

MENTAL HEALTH, PROSPECTIVE-RETROSPECTIVE MEMORY AND COGNITIVE FAILURE OF STROKE SURVIVORS

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Abstract

Stroke is a fatal disease which has massive effect on a person's psycho-social life. This study investigated how stroke survivors and non-stroke persons dissimilar in terms of their mental health, prospective-retrospective memory, and cognitive failure. Thirty (30) stroke survivors were picked by following convenient sampling procedure for the study and another thirty (30) samples were sorted out as healthy control for comparison. Bangla version of General Health Questionnaire (GHQ), Prospective-Retrospective Memory Questionnaire (PRMQ), and Cognitive Failure Questionnaire (CFQ) were administered over participants. Analysis of Variance (Two-way ANOVA) delineated that stroke survivors have more worsen mental health, impaired cognitive failure, and deterred prospective-retrospective memory than healthy control. But sex (male & female) and subject group (stroke survivors & non-stroke persons) have no joint effect on mental health, cognitive failure, and prospective-retrospective memory in this regard. The findings have implications for caregivers, teachers, mental health professionals, researchers, and policy makers.

Keywords: *Mental health, stroke, prospective-retrospective memory, cognitive failure, stroke survivors, and healthy control*

Introduction

Stroke is a medical condition which causes sudden death of brain cells due to poor blood flow or bleeding in the brain. People who have experienced brain stroke tend to get more depressed, anxious, frustration because of different physical and psychological impairments occurred after stroke (Ginta, 2017). In every year there are many people are died due to stroke (WHO, 2012). The scenario of Bangladesh is more drastic than that of other countries. Experts (Islam et al., 2012) reported that the probability of stroke is growing rapidly in Bangladesh. It is the third major cause of death in Bangladesh. In the present study mental health, prospective-retrospective memory, and cognitive failure of stroke survivors and non-stroke persons were studied and compared. Because there is a large body of research concerning mental health and memory of stroke survivors all over the worlds but it is observed that very few studies concentrate on difference between

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stroke survivors and non-stroke persons in terms of their mental health, prospective-retrospective memory, and cognitive failure.

One of the conditions of health is mental health which is common after stroke, cancer, diabetes, or heart disease to (U. S. Department of Health and Human Services, 2015). Prospective Memory (PM) is one kind of memory which inculcate remembering to perform an intended action at some future point in time and implement them successfully (Martin *et al.*, 2003) while retrospective memory (RM) implicates with past and recollecting people, events, situations or words. The other variable named cognitive failure (CF) referred as lapses of awareness which are deliberated to incorporate perceptual, attention, memory, and action-related mental lapses (Broadbent *et al.*, 1982). Finally the persons who experienced stroke in their life they considered stroke survivors in the present study while the persons who didn't experience stroke in their life are considered healthy control or non-stroke persons in the present study.

Potvin *et al.* (2011) examined sex difference in cognitive impairment and its association with anxiety and depression on a sample of 1,942 individuals aged 65 to 96 years. The results indicate that anxiety and depression appear to have separate relationships with cognitive impairment according to sex. Fatoye *et al.* (2007) conducted a comparative study between 109 stroke survivors and 109 non-stroke controls which showed that stroke survivors had cognitive deficits and less quality of life compared to control participants. Different experts (Douiri *et al.*, 2013) claimed that cognitive impairment and memory deficit differ according to gender, socioeconomic status, ethnicity, race etc. Man *et al.* (2014) examined self-report PM failures between older and younger people with stroke. Results highlight the impact of PM failures in patients with stroke. Research by Legg (2017) suggested that strokes reduces the ability to talk, understand words, physical ability and causes neurological problems.

PM and RM, CF, and mental health of stroke survivors are extensively recognized research area. With the changing world, the number of brain stroke patient is increasing. In Bangladesh, brain stroke patients are also increasing rapidly. But no study covers these aspects of stroke survivors under behavioral science in Bangladesh. Not only that how the stroke survivors overcome these problem? What is the nature of their problem after stroke? What are the differences between stroke survivors and non-stroke person? Is there any significance association or distinction between stroke and non-stroke participants considering their mental health, cognitive failure, and prospective-retrospective memory? In the context of Bangladesh, the above mentioned questions remained almost unanswered. Given this gap in knowledge the current efforts are focused on to compare stroke patients and non-stroke persons in terms of their mental health, cognitive failure, and prospective-retrospective memory. It is expected that, the results of the present study will discover some valuable information along with the comparative nature of mental health, cognitive failure and prospective-retrospective memory of stroke survivors and non-stroke person in the perspective of Bangladesh.

After reviewing the literature, the problems of the present study have been taken are Is there any difference between subject group (stroke survivors & non-stroke persons) and sex in terms of their mental health, prospective-retrospective memory and cognitive failure? Are prospective-retrospective memory and cognitive failure associated with mental health of stroke patients? To what extent prospective-retrospective memory and cognitive failure can contribute to the prediction of mental health in stroke survivors.

Based on in-depth literature review and rationale, the following hypotheses were formulated.

There will be a significant difference between stroke survivors and non-stroke persons in terms of their mental health. There will be a significant difference between stroke survivors and non-stroke persons in terms of their prospective-retrospective memory. There will be a significant difference between stroke survivors and non-stroke persons in terms of their cognitive failure. Prospective-retrospective memory and cognitive failure will significantly contribute to the prediction of mental health of stroke patients.

Material and Methods

Participants

A total of 60 participants (stroke survivors-30, non-stroke persons-30) were participated as respondents in the present study. Among them 32 participants (53.3%) were male and 28 participants (46.7%) were female. Participants' average age was 48.33 ($SD = 16.50$). In case of 30 stroke survivors, eighteen (18) participants were selected from Dhaka City while another twelve (12) participants were selected from rural area. The survivors were between 30 to 82 years of age ($M = 57.83$; $SD = 13.26$). Among them 16 participants were male (53.3%) and 14 participants were female (46.7%). The average length of time since experienced stroke is 43.57 months (range from 1 to 146 months). On the other hand, non-stroke participants were selected from different places of Dhaka City. In case of 30 non-stroke participants, 16 participants were male (53.3%) and 14 participants were female (46.7%). Participants' average age was 38.83 ($SD = 13.84$). Data were collected by using convenient sampling technique in-between January to May, 2019.

Measuring Instruments

The following measures were used in the current study:

General Health Questionnaire (GHQ)

In the present study mental health of participants was measured by GHQ. The GHQ consists of 12 Likert-type self-reporting items which were developed by Goldberg and Williams (1988). Among them, six items are positively worded (e. g., Have you been able to concentrate on whatever you are doing?) and the rest six items are negatively

worded (e. g., Have you lost much sleep over worry?). Each item has four response alternatives such as '0' indicated 'Not at all', '1' indicated 'Seldom', '2' indicated 'Usual' and '3' indicated 'More than Usual', while positively worded items were reversely scored. The scores were summed up by adding all the items on the scale ranging from 0 to 12. Higher score indicates worse mental health. In the original scale the internal consistency is .84. Bangla version of the GHQ was adapted by Sarker and Rahman (1989) which has good reliability($r = .69$). The scale was reported to be valid.

Prospective-Retrospective Memory Questionnaire (PRMQ)

Smith *et al.* (2000) developed this Likert-type scale to provide a self-report measure of prospective and retrospective memory in our everyday lives. It consists of sixteen items, eight items asking about prospective memory failures, and the remaining eight concerning retrospective memory failures (e. g., Do you fail to recognize a place you have visited before?). Each item has five response alternatives such as Never (0) to Always (4). The scores were summed up by adding all the items on the scale ranging from 0 to 64. Higher score indicates higher prospective and retrospective memory failure. The reliability of the scale was very good (Cronbach's alpha = .89). The translating reliability of the Bangla version PRMQ is .89 (Uddin, 2017b). The scale was also reported valid (Uddin, 2017b).

Cognitive Failure Questionnaire (CFQ)

Broadbent *et al.* (1982) developed the CFQ scale. This is a questionnaire measure of self-reported failures in perception, memory, and motor function. The CFQ consists of twenty five items (e. g., Do you forget people's name?). Each item has five response alternatives such as Never (0) to Always (4). The scores were summed up by adding all the items on the scale ranging from 0 to 100. Higher score indicates higher cognitive failure. The translating reliability of the Bangla version CFQ is .79 (Uddin, 2017a). The scale was also reported to be valid (Uddin, 2017a).

Procedure

However, steps were taken to ensure the APA ethics guidelines of psychosocial research. Standard data collection procedures were followed in the study. For collecting data from stroke participants, at first, permission was taken from concerned authority, patients and their caregivers. Participants were informed about the purposes and necessity of the present research in the context of Bangladesh both verbally and written. Again they were simply briefed about the questionnaire and how the questions will be filled up. Data were collected with the help of caregiver to get appropriate information from stroke patients. Participants were assured that their information will be used only for research purpose and will keep confidential until their permission. After collecting data, respondents were thanked for their cooperation.

Results and Discussion

Mental Health of Stroke Patients

The mental health score of stroke and non-stroke patients is met the basic assumption of parametric test such as normality ($.20 > .05$; $.20 > .05$ respectively), homogeneity for sex ($.38 > .05$; $.83 > .05$ respectively), interval, and independence. A two way ANOVA for independent sample was conducted to see if the stroke and non-stroke participants were different in term of their mental health. This analysis also examined if male and female participants were different in terms of mental health scores. The results showed that stroke patients had worse mental health conditions than that of non-stroke counterparts ($F_{1, 60} = 48.224, p < .05$). Partial eta squared ($\eta^2 = .46$) revealed moderate effect size which explains 46% variance of worse mental health of stroke survivors. It was also observed that female and male participants were not different on their mental health scores ($F_{1, 60} = .981, p < .326$). No interaction between stroke and gender was found (Figure 1).

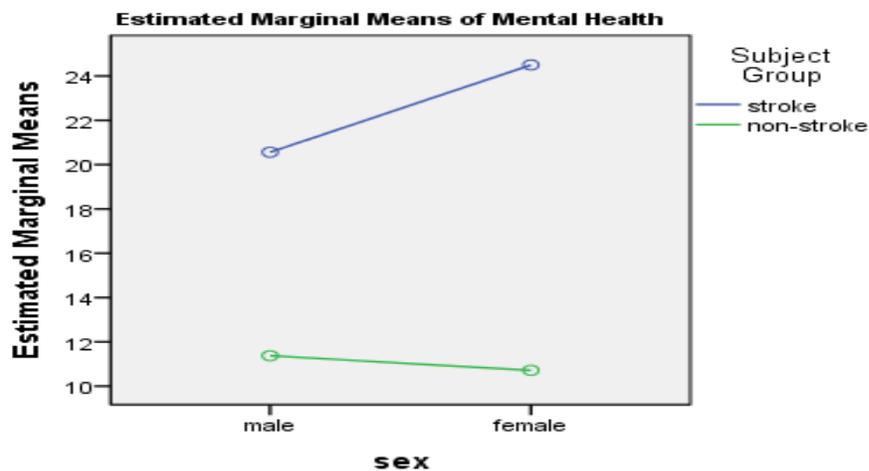


Figure 1. Mental health scores for stroke and non-stroke participants according to their gender identity.

Prospective-retrospective Memory of Stroke Patients

The prospective-retrospective memory score of stroke and non-stroke patients is also met the basic assumption of parametric test such as normality ($.10 > .05$; $.20 > .05$), homogeneity for sex ($.48 > .05$; $.69 > .05$), interval, and independence. A 2x2 way ANOVA for independent sample was conducted to see if the stroke and non-stroke participants were different in term of their prospective-retrospective memory. This analysis also examined if male and female participants were different in terms of prospective-retrospective memory scores. The results showed that stroke patients had deficient prospective-retrospective memory conditions than the non-stroke counterparts

($F_{1, 60} = 146.678, p < .05$). Partial eta squared ($\eta^2 = .72$) revealed high effect size which explains 72% variance of deficient prospective-retrospective memory of stroke survivors. It was also observed that female and male participants were not different on their prospective-retrospective memory scores ($F_{1, 60} = .604, p < .440$). No interaction between stroke and gender was found (Figure 2).

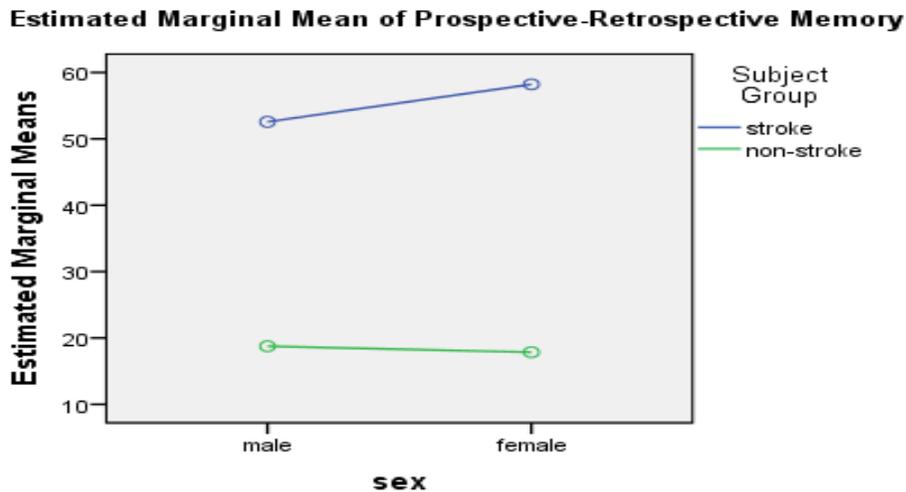


Figure 2. Prospective-retrospective memory scores for stroke and non-stroke participants according to their gender identity

Cognitive Failure of Stroke Patients

Finally the cognitive failure score of stroke and non-stroke patients is met the basic assumption of parametric test such as normality ($.17 > .05; .16 > .05$), homogeneity for sex ($.34 > .05; .10 > .05$), interval, and independence. A two way ANOVA for independent sample was conducted to see if the stroke and non-stroke participants were different in term of their cognitive failure. This analysis also examined if male and female participants were different in terms of cognitive failure scores. The results showed that stroke patients had impaired cognitive failure conditions than their non-stroke equivalent ($F_{1, 60} = 50.525, p < .05$). Partial eta squared ($\eta^2 = .44$) revealed moderate effect size which explains 44% variance of impaired cognitive failure of stroke survivors. It was also observed that female and male participants were not different on their cognitive failure scores ($F_{1, 60} = 3.900, p < .053$). No interaction between stroke and gender was found (Figure 3).

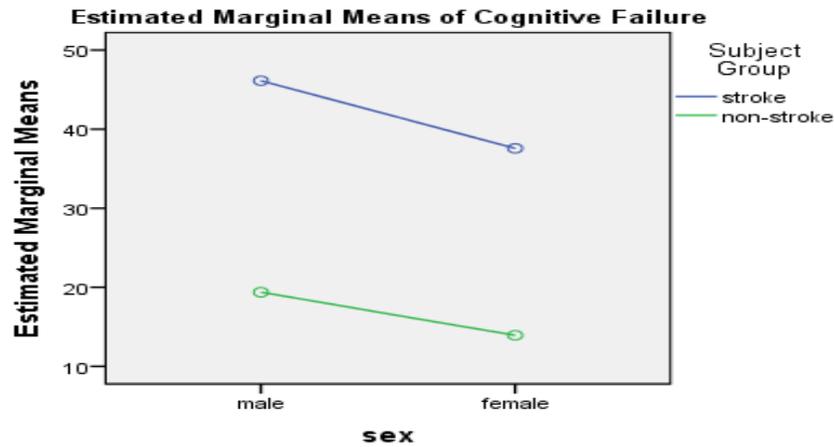


Figure 3. Cognitive failure scores for stroke and non-stroke participants according to their gender identity.

Table 1: Correlation among Mental Health, Prospective-Retrospective Memory, and Cognitive Failure

Name of Variables	1	2	3
Mental health	1		
Prospective-retrospective memory	.704*	1	
Cognitive failure	.493*	.589*	1

* $p < .05$; $N = 30$

Finally, correlation analysis (Table 1) represents that mental health, prospective-retrospective memory and cognitive failure are significantly correlated with each other. But in multiple regression analysis, it was found that prospective-retrospective memory and cognitive failure have no joint effect on mental health of stroke patients. As a result, further regression and mediation analysis were not considered in this study.

The findings of the present study showed that mental health, prospective-retrospective memory, and cognitive failure of stroke survivors are significantly different from non-stroke persons. The effect size analyses also indicate that all the significant results have high and moderate effect on mental health, prospective-retrospective memory, and cognitive failure of stroke survivors compared to non-stroke persons. So the present study clearly supports the first three hypotheses of the present study. Now why mental health, prospective-retrospective memory, and cognitive failure are different between stroke survivors and non-stroke persons in Bangladesh? It might be said that after stroke people losses their interest to those activities which activated their memory or strengthened

memory activities. Even some people who have experienced stroke do not like normal daily life activities.

It is estimated that approximately one third of stroke victims develops memory problems and also develop serious difficulties in other aspects of performing daily activities (Maud, 2006). So, this effect of memory dysfunction can create worse mental health among the stroke survivors. On the other hand, non-stroke person didn't experience the above mentioned problem in their life. These things are, may be, making difference between stroke survivors and non-stroke persons. Another explanation might be, after stroke, patients and their families go through a great amount of economic losses which give pressure to survivors mentally. Also, the patients become dependent on others which disturbs the patient's cognition (such as attention, perception, thinking etc.) and mental wellbeing. Often, family members become irritated and act inappropriately because their lives also became disturbed and hampered in many ways.

Especially, the caregiver sometimes could not handle properly his and patients' chores together and give that message to the patient frequently. Stroke survivors with impairments and their unpaid carers are likely to experience a range of social challenges, including low income and social isolation. These economic crisis and unexpected family relationship affect the survivors' thinking, emotion, perception, health etc. As results, patients lost their interest to engage in memory sharpening activities. All these things may lead to worsen mental health of survivors. On the other hand, non-stroke persons are generally free from the above mentioned difficulties in their life. As results, a significant difference exists between stroke survivors and non-stroke person. In one study Kim et al. (2009) reported that the prospective-retrospective memory is negatively correlated with the symptoms of depression and anxiety. Patients also performed less well than control groups on laboratory measures of prospective-retrospective memory.

Again, due to economic insolvency, most of the patients could not avail proper treatment. Their physical health become weakens day by day. They can't maintain their social relationship and communication with others. Survivors' role in society, level of satisfaction, ability to thinking also deteriorates day by day. All these things worsen their mental health and affect their cognition gradually and make difference from non-stroke persons. The present findings are more or less consistent with previous findings which suggest that stroke survivors and non-stroke persons are significantly different in terms of their mental health and memory functioning. For example, Potvin *et al.* (2011) reported that anxiety and depression appear to have separate relationships with cognitive impairment according to sex.

The findings of Fatoye *et al.* (2007) outlined that stroke survivors experienced more cognitive deficiency than control patients. Control participants also performed significantly better on quality of life than stroke survivors. Not only that, cognitive impairment with stroke survivors suffer from severe hypertension (Ikram *et al.*, 2008)

and chronic stress (Martelli *et al.*, 1999). Kim *et al.* (2009) described that there are a significant difference between stroke survivors and non-stroke controls in terms of their prospective-retrospective memory, cognitive function, perceptual speed, and some aspects of sustained attention. Einstein and McDaniel (1990) found that both prospective-retrospective memories influenced by age. Experts reported that psychological wellbeing's are severely hampered and affected after stroke. Stroke patients customarily meet sleep disruption, low motivation and self-esteem and finally concerns about their future owing to limitations and ailment (Hart *et al.*, 2003).

In a post stroke assessment study conducted by Al-Qazzaz *et al.* (2014) reported that memory dysfunction and cognitive impairment are two general symptoms after stroke which significantly affect the quality of life of stroke survivors. Finally, as per principle of Cognitive Dissonance Theory (CDT: Festinger, 1957, 1964), cognitive failure creates conflicting attitudes, behaviour, and belief among the stroke person which ultimately leads to mental discomfort and unrest. The present finding is consistent with this notion of CDT. Because in the present study correlational analysis reported that the more the cognitive impairment found the more the mental health deterred of stroke patients. Again, the notion of Multi-Process Model proposed by Einstein and McDaniel (2005) reported that impaired prospective-retrospective memory hampers every daily activities which leads to mental health worsen (Ryu *et al.*, 2016). In the present study it was also seen that the more of the impaired prospective-retrospective memory of stroke patients increase more of their diminished mental health increase.

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