

Relationship of Physical Disability and Psychological Status in Stroke Survivors

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Abstract: Stroke is a leading cause of death and disability globally. Stroke affects the physical status of stroke survivors and leads to muscle weakness, musculoskeletal deformities, disabilities and dependency in functional activities. Paralysis is one of the most common disturbances resulting from stroke. Stroke also affects the psychological status in chronic patients. The psychological problems faced by stroke survivors are emotional instability and post-stroke depression. The purpose of the study was to examine the relationship between physical disability and psychological status in stroke survivors. **Methods:** Participants for this study were 50 stroke survivors, selected from the 7 towns of Amritsar district. 22 males and 28 females were recruited for this study. The patients are categorized into three categories: mild, moderate and severe according to their level of severity. Various standardized tools used to measure the physical disability in stroke survivors were: Barthel index, Functional independence measure(FIM), Structured questionnaire and WHO disability schedule. Psychological status was assessed using Emotional stability scale by Psy-Com and Beck's depression inventory. The mean scores were calculated and correlation between physical and psychological status of the three categories of stroke survivors were calculated using Pearson's correlation method. The correlation of musculoskeletal deformities, physical disability, degree of dependency and functional abilities with psychological status of cognition, emotional stability and post-stroke depression was calculated. **Results and analysis:** The results of the study depicted that emotional stability in mild group of patients demonstrated a significant relationship with physical disability and dependency in both males, females and in urban patients ($r=0.545$, $p<0.05$; $r=0.642$, $p<0.01$; $r=0.492$, $p<0.05$ and $r=0.485$, $p<0.05$; $r=0.610$, $p<0.01$; $r=0.712$, $p<0.01$). The moderate group also observed a significant relationship with physical disability, dependency and functional abilities ($r=0.470$, $r=0.498$ and $r=0.552$, $p<0.05$). Whereas in severe group, a significant relationship existed with physical disability, dependency and functional abilities ($r=0.614$, $r=0.615$ and $r=0.618$, $p<0.05$). Post-stroke depression showed a significant relationship with dependency and functional abilities in mild group of stroke survivors ($r=0.528$ and $r=0.516$, $p<0.05$) and with physical disability in females and urban patients ($r=0.543$ and $r=0.524$, $p<0.05$).

Keywords: Cerebrovascular accident, emotional stability, physical status, disability, functional status, musculoskeletal deformities.

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1. INTRODUCTION

Stroke or cerebrovascular accidents refers to rapidly developing clinical signs and symptoms of focal or global loss of cerebral function lasting more than 24 hours with no apparent cause other than that of vascular origin (Carr and Shepherd,2010). The commonest cause of stroke is high blood pressure in 75% of cases in urban population and 95% of cases in rural populations (Harsheen Juneja, 2017).

Globally 15 million people have an acute stroke every year and one-third of them die secondary to stroke. Stroke is a leading cause of death and disability globally. Each year, 5.7 million people die from stroke and it is the second most common cause of death worldwide (9.7% of all deaths), exceeded only by heart disease. Stroke often leaves its survivors with severe disabilities that cause emotional and economic hardships for both patients and their families. Over 85% of strokes are reported from developing countries (Ambar Kulshreshtha et al, 2012).

Stroke affects the physical status of stroke survivors. It leads to muscle weakness, musculoskeletal deformities, disabilities and dependency in functional activities. Paralysis is one of the most common disturbances resulting from stroke. The paralysis involves the side of the body opposite to the side of the brain damaged by stroke. It may affect the entire side of the body or an arm, leg or face (Carr& Shepherd, 2010).

Stroke is the major health issue in the older population because it affects not only physical impairment, but also leads to psychological problems. The impact of stroke on a patient is usually unanticipated and often devastating, resulting in maladjustments in the psychological status of stroke survivors (Pan Jun Hao et al,2008).Stroke usually causes impairments in emotional, physical and social domains (Debjani Mukherjee et al,2006). The psychological problems faced by stroke survivors are, emotional instability and post-stroke depression. Depression predicts poor physical function and poor physical function predicts depression, causing a downward trend in the health of a person. Disability rates are 4-5 times higher among patients with depressive disorders than non-depressed patients. Depression at 3 months post-stroke predicts high risk of disability. The functional disabilities and deformities are directly related to the psychological status of the stroke survivors. Thus, stroke deteriorates the physical and motor abilities, functional capabilities, psychological status and independence in performing functional activities. Hence, making the patient more prone to the severity of symptoms(Yang Yang et al, 2016).

2. Materials and Methods

2.1 Sampling

The sample was collected through survey type of research. A random sample of 50 stroke patients one year after suffering from stroke (both male and female, rural and urban) were chosen for this study. The scales were administered to the stroke patients of 7 towns of Amritsar district: Amritsar Corporation, Nangli, Kathanian, Mudal, Jandiala, Verka and Majitha. The sample chosen was assessed for physical

status in terms of disability, degree of dependency, musculoskeletal deformities and functional abilities.

2.2 Tools

The psychological status of stroke survivors was assessed in terms of emotional stability and post-stroke depression. The patients are categorized into three categories: mild, moderate and severe according to the level of severity. The standardized tools used for the physical and psychological status assessment of the stroke survivors were:

- Functional Independence measure
- Barthel index
- Structured questionnaire
- Disability assessment schedule (WHO)
- Beck's depression inventory
- Emotional stability tool

The functional status and disabilities of the chronic stroke survivors were measured on a two-point scale in different areas i.e., dressing, lifting and handling, transportation, walking, driving, supportive function of arm/leg, changing positions, activities of daily living, moving or walking. The structured questionnaire was constructed and standardized in order to assess the functional status.

In order to find out the relationship between the physical status and psychological status of stroke survivors, the mean scores were calculated. The Pearson's coefficient of correlation was calculated to find out the relationship between physical and psychological status of stroke survivors.

3. Result Analysis

Table1. Relationship of the physical status with emotional stability in the mild group

Psychological Status	Physical Status				
		Musculo-skeletal Deformities	Physical Disability	Degree of Dependency	Impaired Functional Abilities
Emotional Stability	Total group	0.311	0.412	0.442	0.446
	Male	0.274	0.545*	0.485*	0.498*
	Female	0.121	0.642**	0.610**	0.534*
	Rural	0.035	0.456	0.450	0.516*
	Urban	0.345	0.492*	0.712**	0.386

*stands for significance at 0.05 level of confidence $r > 0.468$ ($df=16$), **stands for significance at 0.01 level of confidence $r > 0.590$ ($df=16$)

Table 1 depicts that the physical disability is significantly related to emotional stability in males and urban patients ($r=0.545$ and $r=0.492$ respectively, $df=16$, $p<0.05$) and with females ($r=0.642$, $df=16$, $p<0.01$). On studying the relationship of dependency in mild group with emotional stability, it was observed that dependency is significantly related to emotional stability in females and urban patients ($r=0.610$ and $r=0.712$ respectively, $df=16$, $p<0.01$) and in males ($r=0.485$, $df=16$, $p<0.05$). The mild group was evaluated to find out the relationship of emotional stability with functional abilities. The relationship of emotional stability and functional abilities is significant in males, females and rural patients ($r=0.498$, $r=0.534$ and $r=0.516$ respectively, $df=16$, $p<0.05$). Whereas there is no significant relationship observed between emotional stability and musculoskeletal deformities in mild group.

Table 2. Relationship of the physical status with emotional stability in the moderate group

Psychological Status	Physical status				
		Musculo-skeletal Deformities	Physical Disability	Degree of Dependency	Impaired Functional Abilities
Emotional Stability	Total group	0.345	0.470*	0.498*	0.552*
	Male	0.256	0.541*	0.558*	0.490*
	Female	0.298	0.598**	0.645**	0.597**
	Rural	0.327	0.610**	0.534*	0.563*
	Urban	0.424	0.624**	0.712**	0.499*

*stands for significance at 0.05 level of confidence $r > 0.456$ ($df=17$), **stands for significance at 0.01 level of confidence $r > 0.575$ ($df=17$)

Table 2 depicts that a significant relationship exists between emotional stability and physical status in moderate group. The results revealed that physical disability in total group and males was significant ($r=0.470$ and $r=0.541$ respectively, $df=17$, $p<0.05$) and in females, rural and urban population ($r=0.598$, $r=0.610$ and $r=0.624$, respectively, $df=17$, $p<0.01$).

On examining the relationship of emotional stability with dependency in moderate group, it is observed that dependency is significantly correlated with emotional stability in total group, males and rural patients ($r=0.498$, $r=0.558$ and $r=0.534$ respectively, $df=17$, $p<0.05$, respectively) and in females and urban patients ($r=0.645$ and $r=0.712$ respectively, $df=17$, $p<0.01$).

The moderate group has a significant relationship between emotional stability and functional abilities. The relationship of emotional stability with functional abilities is significant in total group, males, rural and urban population ($r=0.552$, $r=0.490$, $r=0.563$ and $r=0.499$, respectively, $df=17$, $p<0.05$) and in females ($r=0.597$, $df=17$, $p<0.01$). Whereas, no significant relationship was observed in emotional stability and musculoskeletal deformities in

moderate group.

Table 3. Relationship of the physical status with emotional stability in severe group

Psychological Status	Physical status				
		Musculo-skeletal Deformities	Physical Disability	Degree of Dependency	Impaired Functional Abilities
Emotional Stability	Total group	0.345	0.614*	0.615*	0.618*
	Male	0.448	0.605*	0.586*	0.659*
	Female	0.587*	0.716**	0.719**	0.876**
	Rural	0.614*	0.813**	0.659*	0.674*
	Urban	0.415	0.764**	0.735**	0.895**

*stands for significance at 0.05 level of confidence $r > 0.553$ ($df=11$), **stands for significance at 0.01 level of confidence $r > 0.684$ ($df=11$)

Table 3 represents that patients of severe group had a significant relationship between emotional stability and physical status of stroke survivors. The table depicts that musculoskeletal deformities have a significant relationship with emotional stability in females and rural patients ($r=0.587$ and $r=0.614$ respectively, $df=11$, $p<0.05$). On examining the relationship of emotional stability and physical disability in severe group, it is found that the relationship was significant for the total group and males ($r=0.614$ and $r=0.605$ respectively, $df=11$, $p<0.05$) and in females, rural and urban patients ($r=0.716$, $r=0.813$ and $r=0.764$ respectively, $df=11$, $p<0.01$).

In addition, the results of this table indicate a significant relationship of emotional stability and dependency in total group, male and rural patients ($r=0.615$, $r=0.586$ and $r=0.659$ respectively, $df=11$, $p<0.05$) and in females and urban patients ($r=0.719$ and $r=0.735$ respectively, $df=11$, $p<0.01$) in severe group. The relationship of emotional stability and functional abilities in the severe group of stroke survivors is significant in total group, male and rural patients ($r=0.618$, $r=0.659$ and $r=0.674$ respectively, $df=11$, $p<0.05$) and in females and urban patients ($r=0.876$ and $r=0.895$ respectively, $df=11$, $p<0.01$).

The results of the study depict that severe group has more emotional instability as compared to mild and moderate. It is observed that females are more prone to emotional instability as compared to males. Similarly, urban patients are prone to emotional instability as compared to rural stroke survivors.

Table 4. Relationship of the physical status with post-stroke depression in mild group

Psychological Status	Physical status				
		Musculo-skeletal Deformities	Physical Disability	Degree of Dependency	Impaired Functional Abilities
Post-stroke Depression	Total group	0.345	0.286	0.528*	0.516*
	Male	0.389	0.442	0.563*	0.486*
	Female	0.498*	0.543*	0.698**	0.579*
	Rural	0.406	0.397	0.514*	0.538*
	Urban	0.396	0.524*	0.612**	0.654**

*stands for significance at 0.05 level of confidence $r > 0.468$ (df=16), **stands for significance at 0.01 level of confidence $r > 0.590$ (df=16)

Table 4 depicts a significant relationship of post-stroke depression and physical status in mild group of stroke survivors. The musculoskeletal deformities in females are significantly correlated with depression ($r=0.498$, $df=16$, $p<0.05$). The physical disability is observed to have a significant relationship with post-stroke depression in mild group of stroke survivors in females and urban patients ($r=0.543$ and $r=0.524$ respectively, $df=16$, $p<0.05$).

The relationship between dependency and post-stroke depression is significant in total group, males and rural patients ($r=0.528$, $r=0.563$ and $r=0.514$ respectively, $df=16$, $p<0.05$) and in females and urban patients ($r=0.698$ and $r=0.612$ respectively, $df=16$, $p<0.01$).

A significant relationship is depicted in post-stroke depression and functional abilities in the mild group of stroke survivors. This relationship is significant in total group, males, females and rural patients ($r=0.516$, $r=0.486$, $r=0.579$ and $r=0.538$ respectively, $df=16$, $p<0.05$) and in urban patients ($r=0.654$, $df=16$, $p<0.01$).

Table 5. Relationship of the physical status with post-stroke depression in moderate group

Psychological Status	Physical status				
		Musculo-skeletal Deformities	Physical Disability	Degree of Dependency	Impaired Functional Abilities
Post-stroke Depression	Total group	0.376	0.295	0.469*	0.483*
	Male	0.321	0.438	0.495*	0.514*
	Female	0.497*	0.529*	0.584**	0.580**
	Rural	0.543*	0.489*	0.473*	0.496*

	Urban	0.265	0.547*	0.613**	0.715**
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*stands for significance at 0.05 level of confidence $r > 0.456$ ($df=17$), **stands for significance at 0.01 level of confidence $r > 0.575$ ($df=17$)

Table 5 depicts the relationship between post-stroke depression and physical status in moderate group of stroke survivors. The musculoskeletal deformities are significantly correlated to post-stroke depression in females and rural patients ($r=0.497$ and $r=0.543$, respectively, $df=17$, $p < 0.05$).

It was found that the relationship between physical disability and post-stroke depression was significant in females, rural and urban patients ($r=0.529$, $r=0.489$ and $r=0.547$ respectively, $df=17$, $p < 0.05$).

Post-stroke depression is significantly related to dependency in moderate group of stroke survivors. The results depict a significant relationship in total group, males and rural patients ($r=0.469$, $r=0.495$ and $r=0.473$ respectively, $df=17$, $p < 0.05$) and in females and urban patients ($r=0.584$ and $r=0.613$ respectively, $df=17$, $p < 0.01$).

A significant relationship is observed in post-stroke depression and functional abilities in total group, males and rural patients ($r=0.483$, $r=0.514$ and $r=0.496$ respectively, $df=17$, $p < 0.05$) and in females and urban patients ($r=0.580$ and $r=0.715$ respectively, $df=17$, $p < 0.01$).

Table 6. Relationship of the physical status with post-stroke depression in severe group

Psychological Status	Physical status				
		Musculo-skeletal Deformities	Physical Disability	Degree of Dependency	Impaired Functional Abilities
Post-stroke Depression	Total group	0.274	0.492*	0.479*	0.474*
	Male	0.356	0.539*	0.513*	0.496*
	Female	0.519*	0.480*	0.674**	0.567*
	Rural	0.538*	0.526*	0.712**	0.694**
	Urban	0.510*	0.597**	0.649**	0.714**

*stands for significance at 0.05 level of confidence $r > 0.468$ ($df=16$), **stands for significance at 0.01 level of confidence $r > 0.590$ ($df=16$)

Table 6 represents the relationship between post-stroke depression and physical status of the severe group of stroke survivors. The musculoskeletal deformities in females, rural and urban population are significantly correlated to post stroke depression ($r=0.519$, $r=0.538$ and $r=0.510$ respectively, $df=16$, $p < 0.05$).

The physical disability in total group, male, female and rural patients is significantly correlated to post-stroke depression ($r=0.492$, $r=0.539$, $r=0.480$ and $r=0.526$ respectively, $df=16$, $p<0.05$) and in urban patients ($r=0.597$, $df=16$, $p<0.01$).

The degree of dependency in total group and males are significantly correlated to post-stroke depression ($r=0.479$ and $r=0.513$ respectively, $df=16$, $p<0.05$) and in females, rural and urban patients ($r=0.674$, $r=0.712$ and $r=0.649$ respectively, $df=16$, $p<0.01$).

The impairment in functional abilities is observed to have a significant correlation with post-stroke depression in total group, males and females ($r=0.474$, $r=0.496$ and $r=0.567$ respectively, $df=16$, $p<0.05$) and in rural and urban patients ($r=0.694$ and $r=0.714$ respectively, $df=16$, $p<0.01$).

The results depict that majority of patients in severe group suffer from post stroke depression. This affects the physical status in patients, thus leading to dependency and impairment in functional abilities in these patients.

4. Discussion

Incidence of stroke varies in different countries, geographical regions and ethnic groups (Mira Katan, 2018). The three categories of stroke survivors: mild, moderate and severe represent a wide variation in their physical, socio-economic, psychological and emotional status (Irene L. Katzan et al, 2019). From the results, it is evident that the mild group of stroke survivors had lesser musculoskeletal deformities and physical disability, and thus reduced dependency in patients as compared to moderate and severe group (Pooja Khatri et al, 2012). It is found that emotional stability has a significant relationship with physical status of stroke survivors in mild group. The physical disability and dependency in urban, male and female patients has a significant relationship with emotional stability. Whereas in moderate group, a significant relationship exists between emotional stability and physical disability, dependency and functional abilities in total group, males, females and urban population. In the severe group, a significant relationship was found between emotional stability and overall physical status, more in females as compared to males. The results of a study conducted by Amra Zalihic et al, 2010 also obtained similar results showing the severity of psychological problems in females compared to males.

The study depicted that post-stroke depression had a significant relationship with the physical status in stroke survivors. This relationship was strongly significant in severe group as compared to the moderate group. The severity of stroke is an important factor in the occurrence of post-stroke depression. These findings are in consonance with the results of the study conducted by Yu Shi et al, 2017. In the moderate group, the relationship was significant for physical disability and dependency in total group. Whereas in mild group, a significant relationship was found between post-stroke depression and physical status for dependency, physical disability and functional abilities. The study conducted by Susan Fitzgerald, 2019 found that about 50 percent of patients suffer from depression after stroke. Female stroke patients are more susceptible to depression, causing a poorer quality of life in stroke survivors. Thus, it was found that a strong relationship exists between physical status and post-stroke depression. These results fall in line with the results of the study by Lai Sue-Min et al, 2005. Depression influenced the independence and performance of functional activities

in stroke survivors negatively, leading to physical disability and dependency in stroke survivors. Similar results were obtained by study conducted by David Sinyor et al (1986).

The frequency of poor outcomes was higher in female patients than in male patients. The female gender persisted as a predictor of poor functional outcome after stroke. Female patients have greater difficulty than male patients in recovering from a disabled state after acute stroke (Ji-Sun Kim et al, 2010). Women participants face more difficulty with psychosocial adjustment (Robert Perna et al, 2014).

The study conducted by Sapna E Sridharan (2009) found that the case fatality rate was 24.5% for urban and 37.1% for rural population (overall 27.2%) in Trivandrum. The present study depicted similar results showing that significantly more rural patients compared to urban patients suffer from physical disabilities and deformities, which probably reflects the disparity in the quality of stroke care between the rural and urban areas. On the other hand, stroke survivors in rural areas had a lower prevalence of post-stroke depression than those in urban areas. Although, rural participants were less likely to have contacted health professionals for mental health problems (Jianli Wang, 2004).

5. Conclusion

The conclusions drawn from the study predict that post-stroke depression and emotional instability is common in severe group of patients as compared to mild and moderate. There is a significant relationship between depression and physical status in terms of physical disability, dependency and impairment in functional activities. Similarly, emotional stability is deteriorated in severe group of stroke survivors and depicts a strong relationship with physical status in terms of disability and dependency. This relationship was stronger in females and urban patients.

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