

Frequency and Intensity of Shoulder Pain in Patients after Stroke

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Author's Contribution

^{1,2} Conception and design, Collection and assembly of data, ⁴Analysis and interpretation of the data, ³Critical revision of the article for important intellectual content, ⁵⁻⁶Statistical expertise, ⁷Final approval and guarantor of the article

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A B S T R A C T

Background: Stroke can occur due to blockage or blood vessels' hemorrhage which supply blood to brain. Post-stroke shoulder pain (PSSP) is very common after stroke. It is present even during resting condition and affects active and passive movements of shoulder girdle. This pain limits the ROM of shoulder joint and hinders recovery.

Objective: The objective of this research was to determine the frequency and intensity of shoulder pain in post-stroke patients. This study also focused on activity limitations and sleep impairment in these patients.

Methodology: 134 patients (n=134) were included in this cross sectional research. Outcomes were measured by using VAS, SPADI (Shoulder Pain and Disability Index) and likert type sleep quality scale. Results were analyzed in the form of percentages. A p-value less than 0.05 was taken significant.

Results: Total frequency was found to be 60.9%. In the sample of 134 participants, 44.7% had moderate and 28.5% had severe intensity of pain measured on VAS. SPADI score for pain and disability showed mean value of 26.96±7.082 and 45.45±15.485 respectively. 47(35.07%) patients showed disturbed sleep pattern.

Conclusion: More than half of stroke patients had pain in their shoulder joint, most of which had moderate to severe intensity of pain. This pain impairs daily life activities and also results in sleep impairment in approximately half of patients with post stroke shoulder pain

Keywords: Shoulder Pain and Disability Index, VAS, Post Stroke Shoulder Pain, Hemiplegic Shoulder Pain, Pain Intensity, Stroke

Introduction

Stroke is an acute neurological dysfunction. It occurs due to blockage or blood vessels' hemorrhage which supply blood to different parts of the brain.¹ The clinical signs of focal disturbance are seen in stroke patients without any evident cause. There are three types of stroke: ischemic stroke, hemorrhagic stroke, and Transient ischemic attack. The symptoms develop suddenly and affect the functions performed by the cerebral area of the brain. The symptoms last for 24 hours or longer and sometimes it leads to death. (2) Stroke causes almost 250 deaths per 100,000 in Pakistan. An estimated 7, 00,000 Pakistanis older than 20 years of age have suffered from stroke.³ Stroke may leave permanent disabilities

including paresis, somatosensory problems, difficulty in speech and language, cognitive problems, personality changes, and fatigue.⁴

Post-stroke shoulder pain (PSSP) is very common after stroke. It is a common complication in stroke patients. It can cause significant disability and can limit the patients' ability to reach their maximum functional potential and hinders rehabilitation.⁵ Shoulder pain can negatively affect rehabilitation outcomes as good shoulder function is required for successful transfer, maintaining balance, performing ADLs and effective hand functions. Neurological recovery is delayed after stroke

and it can injure the neurovascular tissues around the shoulder joints.⁶

It is present even during resting conditions and affects active and passive movements of the shoulder girdle. It puts a bad impact on health, satisfaction, quality of life and results in activity limitation, and interferes with functional recovery after stroke.⁷ PSSP also causes an economical burden to the patients because it increases the time to stay in the hospital. 57% of stroke survivors develop shoulder pain along with shoulder subluxation and motor weakness.⁸ Prevalence was calculated in a study in patients with pain in the shoulder joint after stroke with a sample size of 443 patients. The overall prevalence of pain was calculated to be 29.56%, 14.06% in the acute and 31.90 % in the chronic post-stroke stage. the pain was more common in the sub-acute stage of stroke than in the chronic stage.⁹ Zeliha et al conducted a research in 2014 with a sample size of 55 patients to find out the factors related to shoulder pain and effects of rehabilitation program on Hemiplegic patients. It was found that 21 patients (38%) did not have shoulder pain and 34 patients (62%) had decreased shoulder pain. Duration of disease and low motor function capacities were found to have an impact on pain in shoulder joint.¹⁰ There is increased incidence of shoulder pain in patients after paralysis. It results in the limitation of movements at shoulder joint and restricts patient's daily life activities. The purpose of this study was to find the frequency of shoulder pain in patients after stroke. This study also focused on the intensity of shoulder pain and the activity limitations due to pain as well as the sleep impairment in stroke patients which hinders their recovery.

Methodology

Both male and female patients between ages of 30-70 years were included. This cross sectional study was conducted in Lahore General Hospital and Services Hospital Lahore by using convenient sampling technique, The duration of the study was 6 months from July 2019-dec 2019. The sample size was calculated by using the following formula.

$$n = \frac{Z_{1-\frac{\alpha}{2}}^2 P(1-P)}{d^2}$$

Where: Z = Standard normal distribution level corresponding to desired confidence level (Z=1.96 for 95% CI), d is desired precision=0.05 and CI=0.95. A total sample of 220 patients was calculated of which 134 patients reported positive for shoulder pain which were analyzed further for measuring intensity of shoulder pain, disability caused by pain and sleep

disturbances. Remaining 86 patients which reported negative for shoulder pain were excluded from the research.¹¹

Consent in the written form was taken from patients prior to participate in this study. The study Was Approved By The Institutional Review Board(Irb) of The School of Allied Health Sciences children hospital and institute of child health lahore with the IRB no. of 768/SAHS. Outcomes Were Measured By Using Visual Analogue Pain Scale (Vas) and Spadi (Shoulder Pain and Disability Index). Sleep disturbance level was measured using a likert type sleep quality scale. SPADI is a reliable and valid tool for assessing functional disability in shoulder pain.^{12,13} It is a self-administered questionnaire and consisted of two dimensions, one measures pain and the other dimension measures level of disability. It is a valid measure for community based patients who complains of pain in shoulder joint due to any musculoskeletal pathology. Sleep quality scale was used in respondents to indicate how frequently they suffer from sleep disturbance. It indicated the quality of sleep the patients had in last one month due to their shoulder pain.⁹ The inclusion criteria were the stroke patients who had developed stroke due to the involvement of anterior, middle or posterior cerebral artery (either haemorrhagic or ischemic) and had developed stroke from past 1 year.¹⁰ The patients who had any problem in cognition, Rheumatic disease or History of pain in shoulder joint before suffering from stroke were omitted from the research.¹⁴

The data was entered and analyzed using IBM-SPSS Version 23. The results of demographic and baseline variables were analyzed in the form of percentages. Mean value was calculated to interpret the results of intensity of pain, disability caused due to pain and sleep impairment. A p-value of <0.05 was considered significant. .

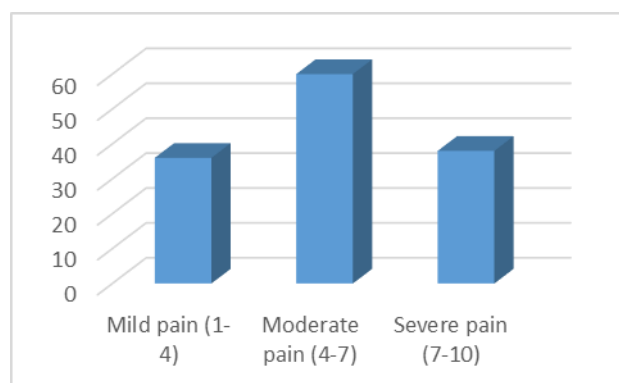
Results

Total frequency in the sample size of 134 patients was found to be 60.9% of which 58(43.2%) were males and 76(56.8%) were females. Results showed that 46(34.32 %) patients included in the research were of 41-50 years of age, 41(30.59%) patients were of 51-60 years of age, 27(20.11%) patients were of 30-40 years and 20(14.93%) patients were of 61-70 years of age. Out of 134 respondents 78 (58.2%) patients suffered from ischemic stroke while 56(41.8%) patients suffered from hemorrhagic stroke. The calculated results for the frequency distribution of the involvement of vascular territory showed that out of 134, 79(58.9%) patients had middle cerebral artery involvement, 25(18.7%) patients had anterior cerebral artery involvement and 30 (22.4%) patients had involvement of posterior cerebral artery. Frequency distribution of the side of

involvement showed that 69(51.5%) patients had right sided shoulder pain and 65(48.51%) had left sided shoulder pain.

| Table I: Demographic and Baseline variables | | |
|---|------------------------------------|-------------|
| Variables | | Percentage |
| Age of the patients In years | 30-40 years | 27(20.11%) |
| | 41-50 years | 46 (34.32%) |
| | 51-60 years | 41(30.59%) |
| | 61-79 years | 20 (14.93%) |
| Type of stroke | Hemorrhagic | 56 (41.8%) |
| | Ischemic | 78(58.2%) |
| Side of involvement | Right side | 69(51.5%) |
| | Left side | 65(48.51%) |
| Vascular territory involvement | Anterior cerebellar artery | 25(18.70%) |
| | Posterior Middle cerebellar artery | 79(58.90%) |
| | | 30(22.40%) |

Graph 1 is showing the intensity of shoulder pain measured by using VAS. The results showed that 36(26.86%) patients complained of mild pain, 60(44.7%) patients complained of moderate level of pain while 38(28.5%) patients complained of severe pain in shoulder joint.



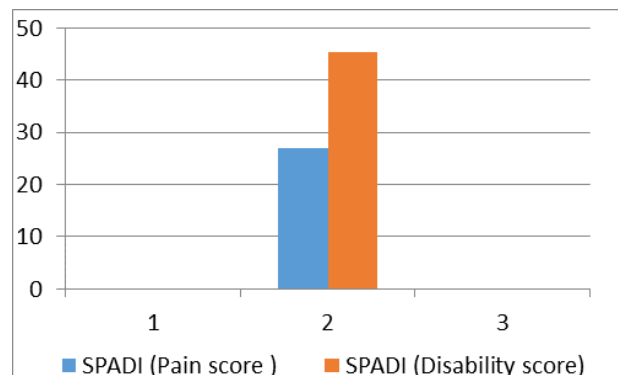
Graph 1: Pain measured on VAS

Table II is showing the results of SPADI score and level of sleep disturbance. When sleep disturbance level was measured in post stroke patients with shoulder pain it was calculated that 52(38.80%) patients had sleep disturbance at 1-2 times a week as shown in table II.

Graph 2 is showing the total pain and disability score

| Table II: Sleep disturbance and SPADI score | | | | |
|---|-----|-------------|----------------|----------------|
| | N | Mean value | Std. deviation | Sig. (P value) |
| Rarely (1-3 times a month) | 134 | 32 (23.90%) | 9.985 | |
| Sometimes(1-2 times a week) | | 52(38.80%) | 7.056 | |
| Often (3-5 times a week) | | 30(22.38%) | 9.941 | |
| Almost always (6-7 times a. week) | | 20(14.92%) | 6.317 | |
| SPADI (Pain score) | 134 | 26.96 | 7.082 | |
| SPADI (Disability score) | 134 | 45.45 | 15.485 | .000 |

calculated by SPADI. According to the total pain score the mean value was calculated as 26.96 ± 7.082 . The mean score of the total disability index was calculated to be 45.45 ± 15.485 which showed that pain restricted the daily activities in 45.45% patients. The p value was calculated to be 0.000 which showed the results were highly significant.



Graph 2: Pain and disability score calculated by SPADI

Discussion

This study reported frequency and intensity of shoulder pain in the stroke survivors. The study focused on the patients' perspective. This study reported that overall frequency of shoulder pain in post stroke patients is calculated to be 60.9%.¹⁵ The frequency of pain after stroke has varied considerably in previous studies, presumably due to the difference in inclusion criteria and methods of follow up. According to the research conducted by in grid and his colleagues, the frequency of shoulder pain ranges from 38-60%. While in some studies, the frequency has varied between 19% and 74%. According to Jonsson the incidence varies between 19% and 53% depending on patient group and study design.¹⁶ This study reported that 76(56.8%) females showed presence of shoulder pain after stroke which is more as compared to males. This association was also described in a research done by Jonsson who found that there is association between higher VAS scores and female sex. He reported that there might be sex differences in the presentation of symptoms in stroke patients. More impaired functional status in females may contribute in their greater intensity of pain.¹⁷ 46(34.32%) patients who suffered from shoulder pain were of age group of

41- 50 years and 41(30.59%) patients were of 51-60 years of age. This study correlates with the research of Gamble who conducted a research with a sample of 103 patients and concluded that most patients who suffered from shoulder pain belong to the age group of 35-45 years.¹⁸ Patients of ischemic stroke were found to have greater prevalence of pain in shoulder joint of about 41.8% than the patients of hemorrhagic stroke 78(58.2%)¹⁹ In another study when shoulder pain was compared with stroke's type, the pain in patients of ischemic stroke was more frequent (62.5%) than hemorrhagic stroke (40%). But these results were not statistically significant ($p=0.061$).²⁰ This study reported that 69(51.5%) patients had right sided shoulder pain and 65(48.51%) patients had left sided shoulder pain. This study has not compared that which sided shoulder pain is more frequent with hemorrhagic or ischemic type of stroke and it also does not focus the effect of primary etiology of stroke on shoulder pain which opens a gateway of research for new researchers. Our results showed that approximately 48% patients had moderate pain and 38% patients had severe level of pain according to visual analogue pain scale. Shafshaket al conducted a research with a sample of 46 patients and found out 58% ($n=17$).²¹ Another research was conducted in Sweden which included sample of 416 patients and results showed that after 16 months of follow up 52% patients had pain in shoulder joint and same results were observed in a study which showed 63%. K Walsh and colleagues found conflicting results in their research. They took a sample of 311 patients and the prevalence rate in their study was 54%. The large proportions of patients with frequent shoulder pain indicate a need for a more active pain treatment.²² When intensity of shoulder pain was considered according to SPADI a mean of 26.96 was calculated with a p value of 0.000. The outcomes of this research were related to the study of Joy and his colleagues who concluded that 69% of stroke patients develop shoulder pain of moderate to severe intensity with a mean value of 38.64.²³ The quality of life was compromised in stroke patients and there were restrictions in performing daily life activities due to shoulder pain after stroke. The disability score with a mean value of 45.45 ± 15.485 was calculated but it is not described either these factors directly affect the pain severity or degree of impairment. This study correlates with the research of McLean and his colleagues who worked on the Medical complications experienced by a cohort of stroke. They found that there is a great deal of restrictions of activities in stroke patients due to pain which restricts their activities in case of upper limb involvement and ambulation in case of lower limb involvement.²⁴ Almost 39% patients had difficulty in sleeping 1-2 times a week and 22.38% patients had difficulty in sleeping 3-5 times a week because of pain after stroke. Lack of sleep may contribute to the post-stroke fatigue

which is one of the most common impairments after stroke. This study showed that there is high frequency of shoulder pain in patients after stroke and it also affects the activities performed in daily life. An undisturbed sleep is very important for these patients but it is interrupted by the intensity of pain. In the routine follow up rehabilitation protocols, pain after stroke is an under recognized and undertreated entity.

Conclusion

More than half of stroke patients had pain in their shoulder joint, most of which had moderate to severe intensity of pain. This pain impairs daily life activities and also results in sleep impairment in approximately half of patients with post stroke shoulder pain.

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