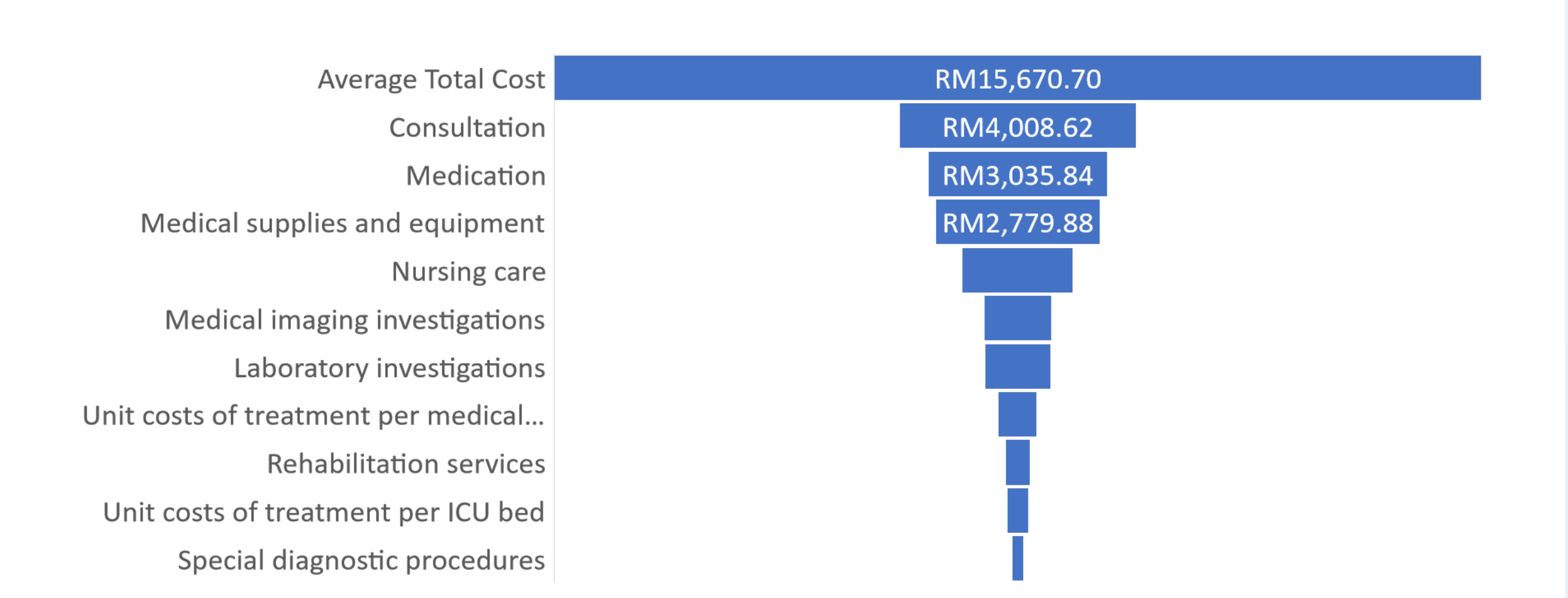
A total of 180 patients' data were extracted in this study with 143 cases (79.4%) of ischemic stroke compared with 37 cases (20.6%) of hemorrhagic stroke. The mean age of stroke patients was 60.69 ± 14.8 years. Ninety-eight (54.4%) were male. The mean length of stay was 4.56 ± 3.8 days, ranging from a minimum of 1 day to a maximum of 27 days. Approximately 80% of hospital admissions were funded through private insurance reimbursement, with the remaining 20% being covered by out-of-pocket expenses.

## Demographic Characteristics Of The Patients

Demographic Characteristics	Number of Patients N = 180 n (%)	Mean (SD)	Remarks
Age (years)		60.69 ± 14.8	
Ethnicity			
Malay	101 (56.1)		
Chinese	52 (28.9)		
Indian	25 (13.9)		
Others	2 (1.1)		
Length of Stay (days)		4.56 ± 3.8	Max: 27 ; Min: 1
Types of Payment			
Insurance Imbursement	142 (78.9)		
Own Pocket Money	38 (21.1)		

The average total cost was found to be RM 15,670.70 ± 14,374.19 (equivalent to 3315.85 USD), with a minimum value of RM 2,453.75 and a maximum value of RM 88,602.15.

## Average Direct Medical Costs For Each Component

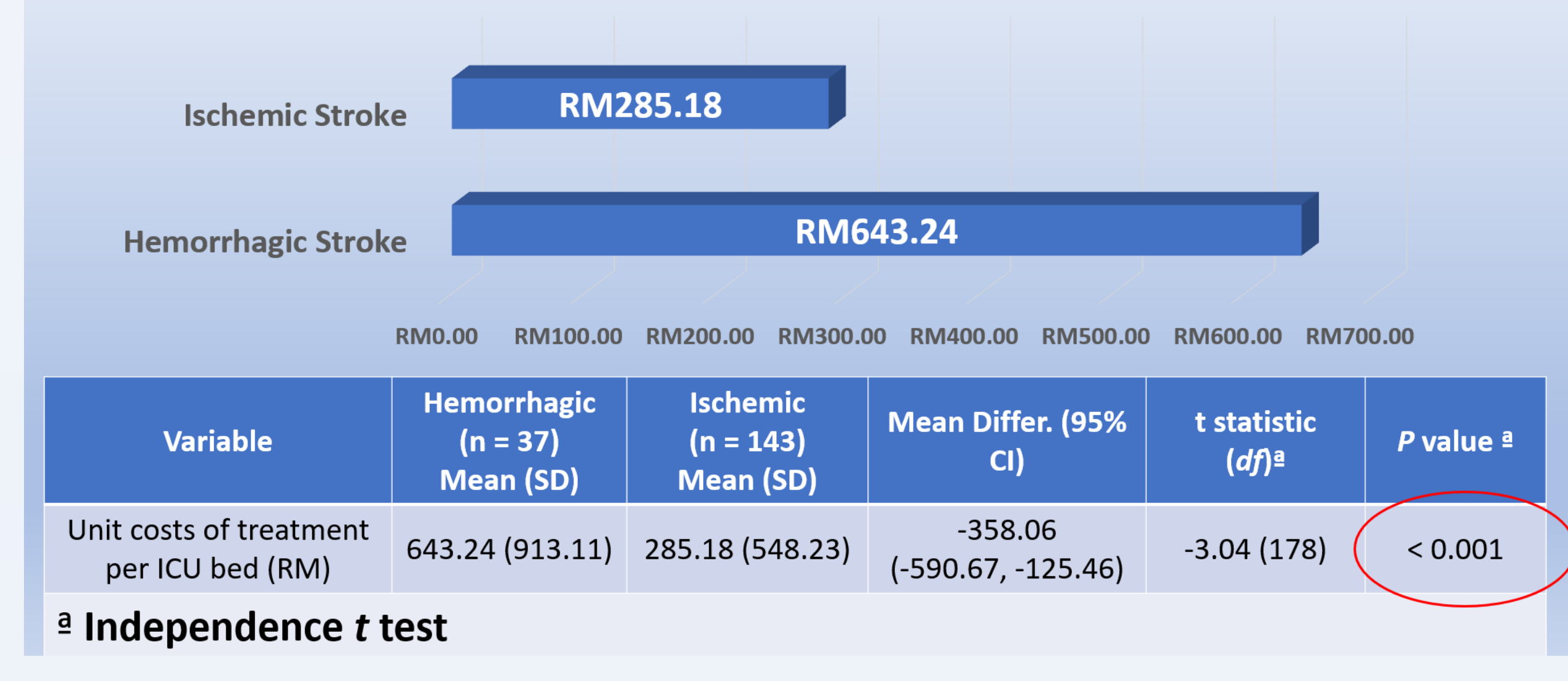


## RESULTS (cont.)

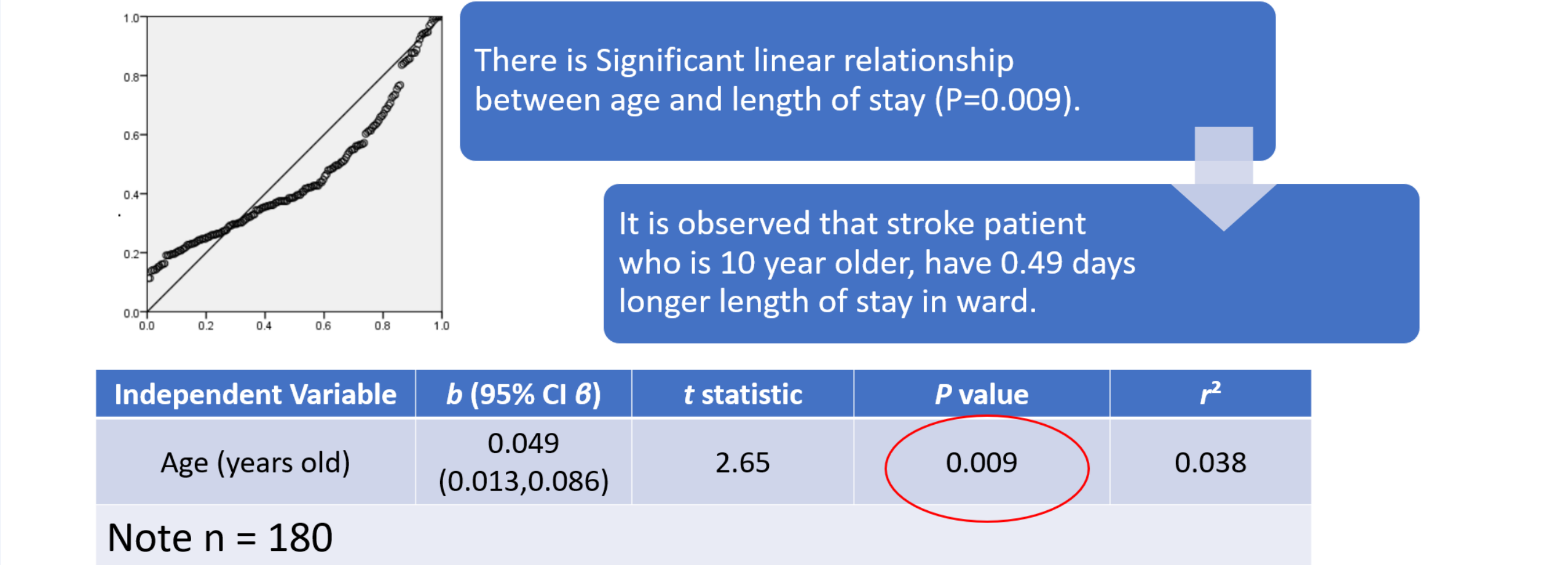
Average Direct Medical Costs For Each Component			
Components	Average Cost ± SD (RM)	Minimum (RM)	Maximum (RM)
Average Total Cost	15,670.70 ± 14,374.19	2,453.75	88,602.15
Consultation	4,008.62 ± 3557.44	0	27,603.45
Medication	3,035.84 ± 3726.54	8.0	28,899.95
Medical Supplies And Equipment	2,779.88 ± 4847.80	51.11	30,038.25
Nursing Care	1,874.50 ± 2045.75	313.40	14,213.60
Medical Imaging Investigations	1,134.27 ± 927.84	0	4,646.00
Laboratory Investigations	1,103.22 ± 868.22	158.00	5,020.00
Unit Costs Of Treatment Per Medical Bed	654.89 ± 668.24	0	5,600.00
Rehabilitation Services	427.94 ± 616.95	0	4,405.00
Unit Costs Of Treatment Per ICU Bed	358.78 ± 653.58	0	3,500.00
Special Diagnostic Procedures	203.58 ± 297.91	0	1,613.00

The mean cost of intensive care unit (ICU) stays for patients with hemorrhagic stroke, RM 643.24 ± 913.11, is significantly greater than that for patients with ischemic stroke, RM 285.18 ± 548.23 (P = 0.003). However, there is no significant difference in the average cost of medication between the two groups of patients with hemorrhagic and ischemic stroke (p = 0.641). A statistically significant (linear) association exists between the expenses of consultations and the duration of hospital stays (P<0.001).

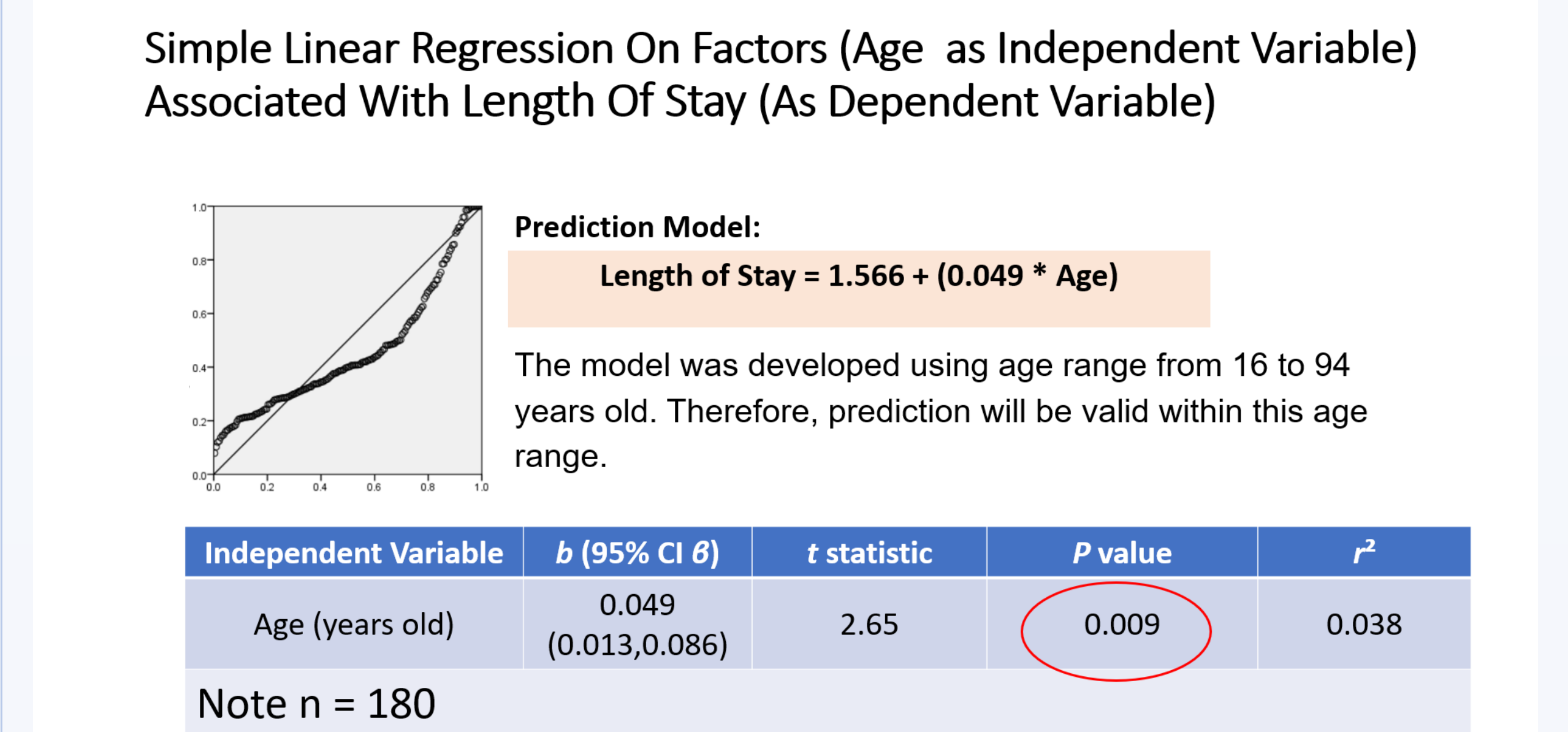
## Comparing Average Cost Of ICU Stay Between Hemorrhagic And Ischemic Stroke



## Simple Linear Regression On Factors (Age as Independent Variable) Associated With Length Of Stay (As Dependent Variable)



## RESULTS (cont.)



## CONCLUSIONS

This research has successfully determined the average overall direct medical cost associated with acute stroke hospitalization was RM 15,670.70 ± 14,374.19. The cost components exhibited a variation ranging from RM 40 to RM 4008.62 ± 3557.44. The findings of this study demonstrate the multiple aspects of acute stroke care expenses in receiving advanced medical care service at a private hospital. Nevertheless, private hospital settings including the physicians as well as other healthcare professionals, have demonstrated unwavering commitment to the well-being of their patients, striving to provide the highest quality healthcare.

## REFERENCES

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