

**Original article:**

## **Qualitative assessment of sleep disorder in post stroke patients: across sectional study**

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### **ABSTRACT:**

**Introduction:** Normal brain structure gets affected after stroke which may affect normal sleep architecture. Various studies shows that Sleep disturbances occurs or worsen after a stroke, they occurs in various forms such as insomnia, parasomnia, Hypersomnia, Sleep apnea, daytime sleepiness and periodic limb movement etc. has been known to disturb the life post stroke patients who is undergoing rehabilitation. Post stroke Sleep disorders also impact Neuropsychiatric complications, stroke rehabilitation, quality of life and if left untreated can be contribute to stroke recurrence. There is huge dearth of literature regarding post stroke sleep disorders in Indian population with a handful of studies. This study was an attempt to understand correlation between “post stroke survivor patients and their sleep quality” which in turn affect prognosis of stroke itself.

**Methodology:** A cross sectional study conducted from June 2019 to August 2019 after ethic committee approval. A total of 50 patients of cerebrovascular stroke were included one month following stroke after they satisfy the eligibility criteria at neuropsychiatry clinic..They were evaluated for sleep quality in neuropsychiatric clinic by a self-administered questionnaire Pittsburgh Sleep Quality Index (PSQI) which assesses sleep quality and other dimensions of sleep.

**Results and conclusion:** This study was an attempt to understand correlation between “post stroke survivor patients and their sleep quality” which in turn affect prognosis of stroke itself. To our knowledge, there has few to none Indian study/studies dedicated/ focused light on post stroke sleep disorders. In our study, we found that post stroke survivors have poor quality of sleep and impaired other dimensions of sleep which covered by PSQI but more comparative studies are needed to confirm this relationship in future with considering comorbid illness/illnesses, their treatment modalities, post stroke factors which also affects sleep beside site, size, side of stroke, ischemic vs hemorrhagic stroke.

**Key Words:** Post Stroke Survivor, Sleep Quality, Pittsburgh Sleep Quality Index

### **INTRODUCTION**

World Health Organization (WHO) defined stroke as a “rapidly developing clinical signs of local (at times focal) disturbance of cerebral function lasting more than 24 hours or leading to death, with no apparent cause other than that of vascular origin.<sup>1</sup>Stroke can also be defined as a complex neurological condition that occurs when there is an interruption of blood supply to a part of the brain causing brain cells to die.<sup>2</sup>Stroke is a leading cause of disability in adults and accounts for a large percentage of disease, worldwide.<sup>3</sup> Sleep plays very important role in health of an individual. Evidence have shown the linkage of poor sleep with cardiovascular disease, stroke, diabetes , metabolic dysfunctions.<sup>1</sup>Stroke affects brain structure which impairs sleep architecture.<sup>4</sup>Normal brain structure gets affected after stroke which may affect sleep.<sup>5</sup>

Sleep disturbance as a neuropsychological disorder occurs or worsens after stroke.<sup>6</sup>Recent studies have shown that post stroke sleep disturbances occurs in various forms such as insomnia, parasomnia , hypersomnia , sleep apnea and daytime sleepiness etc.. And has been known to disturb the life of rehabilitation of stroke patients and prognosis of stroke.<sup>4,5,6,7,8,9</sup> Post stroke sleep disorders also impact neuropsychiatric complications ,quality of life and if left untreated can contribute to stroke reoccurrence.<sup>10,11,12</sup>

This study was an attempt to understand correlation between “post stroke survivor patients and their sleep quality” which in turn affect prognosis of stroke itself.

#### **MATERIALS & METHODS:**

This is descriptive cross sectional study conducted from June 2019 to August 2019 after ethic committee approval. Purpose of this study was explained to the participating patients. All privacy and confidentiality safeguard were observed. Patient’s written informed consent was taken.

A total of 50 patients of cerebrovascular stroke were included one month following stroke after they satisfy the eligibility criteria at neuropsychiatry clinic. They were evaluated for sleep quality in neuropsychiatric clinic by a self-administered questionnaire Pittsburgh Sleep Quality Index (PSQI) which assesses sleep quality and other dimensions of sleep.

#### **Inclusion criteria:**

Patients of age above 18 years irrespective of gender and other medical condition like Hypertension or Diabetes Mellitus etc.

Who are diagnosed at the end of neuroimaging to have cerebrovascular stroke (Ischemic or haemorrhagic)

Stroke patients willing for participation in study after giving written informed consent.

#### **Exclusion criteria:**

Delirium

Patient who are not able to understand or follow instructions

Patient who were having history of psychiatric illness prior to stroke

Patient who were on sleep medication prior to stroke.

Patients not willing to participate in study

#### **Pittsburgh Sleep Quality Index (PSQI)**

This questionnaire assess the quality of sleep over a month interval. This has 19 questions generate 7 “component scores,” the sum of which gives a global score that facilitates comparison between subjects. All questions are answered on Likert-type scale (0-3).The sum of all answers are transformed into a global score (0-21) where higher score indicates worse sleep quality.

The global score is essential part of PSQI which differentiate good from poor sleepers.A global (total) score greater than 5 points is indicative of poor sleep quality. The PSQI has shown a good internal consistency and test retest reliability.<sup>13,14,15</sup>

In our study, instead of self-reporting we used an interview format because it offers the advantage of minimizing missing and inappropriate responses.<sup>16,17,18</sup>

Even though the interview administered PSQI does not provide a specific diagnosis, its discriminative ability makes it an attractive research instrument as well as clinical screening tool to identify who have poor sleep quality and need further evaluation.<sup>19</sup>

The PSQI may be a good screening tool, but is not a substitute for sleep disorder diagnoses established through a clinical interview performed by an experienced sleep clinician especially using DSM 5, ICSD 3 and users of the PSQI in populations with a history of psychiatric illness should exercise caution in interpretation.<sup>24</sup>

**RESULTS AND DISCUSSION:**

Our study included patients of age group between 20 to 60 years, out of which maximum number of patients (43 patients) are of age more than 40 years (Table 1), which is comparable to study done by B. karaca et al who also had maximum number of patients between age group 46 to 76 years.<sup>22</sup>

Age group (years)	Frequency	Percentage
21-30	4	8.00%
31-40	3	6.00%
41-50	22	44.00%
51-60	21	42.00%
Total	50	100.00%

**Table 1-** Age Group wise distribution of patients

Out of 50 patients 35 are male and 15 are female in present study (Table 2).It has no significant difference with regard to sleep quality. A study done by B.karaca et al who in their study found similar results namely 39.1 % people with no difference in sleep quality with regard to gender.<sup>22</sup>

Sex	Frequency	Percentage
Female	15	30.00%
Male	35	70.00%
Total	50	100.00%

**Table 2-** Gender wise distribution of patients

In the present study 45 out of 50 patients (90%) having anterior circulation (ACA+MCA) involvement in stroke as compared to 5 patients (10%) who have posterior circulation involvement(Table-3).A study done by Pasic et al have shown that more than 70% of people have anterior circulation involvement in stroke which is comparable to our study.<sup>20</sup>

**Table 3-**Kruskal-wallis test is applied for variable artery involved to find significance of difference PSQI median scores of three groups

RANKS			
Total score	Artery Involved	N	Mean rank
PSQI	ACA	8	27.25
	MCA	37	24.46
	PCA	5	30.40
	Total	50	

Out of total 50 patients who participated in study 36 (72%) were having PSQI score more than 5 (Table-4). Dr. Jinil kim et al in his study shown that the average PSQI score in the 80 patients was 8.1±4.1, with 57 patients(71.2%) having a PSQI score more than 5 which is comparable to our study.<sup>21</sup>Currently, No Indian study is available to compare sleep quality in post stroke survivors and even as per our knowledge no Indian studies provide information on prevalence of sleep disorder in general population of India so we can compare with them but a study done by Samhita Panda et al on “ sleep related disorders among a healthy population in south India” shows population 7% have PSQI score more than 5. Indicating poor quality of sleep.<sup>23</sup>

PSQI Score	Frequency	Percentage
<=5	14	28.00%
>=5	36	72.00%
Total	50	100.00%

**Table 4:** PSQI SCORE

No significant difference was found in quality of sleep with respect to gender, education, occupation, past medical history and substance use disorder in our study (Table -5) which is comparable to other studies like that of by Brucu karaca et al which also has found no correlation between PSQI score and demographic variables of patients.<sup>19,20,21,22</sup>

**Table 5-PSQI values > 5 regarding Demographic and clinical features of the patients.**

So Mann Whitney U test is used to test significance of difference between median scores of PSQI between two groups

Variables	PSQI		P value
	Median	Range	
<b>Gender</b>			
Female	12	(7-17)	0.653
Male	11	(6-18)	
<b>Education</b>			
High school & above	11	(6-17)	0.628
Middle school & below	12	(6-18)	
<b>Occupation</b>			
Employed	11	(6-18)	0.421
Unemployed	12	(9-17)	
<b>Past Medical H/O</b>			
Present	10	(6-18)	0.272
Absent	12	(7-17)	
<b>Side Of Lesion</b>			
Right	12.5	(7-18)	0.051
Left	10	(6-16)	
<b>Co Morbid Illness</b>			
Present	10	(6-18)	0.090
Absent	13	(7-17)	
<b>Substance H/O</b>			
Present	12.5	(7-18)	0.159
Absent	10.5	(6-17)	

In our study number of patients with poor sleep quality i.e. PSQI score >5 in right side of lesion (n=28) are more than left side of lesion (n=22) because of small sample size and more patient were having right side lesion (28) as compared to left (22) although this is not statistically significant (Table-7). This can be compared to study by Pasic et al which has found no association between quality of sleep and side of lesion.<sup>20</sup>

**Table 7-PSQI SCORE AND SIDE OF LESION**

PSQI Score and side of lesion			
Side	Right	Left	Total
PSQI Score more than 5	20	16	36
PSQI Score less than 5	8	6	14
Total	28	22	50

Patients with global PSQI score more than 5 were having more sleep latency, more sleep duration, their sleep were inefficient and they were dozing more in day time as per sub scores/component scores of PSQI.

Patients with right side lesion were having more sleep latency, their subjective sleep quality was poor, having more sleep disturbances in night, inefficient habitual sleep and more daytime dysfunction than left side lesion(Table-8).

**Table 8-PSQI with its component scores and side of lesion**

PQSI Sub-Scores	Right Side Lesion	Left Side Lesion
Subjective Quality Of Sleep	15	9
Sleep Latency Score	25	20
Sleep Duration Score	18	15
Habitual Sleep Efficiency	17	9
Sleep Disturbances Score	25	20
Sleeping Medication Use Score	15	12
Day Time Dysfunction	21	17

**Limitation of study:**

In the present study descriptive cross sectional study, small sample size, only Subjective sleep quality and other related dimensions of sleep in post stroke survivor studied, no comparison between pre stroke and post stroke sleep disorders as sleep disorder is also one of risk factor viz. Sleep apnea for stroke, those who have poor quality of sleep and impaired other dimension need further clinical evaluation by expert and objective evaluation like PSG, Actigraphy except subjective sleep quality which can draw from PSQI.

**Conclusion:**

To our knowledge, there are very few Indian studies dedicated/focused light on post stroke sleep disorders. In our descriptive cross sectional survey study, we found that post stroke survivors have poor quality of sleep (Right > Left side lesion) and impaired other dimensions of sleep which covered by PSQI although this is not statistically significant which may be small sample size. Hence, more comparative studies are needed to confirm this relationship in future with considering comorbid illness/illnesses, their treatment modalities, post stroke factors which also affects sleep beside site, size, side of stroke, ischemic vs hemorrhagic stroke.

**Acknowledgment:**

We express our deep sense of gratitude to Dr. Kaustubh Chaudhari and Dr. Anup Bharti for timely Selfless and expert opinion.

Conflict of interest: None

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