

EFFECTIVENESS OF TWO HOURLY REPOSITIONING WITH A 30-DEGREE TILT AND FOUR HOURLY REPOSITIONING WITH A 90-DEGREE TILT IN THE PRESSURE ULCER HEALING OF PARAPLEGIC SPINAL CORD INJURED PATIENTS

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ABSTRACT

Introduction: Pressure ulcers are costly and devastating complications of spinal cord injury. A variety of treatment options are available for the management of pressure ulcers. Despite the fact that regular repositioning with a 30-degree and a 90-degree tilt is the most commonly applied interventions for the management of PU in clinical settings, however, their effectiveness is questionable because high-quality evidence is lacking to support or negate these treatment options. The objective of the current research study was to find out the effectiveness of two-hourly repositioning with a 30-degree tilt and four-hourly repositioning with a 90-degree tilt in the pressure ulcer healing of paraplegic spinal cord injured patients.

Material & Methods: A pre-test and post-test control group research study was carried out at Paraplegic Centre, Peshawar from January to June 2019. A total of 42 paraplegic complete spinal cord injury patients with grade-II and -III pressure ulcers participated in the study. Participants in group A received two-hourly repositioning with a 30-degree tilt while participants in group B received four-hourly repositioning with a 90-degree tilt. Both groups were followed for three months. Pressure Ulcer Scale for Healing was used for data collection before and after the intervention.

Results: The mean age of the subjects was 33.6 ± 11.6 years. Pre-treatment Pressure Ulcer Scale for Healing score of group A was 12.9 ± 1.94 and of group B was 12.33 ± 1.65 (p -value=0.311) while post-treatment Pressure Ulcer Scale for Healing score of group A was 1.04 ± 3.30 and of the group B was 7.23 ± 4.21 ($p < 0.001$).

Conclusion: Two hourly repositioning with a 30-degree tilt significantly improved pressure ulcers in people with spinal cord injury compared to four hourly repositioning with a 90-degree tilt.

Key Words: management, positioning, pressure ulcer, spinal cord injury

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INTRODUCTION

Pressure Ulcers (PU) are costly and devastating complications of spinal cord injury (SCI).^{1,2} It is reported that about 1/3 of SCI patients may suffer from PU at least once in their lives.³ Annual incidence rates of PU ranges from 20-31% and prevalence rates from 10-30%.^{4,5} PU extends hospital stay and not only affects the patient physically and mentally but also have profound economic implications.³ It is estimated that 25% of the overall treatment cost of SCI patients is spent on treatment of PU only.⁶ In Pakistan, the exact statistics about SCI and the prevalence of PU in these patients are not available, however, some single centre-based studies reported general information of SCI patients in Pakistan.⁷⁻⁹

PU requires comprehensive management and they are much more difficult to treat than to prevent it. Management of PU need thorough attention from the care givers and medical professionals.^{10,11} A variety of treatment options are available for the management of PU. It includes proper positioning, medications, wound dressing, use of pressure relieving instruments, ultrasound therapy, LASER treatment, debridement,

grafting and electrical stimulation. These treatments are used either alone or in combination to accelerate the healing of pressure ulcer.^{12,13} Of all these interventions, proper positioning and re-positioning to relieve pressure from the ulcer is widely used intervention in clinical settings because it is cost effective.¹⁴⁻¹⁶ Regular turning in the bed can relieve pressure from wound and thus help in healing of the PU.¹⁷

Despite the fact that regular repositioning with 30-degree and 90-degree tilt are the most commonly applied interventions for the management of PU in clinical settings, however, their effectiveness is questionable because high-quality evidence is lacking to support or negate these treatment options.^{18,19} There is scarce literature regarding the effectiveness of two hourly-repositioning with 30-degree tilt and four-hourly repositioning with 90-degree tilt in the management of PU,²⁰⁻²² thus current research study was carried out to find the effectiveness of two hourly repositioning with 30-degree tilt versus four hourly positioning 90-degree tilt in the PU healing of the paraplegic SCI patients admitted in Paraplegic Centre Peshawar.

MATERIAL AND METHODS

A pre-test post-test control group study was carried out at Paraplegic Centre, Peshawar (PCP) from January to June 2019. Ethical approval certificate was taken from the Ethics Board of PCP. A total of 42 paraplegic complete SCI patients with grad II and III PU, aged 18 to 55 years were recruited through consecutive sampling technique. SCI patients with multiple PU's, and other major medical and/or neurological conditions such as traumatic brain injury, brachial plexuses injury and those with tetraplegia were excluded from the study. Neurological assessment of subjects was performed according to the methods devised by American Spinal Injury Association (ASIA) while European Pressure Ulcer Advisory Panel grading was used to assess PU.²³ Informed consent was obtained from the included participants. Participants were divided into group A and group B through lottery method. Participants in group A received two hourly repositioning with 30-degree tilt while participants in group B received four hourly repositioning with 90-degree tilt. Both groups received 2 times daily dressing in addition to the positioning protocols. All the participants were followed for three months. Pressure Ulcer Scale for Healing (PUSH) was used for data collection before and after the intervention. Mean and standard deviation of PUSH scale was calculated before and after the intervention.

SPSS version 20 was used for data analysis. Shapiro-Wilk test was used to assess the normality of the data. Because the data were normally distributed that's why independent sample t-test was executed to scrutinize differences between the two groups. P value of < 0.05 was regarded as significant.

RESULTS

Forty-two patients with mean age of 33.6±11.6 years participated in the study. Male and female participants were 29 (69.0%) and 13 (30.1%), respectively. Common cause of injury was fall from height 16 (38.1%) followed by road traffic accident 6 (14.3%), firearm injury 6 (14.3%), weight fallen over 4 (9.5%) and other minor causes 10 (23.8%) of the injury. Majority of the participants had thoracic 29 (69.0%) injury while 10 (23.8%) had lumbar and 3 (7.1%) had sacral injury.

Each group was having 21 participants. Pre-treatment PUSH score of group A was 12.9±1.94 and of group B was 12.33±1.65. There was no significant difference (P=0.311) between the pre-treatment score of both groups. Post-treatment PUSH score of group A was 1.04±3.30 and of group B was 7.23±4.21. Post-treatment statistical analysis showed that there was significant difference (P<0.001) between groups. (Table 1)

DISCUSSION

The current study was conducted to evaluate the most cost-effective treatment option i.e. repositioning in different positions in the management of PU. The results of the current study showed that pressure ulcer healing in paraplegic SCI can be enhanced by two hourly repositioning with 30-degree tilt. Though effectiveness of 30-degree tilt in the prevention of PU is reported by previous studies^{21,23,24}, yet, effectiveness of 30-degree tilt in the treatment of PU is not well documented in the literature.²⁰ Therefore, current study was a preliminary study which reported promising results of repositioning in the PU management. PU is one of the most prevalent complications among SCI patients.²⁵ Sufferings

associated with the development of PU are incredible.²⁶ PU can lead to septicaemia which is one of the life-threatening condition due to PU.²⁷ PU pose significant challenges to the patients, their care givers and most importantly to the medical team.¹² Literature suggests that proper repositioning by offloading the PU will allow blood flow to the ulcerated area.^{28,29} Logically, blood supply is crucial for PU to heal as blood deliver nutrients to the ulcer. Moreover, proper repositioning helps in preventing the ulcerated area from further injury. In a nutshell, it can be stated that repositioning facilitates faster PU healing.³⁰

Different theories have been postulated to describe the formation of PU. Pressure Gradient Theory (PG) is one of the most acceptable theory, according to which pressure comes from bones toward the outside. PG theory describes that whenever bony prominences contact the supporting surfaces, it presses the epithelium inwardly and in response bone apply an outward pressure. PG theory further explains that muscle and subcutaneous fat are more susceptible to pressure than skin because they have low tolerance to diminished blood flow. In short, PG theory emphasizes that injury to muscles and subcutaneous tissue may take place well before skin break down although this injury to muscles and subcutaneous tissue may not be evident till skin ulcer is not formed.^{31,32} Top to Bottom Theory is yet another theory which explains the process of PU formation. This theory describes that damage starts from the top, from skin and then travel downward and ultimately involve bone.³³ Both these theories support the fact that continuous pressure relief helps in the faster healing of the PU.

Literature suggests that 30-degree tilt may be more beneficial in the prevention of PU because 90-degree tilt position can impede blood supply to skin, thus PU may not heal well at 90-degree position.³⁴ Two hourly repositioning along with 30-degree tilt has been reported more beneficial.³⁵ Moore et al. reported that repositioning with 30-degree tilt is more effective and less costly in term of nursing care.³⁶ Even though current study was a preliminary study in Pakistan which described importance of repositioning in the management of PU, yet, this research study has limitations. Because current study was carried out in clinical settings so confounding variables might influence the results of current study. Moreover, long term follow-up of the patients was not performed due to which long term effects of the repositioning methods in the prevention of PU is questionable.

CONCLUSION

It may be concluded that two-hourly repositioning with 30-degree tilt is more helpful compared to four-hourly repositioning with 90-degree tilt in PU management of paraplegic SCI patients.

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Table 1: Pre and Post treatment scores

	Group A Mean ±SD	Group B Mean ±SD	P-value
Pre-treatment PUSH score	12.9±1.94	12.33±1.65	0.311
Post-treatment PUSH score	1.04±3.30	7.23±4.21	<0.001