Physical Function, Depressive Symptoms, and Quality of Life in Stroke Patients with Post-Acute Care
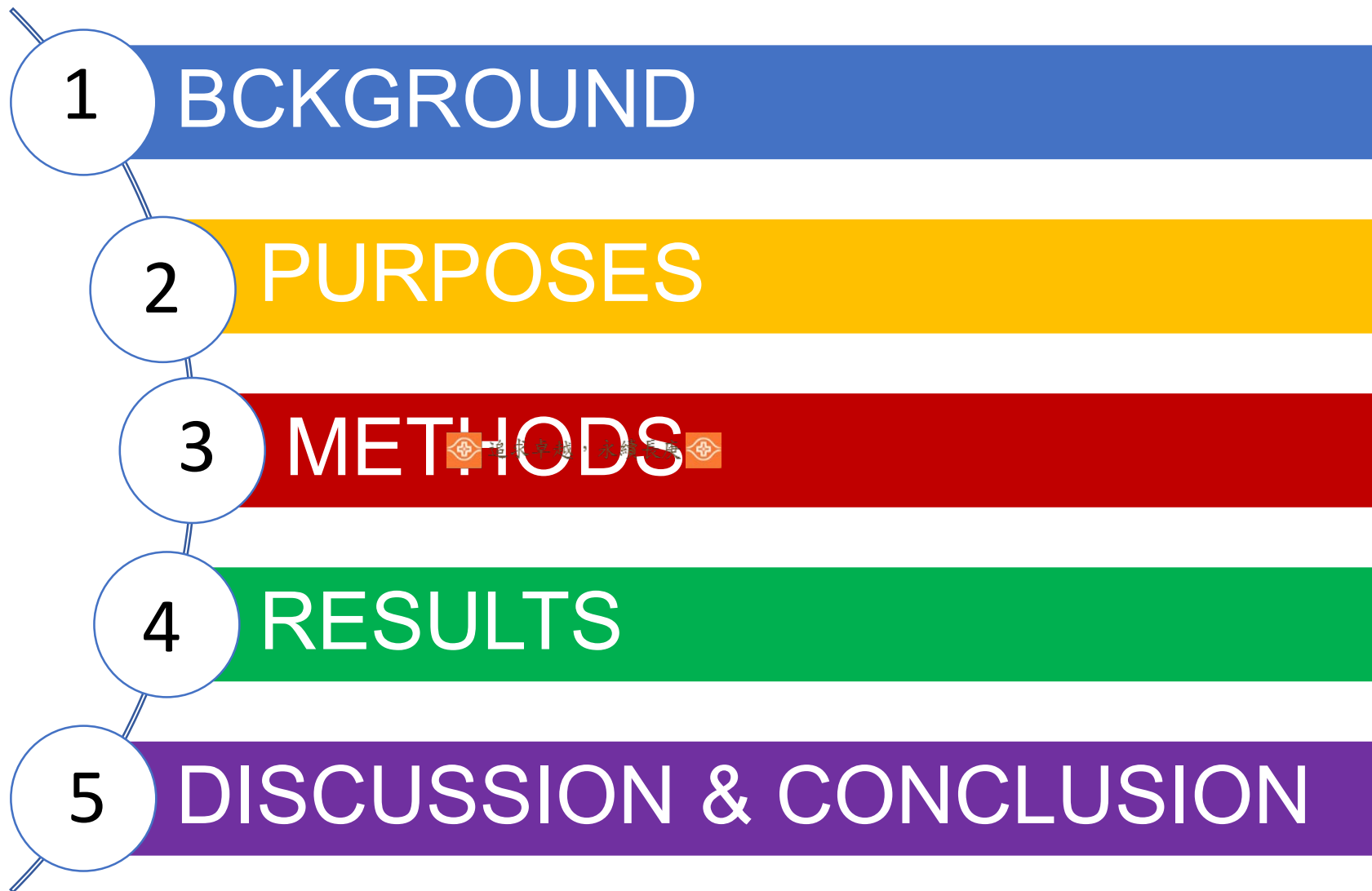
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1 BCKGROUND

2 PURPOSES

3 METHODS

4 RESULTS

5 DISCUSSION & CONCLUSION

BACKGROUND

- Post-acute care (PAC) in Taiwan
  1. In January 2014, the National Health Insurance Administration of the Ministry of Health and Welfare
  2. The Pilot Project of Enhancing Post-acute Care Quality through National Health Insurance: Using Stroke as an Example
- The high-intensity rehabilitation:
  1. Physical therapy (PT), occupational therapy (OT), and speech therapy (ST)
  2. Administered during the golden period
- To expedite the patients' physical function recovery and shorten their length of hospital stay for rehabilitation

PURPOSES

- To follow up post-acute patients with stroke and examined their physical functions, status of depression, quality of life (QoL), and the changing trends of and correlations between these variables after the patients received post-acute care.

- To explore the predictive factors for the QoL of these post-acute patients with stroke.

METHODS - 1

- Design: Prospective and longitudinal study
- Period: July 2017 ~ March 2018
- Place: Neurology department wards in a Chiayi County regional teaching hospital in middle Taiwan

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METHODS - 2

- **Inclusion criteria**:
  1. Diagnosed either ischemic or hemorrhagic stroke **within 8 to 30 days**
  2. More than 20 years old
  3. Able to communicate with mandarin
  4. Modified Rankin Scale **(mRS) 2-4**
  5. Agreed to sign consent form

- **Exclusion criteria:**
  1. Diagnosed either with mental illness or declined cognitive function by physicians
  2. Aphasia (including motor aphasia) or severe hearing impairment
  3. Diagnosed with depression or administered antidepressants by physicians
  4. Transferred to other wards for specific treatment

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METHODS - 3

- **Stroke PAC program**
  1. Usually 3-6 weeks, 5 days a week, twice a day and each time is between 90 to 120 minutes including PT, OT, or ST.
  2. The physicians may extend the PAC program which is dependent upon patients' progress and needs but no more than 12 weeks.

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METHODS - 4

- **Research instruments**
    1. Barthel Index (BI)
    2. mRS
    3. Instrumental activity of daily living (IADL)
    4. 15-item Geriatric Depression Scale (GDS-15)
    5. Stroke Impact Scale Version 3.0 (SIS V3.0)

- **Enrolled, the 1st, 4th, 8th, and 12th week post-stroke**

Time points Measurements	T0 Enrolled	T1 Post stroke 1st week	T2 Post stroke 4th week	T3 Post stroke 8th week	T4 Post stroke 12th week
Demographic data	√				
Disease related data	√				
BI	√	√	√	√	√
IADL		√	√	√	√
mRS	√	√	√	√	√
GDS-15		√	√	√	√
SIS V3.0		√	√	√	√

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METHODS - 5

- **Statistic methods:**
  1. Descriptive statistics:
  2. Inferential statistics:
     - A. Independent t test
     - B. Chi-squared test
     - C. One-way analysis of variance
     - D. Pearson's correlation coefficient
     - E. Generalized estimating equation (GEE)
     - F. Multiple linear regression (to investigate the predictive factors that influenced the QoL of post-acute patients with stroke)

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RESULTS - 1

- Initially, 44 patients with stroke met the inclusion criteria and completed a baseline assessment.

- Three participants were excluded (6.8 % attrition rate) from the study because of loss of follow up.

- Finally, **41 patients** with stroke were enrolled in the study.

Table 1 Demographic data at enrollment (n=41)

Characteristics	N (%)	Mean (SD)	Range
Age (years)		65 (15.07)	91~34
Gender			
Male	22 (53.66)		
Female	19 (46.35)		
Stroke type			
Infarct	37 (90.24)		
Hemorrhagic	4 (9.76)		
Admitted NIHSS		8.51 (4.94)	21~1
Enrollment			
BI		35.12 (22.09)	80~0
mRS		3.78 (0.69)	4~3
mRS=3	5 (12.2)		
mRS=4	36 (87.8)		
Admitted PAC (post stroke day)		17.68 (5.91)	29~7
PAC length (days)		39.27 (16.02)	63~11

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RESULTS - 2

Table 2 Summary of BI, mRS, IADL, GDS-15, SIS V3.0, and SIS9 on Post Stroke 1st, 4th, 8th, and 12th Week

Parameters	Enrollment	Post stroke 1st week	Post stroke 4th week	Post stroke 8th week	Post stroke 12th week
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
BI	35.12(22.09)	42.07(24.90)	49.63(23.81)	65.73(26.31)	73.78(26.85)
mRS	3.78(0.69)	3.76(0.49)	3.59(0.77)	2.93(1.10)	2.51(1.14)
IADL		3.46(2.90)	4.20(3.89)	5.80(5.00)	7.54(5.59)
GDS-15		7.76(3.92)	6.46(3.67)	4.66(4.27)	3.41(3.79)
SIS V3.0		367.73(105.95)	447.38(116.88)	539.69(131.99)	577.68(132.89)
SIS9		18.78(14.00)	32.20(18.78)	55.37(21.69)	63.41(20.81)

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RESULTS - 3

- Physical functions
  1. Patients showed significantly gradual improvements in the BI over time after the care program.
  2. Great improvement between the 4th week to 8th week post stroke.

Table 3 Changing Trends in BI

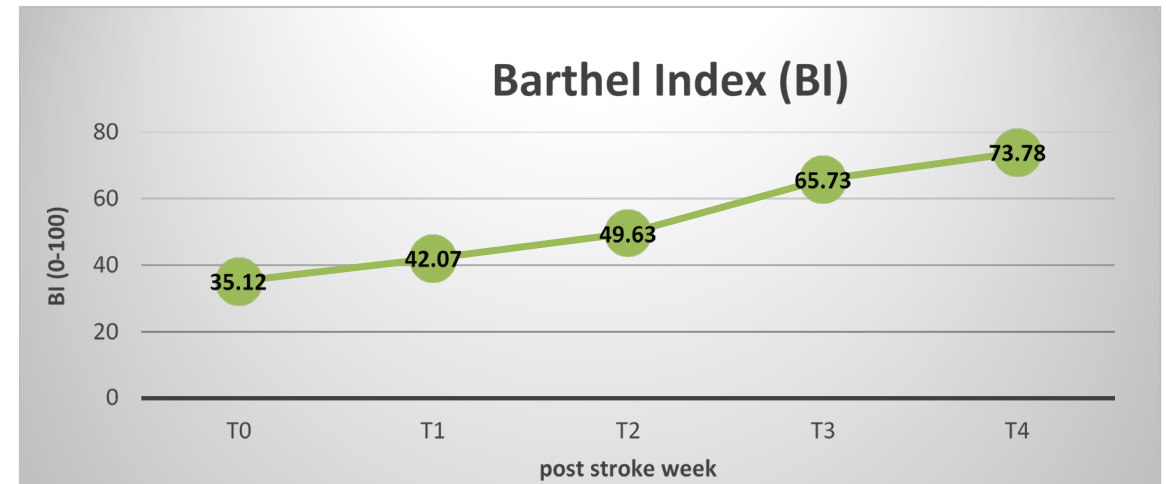| Parameters	B	S.E.	Wald χ^2	p value
Intercept	35.12	3.41	106.21	**<.001**
BIT4	38.66	3.85	100.89	**<.001**
BIT3	30.61	3.56	73.74	**<.001**
BIT2	14.51	3.05	22.71	**<.001**
BIT1	6.95	2.63	6.98	**.008**
BIT0	0			

Figure 1 Illustrates the BI trajectories

Note: BI = Barthel Index; T0 for enrollment; T1 for post stroke 1st week; T2 for post stroke 4th week; T3 for post stroke 8th week; and T4 for post stroke 12th week.

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RESULTS - 4

- Physical functions
  1. Patients showed significantly gradual improvements in the IADL over time after the care program.
  2. Great improvement between the 4th week to 8th week post stroke.

Table 4 Changing Trends in IADL

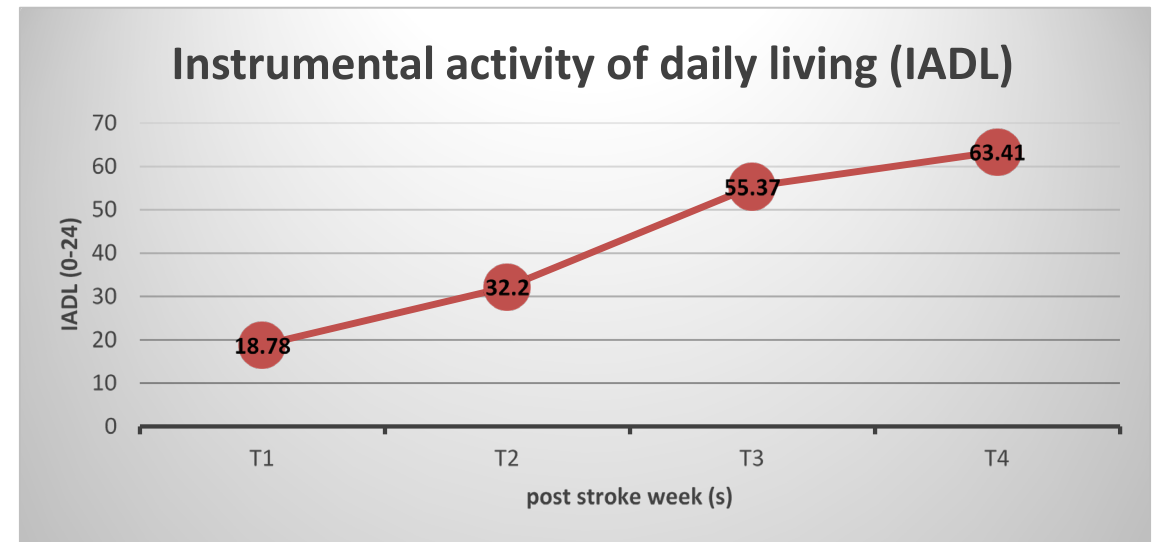| Parameters	B	S.E.	Wald χ^2	p value
Intercept	3.46	0.45	59.98	**<.001**
IADLT4	4.07	0.65	39.02	**<.001**
IADLT3	2.34	0.53	19.39	<.001
IADLT2	0.73	0.27	7.50	**.006**
IADLT1	0			

Figure 2 Illustrates the IADL trajectories

Note: IADL = Instrumental activity of daily living; T1 for post stroke 1st week; T2 for post stroke 4th week; T3 for post stroke 8th week; and T4 for post stroke 12th week.

RESULTS - 5

Table 5 Changing Trends in mRs

Parameters	B	S.E.	Wald χ^2	p value
Intercept	3.78	0.11	1262.85	**<.001**
mRST4	-1.27	0.21	37.53	**<.001**
mRST3	-0.85	0.20	18.81	**<.001**
mRST2	-0.20	0.15	1.76	.19
mRST1	-0.02	0.12	0.04	.84
mRST0	0			

- The mRS scores showed a significantly substantial decrease on the 8th week.

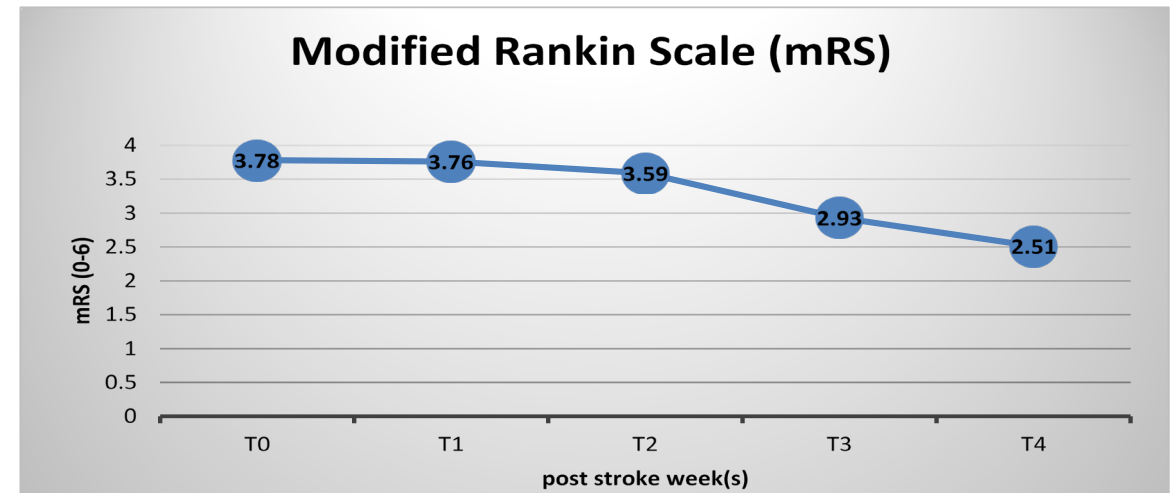- Great improvement between the 4th week to 8th week post stroke.

Figure 3 Illustrates the mRS trajectories

Note: mRS = Modified Rankin Scale; T0 for enrollment; T1 for post stroke 1st week; T2 for post stroke 4th week; T3 for post stroke 8th week; and T4 for post stroke 12th week.

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RESULTS - 6

- Statistically significant differences in the patients' scores of GDS-15 was achieved over time.

- Great decrease between the 4th week to 8th week post stroke.

Table 6 Changing Trends in GDS-15

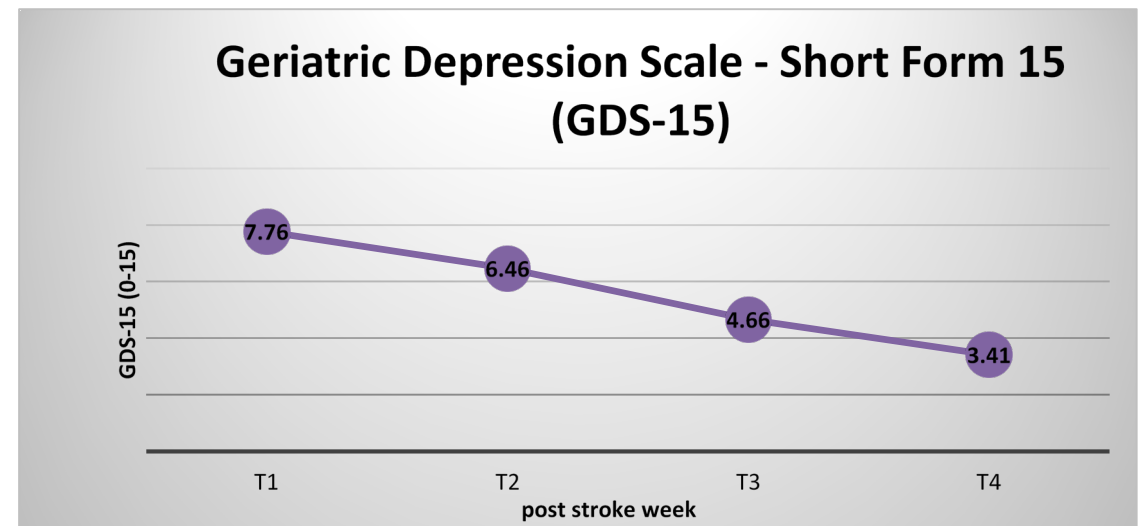| Parameters	B	S.E.	Wald χ^2	*p* value
Intercept	7.76	0.61	164.28	**<.001**
GDST4	-4.34	0.64	45.31	**<.001**
GDST3	-3.10	0.59	27.45	**<.001**
GDST2	-1.29	0.40	10.54	**.001**
GDST1	0			

Figure 4 Illustrates the GDS-15 trajectories

Note: GDS-15 = Geriatric Depression Scale - Short Form 15; T1 for post stroke 1st week; T2 for post stroke 4th week; T3 for post stroke 8th week; and T4 for post stroke 12th week.

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RESULTS - 7

- Statistically significant differences in the patients' scores of SIS V3.0 was achieved over time.

- Great improvement between the 4th week to 8th week post stroke.

Table 7 Changing Trends in SISV3.0

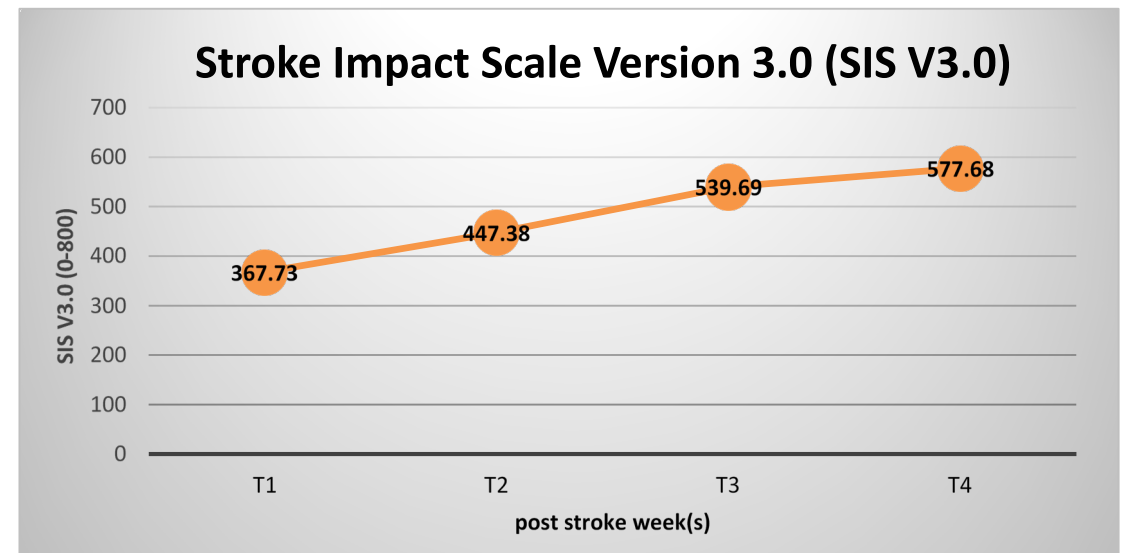| Parameters	B	S.E.	Wald χ^2	p value
Intercept	367.73	16.34	506.23	**<.001**
SIST4	209.94	15.43	185.16	**<.001**
SIST3	171.96	13.95	151.96	**<.001**
SIST2	79.65	9.64	68.20	**<.001**
SIST1	0			

Figure 5 Illustrates the SISV3.0 trajectories

Note: SIS V3.0 = Stroke Impact Scale Version 3.0; T1 for post stroke 1st week; T2 for post stroke 4th week; T3 for post stroke 8th week; and T4 for post stroke 12th week.

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RESULTS - 8

- Statistically significant differences in the patients' scores of SIS V3.0 (part 9) Stroke recovery was achieved over time.

- Great self-rated recovery between the 4th week to 8th week post stroke.

Table 8 Changing Trends in SIS (part 9) Stroke Recovery

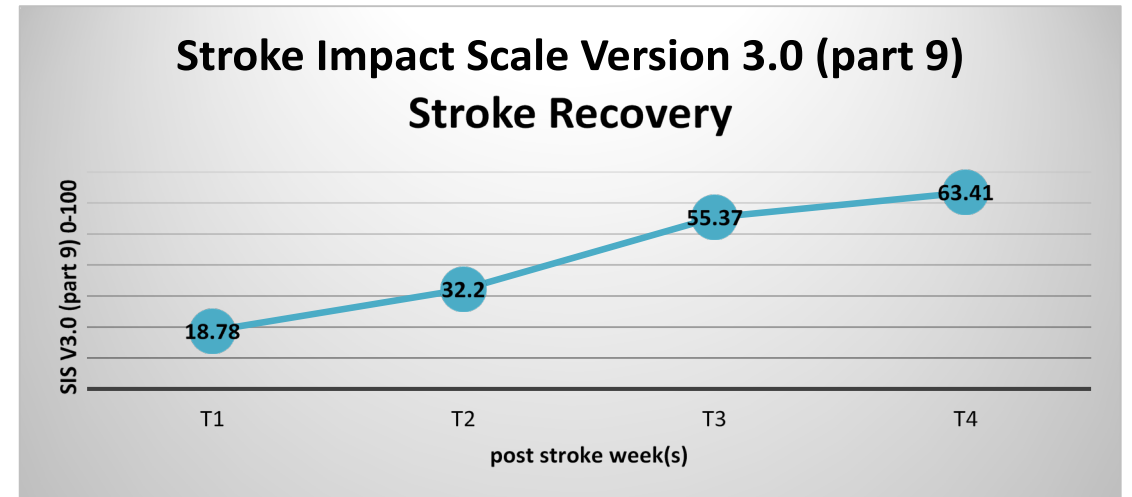| Parameters	B	S.E.	Wald χ^2	p value
Intercept	18.78	2.16	75.63	**<.001**
SIS9T4	44.63	3.28	185.85	**<.001**
SIS9T3	36.59	3.37	117.67	**<.001**
SIS9T2	13.42	2.43	30.49	**<.001**
SIS9T1	0			

Figure 6 Illustrates the SISV3.0 (part 9) stroke recovery trajectories

Note: SIS V3.0 (part 9) = Stroke Impact Scale Version 3.0 (part 9) stroke recovery; T1 for post stroke 1st week; T2 for post stroke 4th week; T3 for post stroke 8th week; and T4 for post stroke 12th week.

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RESULTS - 9

Table 9 Correlational among BI, IADL, mRS, GDS-15, SISV3.0, and SIS9

Parameters	BI (T1-T4)	IADL (T1-T4)	mRS (T1-T4)	GDS-15 (T1-T4)	SISV3.0 (T1-T4)	SIS9 (T1-T4)
Age	*	***	**	NS	*(T2-T4)	*(T2-T4)
Admitted NIHSS	*	*	NS	*(T2, T4)	**	NS
BI (T1-T4)	-	***	***	*(T2-T4)	***	***(T2-T4)
IADL (T1-T4)	***	-	***	*(T2-T4)	***	***(T2-T4)
mRS (T1-T4)	***	***	-	*(T2-T4)	***	***(T2-T4)
GDS-15 (T1-T4)	*(T2-T4)	*(T2-T4)	*	-	***(T2-T4)	**(T2-T4)
SIS V3.0 (T1-T4)	***	***(T2-T4)	***	***(T2-T4)	-	***
SIS9 (T1-T4)	***	***(T2-T4)	***(T2-T4)	**(T2-T4)	***	-

Note: * p < .05; ** p < .01; *** p < .001; NS no significant; T1 for post stroke 1-week; T2 for post stroke 4-week; T3 for post stroke 8-week; and T4 for post stroke 12-week.

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RESULTS - 10

- NIHSS, Length of PCA, BI, IADL, and GDS-15 were crucial predictive factors for patients' QoL on the 4th week after stroke.

- Adjusted R^2 = 87.1%

Table 10 QoL Predictors for post stroke 4th week

Parameters	B	S.E.	β	t	p
Intercept	385.89	103.70		3.72	**.001**
Educational level (primary school as reference)	-26.77	21.96	-0.11	-1.22	.232
Age (years)	-0.34	0.82	-0.04	-0.42	.680
NIHSS	**-4.93**	**1.82**	**-0.21**	**-2.71**	**.011**
Length of PCA	**-1.38**	**0.50**	**-0.19**	**-2.74**	**.010**
BI(T2)	**2.04**	**0.60**	**0.42**	**3.41**	**.002**
mRS(T2)	30.87	18.71	0.20	1.65	.109
IADL(T2)	**11.12**	**4.68**	**0.37**	**2.37**	**.024**
GDS-15(T2)	**-10.57**	**2.10**	**-0.33**	**-5.03**	**<.001**
R^2	.897				
Adjusted R^2	.871				
F	34.84				
p	<.001				

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RESULTS - 11

- NIHSS, BI, and GDS-15 were crucial predictive factors for patients' QoL on the 8th week after stroke.

- Adjusted R^2 = 87.2%

Table 11 QoL Predictors for post stroke 8th week

Parameters	B	S.E.	β	t	*p*
Intercept	527.19	136.25		3.87	**.001**
Educational level (primary school as reference)	4.79	24.99	0.02	0.19	.849
Age (years)	-0.32	0.99	-0.04	-0.33	.745
NIHSS	**-4.82**	**2.00**	**-0.18**	**-2.41**	**.022**
急性後期住院天數	-0.87	0.58	-0.11	-1.50	.143
BI(T3)	**2.55**	**0.77**	**0.51**	**3.32**	**.002**
MRS(T3)	-9.23	19.71	-0.08	-0.47	.643
IADL(T3)	1.01	3.58	0.04	0.28	.780
GDS-15(T3)	**-8.59**	**2.41**	**-0.28**	**-3.57**	**.001**
R^2	.898				
Adjusted R^2	.872				
F	35.04				
p	<.001				

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RESULTS - 12

- BI, mRS, and GDS-15 were crucial predictive factors for patients' QoL on the 12th week after stroke.

- Adjusted R^2 = 95.2%

- In summary, BI and GDS-15 were crucial predictive factors for patients' QoL on the 4th, 8th, and 12th week after stroke.

Table 12 QoL Predictors for post stroke 12th week

Parameters	B	S.E.	β	t	p
Intercept	421.38	66.16		6.37	**<.001**
Marriage status (married as reference)	11.53	14.57	0.04	0.79	.435
Educational level (primary school as reference)	3.77	15.36	0.01	0.25	.808
Work status (no job as reference)	21.78	12.22	0.08	1.78	.085
Age (years)	0.93	0.66	0.11	1.41	.170
NIHSS	-1.95	1.28	-0.07	-1.53	.137
BI(T4)	2.43	0.41	0.49	5.89	**<.001**
mRS(T4)	-30.68	10.58	-0.26	-2.90	**.007**
IADL(T4)	3.08	1.72	0.13	1.79	.083
GDS-15(T4)	-8.00	1.52	-0.23	-5.25	**<.001**
R^2	.963				
Adjusted R^2	.952				
F	88.81				
p	<.001				

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DISCUSSION & CONCLUSION-1

- Among 41 patients, most of them (87.8%) were mRS = 4, BI = 35.12± 22.09 (Severe dependent)- **Poor physical function** (Tsai, 2014)

- The length of PCA program was **39.27(16.02) days ranging from 63 to 11** which was longer than Wu et al. (2016) 21.8 (14.7) days. The PCA program did show the **improvements in physical function** (BI, IADL, and mRS) (Wu et al., 2016)

- After 12 weeks post stroke, there were still 51.2% (21) patients' mRS ≥ 3 (Sung et al. (2014) there were 44.3% patients' mRS ≥ 3)

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DISCUSSION & CONCLUSION-2

- Depression symptoms declined from post stroke 1st week (68.3%) to 12th week (24.4%).

- Chang (2016): Post stroke 1-week 12% to 4-week 20%; Lui (2009): Within 12 weeks, 62% (Both were cross-sectional design) may be confounded by physical function, NIHSS score, co-mobility.

- Quality of life improves gradually (Gbiri & Akinpelu (2013) & Prlić & Kadojić (2012).

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DISCUSSION & CONCLUSION-3

- NIHSS, Length of PCA, BI, IADL, mRS, and GDS-15 were identified predictive factors for patients' QoL on the 4th week, 8th week, and 12th week after stroke. The proportion of variance (R^2)explained by the regression model to the amounted to 87.2% ~95.2%.

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DISCUSSION & CONCLUSION-4

- Future studies were recommended to compare the changing trends of physical functions, depression symptoms, and QoL between patients who received post-acute care and those who did not. (on going)

- This study can serve as a reference for clinical medical personnel in caring for patients with stroke

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THANK YOU!
QUESTIONS?

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