

## Chapter 4

### Statistical Modeling

In Chapter 3 we used basic statistical method for analysis of the data. In this chapter we will use multiple linear regression model.

#### 4.1 Multiple Linear Regression Model

Following the method described in Chapter 2, we fitted the models containing all 13 determinants to each factor in turn as outcome variable. Results of full model for *clinical activities* were shown in Table 4.1.

Variables	Coefficients	S.E.	p-value
Intercept	1.276	0.305	< 0.001
Gender			
Female	0.000		
Male	-0.173	0.122	0.157
Age			
> 28 years	0.000		
≤ 28 years	-0.010	0.174	0.950
Marital status			
Marriage	0.000		
Single	-0.075	0.093	0.422
Level of education			
Bachelor or Master degree	0.000		
Certificate	0.061	0.096	0.526
Place of graduate			
SCPH, in other provinces	0.000		
SCPH, Yala	-0.086	0.085	0.311
Year of graduation			
2009 or later	0.000		
Before 2009	0.277	0.131	<b>0.036</b>
Malayu			
Yes	0.000	0.000	
No	0.021	0.087	0.805
Working experience			
> 7 years	0.000		
≤ 7 years	-0.021	0.170	0.898

Variables	Coefficients	S.E.	p-value
<b>Work position</b>			
Non government	0.000		
Dental nurse practitioner	-0.030	0.118	0.796
Dental nurse professional	-0.148	0.170	0.383
<b>Work place</b>			
Health offices	0.000		
Health center	-0.246	0.170	0.383
Hospital	0.685	0.253	<b>0.007</b>
<b>Having dentist</b>			
No	0.000		
Yes	-0.166	0.221	0.453
<b>Number of dental nurse</b>			
> 1 dental nurses	0.000		
1 dental nurse	-0.016	0.088	0.851
<b>Dental assistant</b>			
Yes	0.000		
No	-0.144	0.139	0.302

Table 4.1: The results of full model for clinical activities

Table 4.2 shows the results of the multiple linear regression analysis after omitting determinants with p-value more than 0.05, using backward elimination.

The r-squared for final model was 14.21 %. The model shows that year of graduation and work place are statistically significant.

Variable	Coefficients	S.E.	p-value	R <sup>2</sup>
Intercept	0.730	0.047	< 0.001	14.21 %
<b>Year of graduation</b>				
2009 or later	0.000			
Before 2009	0.236	0.077	0.002	
<b>Work place</b>				
Health office	0.000			
Health center	0.013	0.076	0.857	
Hospital	0.826	0.187	< 0.001	

Table 4.2: The results of backward elimination for clinical activities

Figure 4.1 shows the normal quartile plot of final model for *clinical activities*. The normality assumption for the errors was plausible. Outliers are visible in the upper and lower right corner.

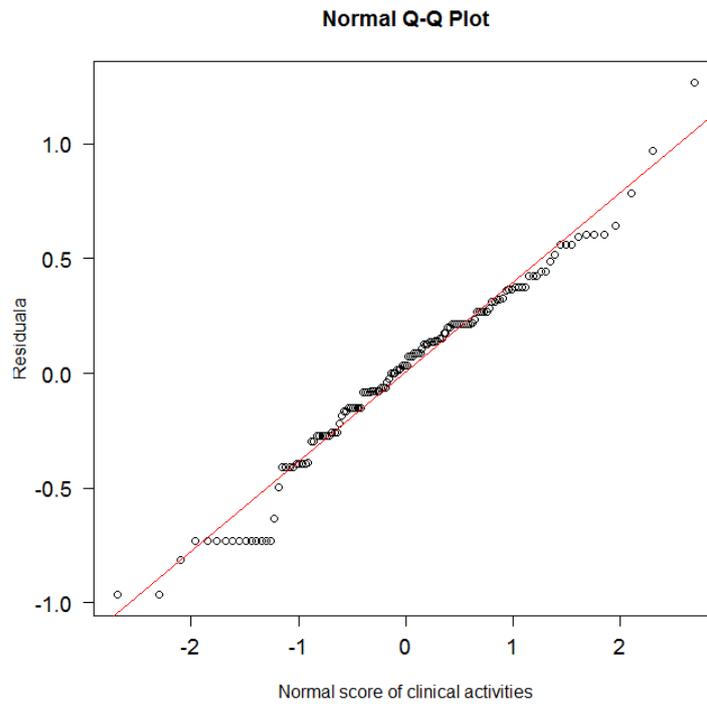


Figure 4.1: Normal quartile plot for clinical activities

Results of full model for *preventive activities* were shown in Table 4.3.

Variables	Coefficients	S.E.	p-value
Intercept	0.795	0.339	0.020
Gender			
Female	0.000		
Male	-0.015	0.135	0.908
Age			
> 28 years	0.000		
≤ 28 years	-0.072	0.194	0.708
Marital status			
Marriage	0.000		
Single	-0.142	0.104	0.175
Level of education			
Bachelor or Master degree	0.000		
Certificate	0.062	0.107	0.560
Place of graduate			
SCPH, in other provinces	0.000		
SCPH, Yala	0.053	0.095	0.575
Year of graduation			
2009 or later	0.000		
Before 2009	0.234	0.146	0.111

Variables	Coefficients	S.E.	p-value
Malayu			
Yes	0.000	0.000	
No	-0.102	0.097	0.293
Working experience			
> 7 years	0.000		
≤ 7 years	0.045	0.190	0.811
Work position			
Non government	0.000		
Dental nurse practitioner	-0.188	0.132	0.156
Dental nurse professional	-0.223	0.189	0.241
Work place			
Health offices	0.000		
Health center	-0.057	0.257	0.824
Hospital	0.955	0.282	< 0.001
Having dentist			
No	0.000		
Yes	0.438	0.246	0.005
Number of dental nurse			
> 1 dental nurses	0.000		
1 dental nurse	-0.007	0.098	0.940
Dental assistant			
Yes	0.000		
No	-0.214	0.155	0.385

Table 4.3: The results of full model for preventive activities

Table 4.4 shows the results of the multiple linear regression analysis after omitting determinants with p-value more than 0.05, using backward elimination.

The r- squared for final model was 20.13 %. The model shows that work place and dentist are statistically significant.

Variable	Coefficients	S.E.	p-value	R <sup>2</sup>
Intercept	1.383	0.239	< 0.001	20.13 %
Work place				
Health office	0.000			
Health center	0.145	0.132	0.272	
Hospital	0.917	0.251	< 0.001	
Dentist				
None	0.000			
Yes	0.541	0.237	0.014	

Table 4.4: The results of backward elimination for preventive activities

Figure 4.2 shows the normal quartile plot of final model for *preventive activities*. The normality assumption for the errors was plausible. Outliers are visible in the upper right corner.

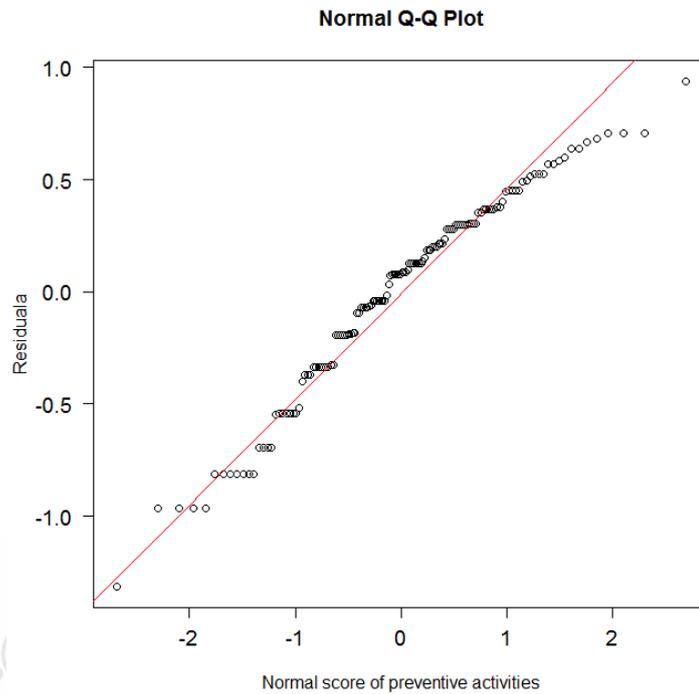


Figure 4.2: Normal quartile plot for preventive activities

Results of full model for *project activities* were shown in Table 4.5.

Variables	Coefficients	S.E.	p-value
Intercept	1.942	0.747	0.010
Gender			
Male	0.000		
Female	0.325	0.298	0.277
Age			
≤ 28 years	0.000		
> 28 years	-0.784	0.427	0.095
Marital status			
Single	0.000		
Marriage	0.595	0.104	<b>0.010</b>
Level of education			
Certificate	0.000		
Bachelor or Master degree	-0.115	0.235	0.624
Place of graduate			
SCPH, Yala	0.000		

Variables	Coefficients	S.E.	p-value
SCPH, in other provinces	0.176	0.209	0.400
Year of graduation			
Before 2009	0.000		
2009 or later	-0.495	0.321	0.125
Malayu			
No	0.000		
Yes	0.182	0.213	0.393
Working experience			
≤ 7 years	0.000		
> 7 years	0.702	0.418	0.069
Work position			
Dental nurse professional	0.000		
Dental nurse practitioner	0.141	0.291	0.628
Non government	0.318	0.417	0.446
Work place			
Hospital	0.000		
Health center	0.141	0.291	0.628
Health offices	0.318	0.417	0.446
Having dentist			
Yes	0.000		
No	-0.017	0.542	0.974
Number of dental nurse			
1 dental nurse	0.000		
> 1 dental nurses	-0.039	0.215	0.854
Dental assistant			
No	0.000		
Yes	-0.277	0.340	0.417

Table 4.5: The results of full model for preventive activities

Table 4.6 shows the results of the multiple linear regression analysis after omitting determinants with p-value more than 0.05, using backward elimination.

The r- squared for final model was 11.97 %. The model shows that marital status and working experience are statistically significant.

Variables	Coefficients	S.E.	p-value	R <sup>2</sup>
Intercept	1.145	0.067	0.011	11.97 %.
Marital status				
Single	0.000			
Marriage	0.764	0.106	< 0.001	

Working experience			
≤ 7 years	0.000		
> 7 years	0.754	0.125	0.043

Table 4.6: The results of backward elimination for project activities

Figure 4.3 shows the normal quartile plot of final model for *project activities*. The normality assumption for the errors was plausible. Outliers are visible in the upper right and lower left corner.

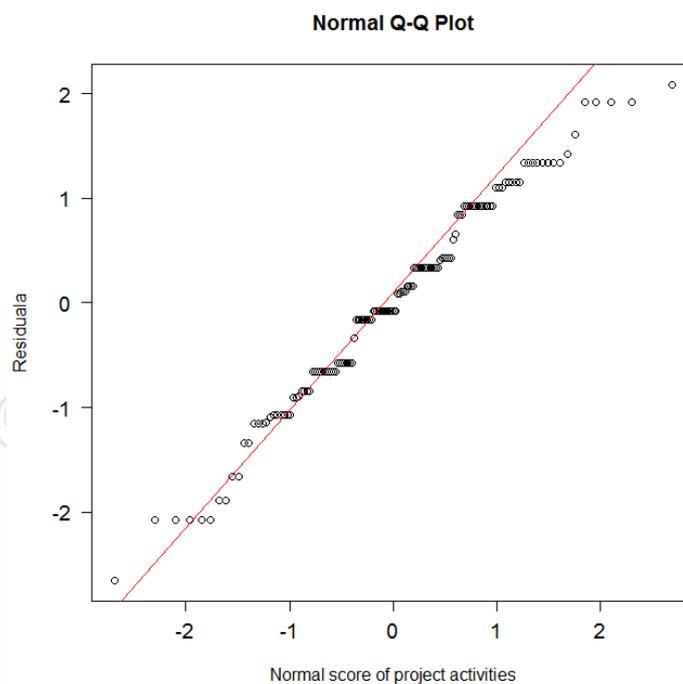


Figure 4.3: Normal quartile plot for project activities