

BSM conference 2022

*Original Article Presentation*

Presented by

**Dr. Kazi Md Rubayet Anwar**

*MBBS(SSMC), FCPS(Medicine), MRCP, MD(Cardiology)  
National Institute of Cardiovascular Diseases(NICVD), Dhaka*

Pressure sore among stroke patients during hospital stay: a cross-sectional study in a tertiary care hospital

Anwar KMR1; Noor SM2; Ahmad MM3; Sultana S4; Aman S3.

*Accepted in Mymensing Medical Journal*

*ID: 2788*

# Background

- Stroke is rapidly developed clinical signs of focal (or global) disturbance of cerebral function, lasting more than 24 hours or leading to death, with no apparent cause other than of vascular origin.
- Second most common cause of death (12% of all deaths) worldwide, after ischemic heart disease, and the third most common cause of disability (4.5% of DALYs from all-cause).
- Complications including pneumonia, urinary tract infection, pressure ulcer or pressure sore, falls, venous thromboembolism, etc.

The prevalence of pressure sore among stroke patients during hospitalization ranged from 0.8 to 2.8% in different studies. However, the prevalence varied and slightly higher among the patients with hemorrhagic stroke (1.5%) compared to ischemic stroke (0.8%)

Several risk factors like older age, severe neurological disability, poor nutritional status, low hemoglobin, history of diabetes mellitus and peripheral vascular disease, etc.

In Bangladesh most of the patients are deprived of quality post-stroke care. the prevalence and risk factors of pressure sore remained quite unexplored in Bangladesh.

Prospective cross-sectional study conducted in the Department of Neurology of Dhaka Medical College Hospital (DMCH) from July to December 2020.

All the patients admitted with the diagnosis of acute ischemic or hemorrhagic stroke were the study participants.

Previous study reported that around 1.2% of stroke patients suffer from a pressure sore during hospitalization. Using this information for 5% precision of error our calculated sample size was 37 patients.

However, a total of 50 stroke patients were included in the present study.

### **Inclusion criteria**

- Male and female patients aged >18 years admitted to the Neurology Department of DMCH with the diagnosis of acute ischemic or hemorrhagic stroke without any previous history of pressure sore.

### **Exclusion criteria**

- Patients admitted without acute stroke, subarachnoid Hg, with a previous history of pressure sore were excluded.

Grade was defined as National Pressure Ulcer Advisory Panel, the uniform classification system. According to this grading system

**Grade I** non-blanchable erythema of intact skin-the heralding lesion of pressure ulcers;

**Grade II** was defined as partial thickness skin loss involving the epidermis or dermis;

**Grade III** was defined as full-thickness skin loss involving subcutaneous tissue that may extend to, but not through, the underlying fascia; and

**Grade IV** was defined as deeper, full-thickness lesions extending into muscle or bone.



Anthropometric measurements including weight, height, mid-upper arm circumference, etc.

Nutritional status of the patients was detected using the Malnutrition Universal Screening Tool (MUST).

After clinical examination, a blood sample was collected from each patient and analyzed in an auto-analyzer (Sysmex-2100XN, Sysmex, USA) for hemoglobin level, the total count of WBC, and differential count of WBC, Renal function.

### **Statistical analyses:**

All statistical analyses were carried out using the SPSS version 26.0. Descriptive statistics like the frequency with percentage and mean with standard deviation (SD) was used to represent patients' characteristics. The Chi-square test was used to determine the difference between patients' groups. Statistical significance was set at p-value <0.05.

# Results

- The mean (SD) age of the patients included in the present study was 59.16 (11.53) years and half of them were male. Half of the patients were suffering from ischemic stroke and another 50% from hemorrhagic stroke. Glasgow Coma Scale (GCS) score was <5 in 20%, 5-10 in 32% and >10 in 48% of the patients. Around 56% of the patients were normotensive on admission.
- Diabetes mellitus was the most prevalent comorbidity among the patients (42%) followed by hypertension (22%) and renal failure (14%).

- A total of 20% of patients with ischemic stroke developed pressure sore while and 30% of the hemorrhagic stroke patients developed pressure sore,
- Prevalence of pressure sore was higher among elderly patients, patients with poor nutritional status and low hemoglobin level as well as among renal failure patients.
- The most common site of the pressure sore among stroke patients was the sacral area (50%) followed by buttock (25%), heel (17%), and greater trochanter (8%).

- Almost 42% of the sores were grade I, 50% were grade II and III, and 8% were grade IV. The temperature of the pressure sore was raised in 75% of the patients.
- Evidence of vasculopathy was present in 25% of patients. The sores of 42% of patients healed spontaneously, 25% needed conservative management, and 25% needed skin graft

A total of 12 out of 50 stroke patients were suffering from a pressure sore during the hospital stay (prevalence of pressure sore was 24%).

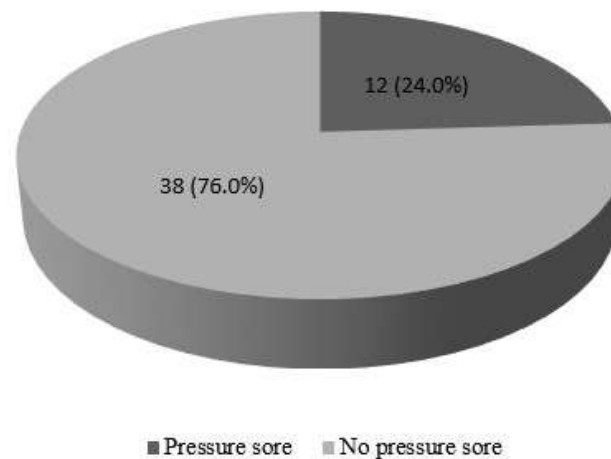


Figure : Prevalence of pressure sore among the stroke patients

# Socio-demographic and clinical characteristics of the patients (n = 50)

Characteristics	Total, n (%)	Pressure sore, n (%)	No pressure sore, n (%)	p-value
<b>Age (years)</b>				
≤ 60	29 (58.0)	5 (17.2)	24 (82.8)	0.164 <sup>a</sup>
>60	21 (42.0)	7 (33.3)	14 (66.7)	<b>0.0325</b>
<b>Gender</b>				
Male	25 (50.0)	6 (24.0)	19 (76.0)	0.624 <sup>a</sup>
Female	25 (50.0)	6 (24.0)	19 (76.0)	
<b>Nutritional status</b>				
Normal (MUST score <2)	31 (62.0)	5 (16.1)	26 (83.9)	0.094 <sup>a</sup>
Below Normal (MUST score ≥2)	19 (38.0)	7 (36.8)	12 (63.2)	<b>0.0423</b>

Type of stroke	Total, n (%)	Pressure sore, n (%)	No pressure sore, n (%)	p-value
Ischemic	30 (60.0)	6 (20.0)	24 (80.0)	0.506 <sup>a</sup>
Hemorrhagic	20 (40.0)	6 (30.0)	14 (70.0)	
<b>GCS score on admission</b>				
<5	10 (20.0)	1 (10.0)	9 (90.0)	0.081 <sup>b</sup>
5-10	16 (32.0)	7 (43.8)	9 (56.3)	
>10	24 (48.0)	4 (16.7)	20 (83.3)	

# Socio-demographic and clinical characteristics of the patients (n = 50)

Hemoglobin level on admission					Neutrophil count on admission				
≥10	40 (80.0)	8 (20.0)	32 (80.0)	0.225 <sup>b</sup>	<75%	28 (56.0)	4 (14.3)	24 (85.7)	0.099 <sup>b</sup>
<10	10 (20.0)	4 (40.0)	6 (60.0)	<b>0.0389</b>	≥75%	22 (44.0)	8 (36.4)	14 (63.6)	
Blood pressure on admission					Comorbidity				
Normal	28 (56.0)	8 (28.6)	20 (71.4)	0.512 <sup>b</sup>	Diabetes	21 (42.0)	5 (23.8)	16 (76.2)	0.639 <sup>b</sup>
Hypertensive	22 (44.0)	4 (18.2)	18 (81.8)		Hypertension	11 (22.0)	2 (18.2)	9 (81.8)	
WBC count on admission					Renal failure	7 (14.0)	3 (42.9)	4 (57.1)	<b>0.0341</b>
<12000 cells/mm <sup>3</sup>	28 (56.0)	4 (14.3)	24 (85.7)	0.099 <sup>b</sup>	Others	11 (22.0)	2 (18.2)	9 (81.8)	
≥12000 cells/mm <sup>3</sup>	22 (44.0)	8 (36.4)	14 (63.6)						

<sup>a</sup> Chi-square test, <sup>b</sup> Fisher exact test



# Characteristics of pressure sore among the stroke patients (n = 12)

Characteristics	N	%
<b>Site of pressure sore</b>		
Sacral area	6	50.0
Buttock	3	25.0
Heel	2	16.7
greater trochanter	1	8.3
<b>Grade of pressure sore</b>		
Grade I	5	41.7
Grade II	3	25.0
Grade III	3	25.0
Grade IV	1	8.3
<b>Temperature of pressure sore</b>		
Normal	3	25.0
Raised	9	75.0
<b>Skin condition around pressure sore</b>		
Healthy	10	83.3
Not healthy	2	16.7
<b>Evidence of vasculopathy around pressure sore</b>		
Yes	3	25.0
No	9	75.0



# Discussion

- A total of 24% of our study participants were suffering from a pressure sore. There is a lack of evidence on the prevalence of pressure sore among stroke patients of Bangladesh to compare with our finding.
- Indonesia reported the prevalence of pressure ulcers as 28% which is similar to our finding.
- The reported prevalence is quite lower in developed countries compared to developing countries including ours. For example, a Turkish study reported that almost 7%, 1.2% in the USA , 0.8% in China, and 2.6% in Thailand .
- The prevalence of pressure sore was higher in hemorrhagic stroke compared to ischemic stroke in our study participants.

Our data showed that patients aged more than 60 years were more likely to develop a pressure sore, though it was not established with statistical significance in our study.

Moreover, poor nutritional status and moderate to severe anemia also increased the proportion of developing a pressure sore. Besides severe neurological disability also contributes.

Nutritional deprivation is one of the major risk factors for the development of pressure ulcers and impaired wound healing.

Comorbidities like diabetes mellitus and peripheral vascular disease are also associated with pressure ulcers.

The underlying pathophysiology and immune compromise due to these diseases make the skin vulnerable to non-healing ulcers and superimposed infections.

- The most common site of the pressure sore among our stroke patients was the sacral area followed by the buttock, heel, and greater trochanter. Similar findings were revealed in other studies too. Pressure sores healed spontaneously in almost half of the patients included in our study, 25% needed conservative management, and 25% needed skin graft.
- The present study provides an insight into the prevalence and associated factors of pressure sores among hospitalized stroke patients.

# Conclusion

- Our study generates primary evidence on the prevalence of pressure sore among stroke patients of Bangladesh. We found that a large portion of stroke patients develop pressure sores during their hospital stay. **Older and anemic patients with poor nutritional status had a higher prevalence of pressure sore.**
- Preventive measures like maintenance of adequate nutrition, timely usage of pneumatic beds as well as proper rehabilitation should be ensured for better stroke management and to reduce long-term complications.

# Declarations

- Supplementary Materials: Patient-level data will be available on request from the corresponding author.
- Funding: The authors have no support or funding to report.
- Acknowledgments: The authors would like to express their sincere gratitude to Pi Research Consultancy Center ([www.pircc.org](http://www.pircc.org)) for their help in data analysis and manuscript revision and editing. Also thanks to all the patients of the study participants and the staff engaged in the study.
- Conflict of Interests: The authors declare that they have no competing interests.
- Ethical consideration

Approval of study protocol was obtained from the ethical committee of Dhaka Medical College prior to the commencement of the study. Informed written consent was obtained from each patient before recruitment.

## Limitation

First of all, the study was a single-center study, follow up period and the sample size was not large enough to explore the significant risk factors of pressure sore among stroke patients.

Furthermore, the study only included patients who developed pressure sores during the hospital stay and no long-term follow-up was done. So, a number of patients who may develop a pressure sore after discharge were excluded from the study that could potentially hide the actual scenario.

*Thank you*