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EFFECT OF MODIFIED ADAPTIVE AID DONUT CUSHION ALONG WITH OCCUPATIONAL THERAPY INTERVENTION ON PRESSURE SORES ON PROLONGED BED RIDDEN PATIENTS WITH NEUROLOGICAL DISORDERS

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ABSTRACT

The main aim and objective of the study were to find out the effect of modified adaptive aid Donut cushion along with occupational therapy intervention on pressure sores on prolonged

bed ridden patients with neurological conditions. This was a quasi-experimental design with convenience sampling and sample selected (n=31), which were split into two groups, an experimental group (n=16) and a control group (n=15), based on inclusion and exclusion criteria. The duration of the study was three months, three sessions per week, lasting for 45 minutes. The experimental group received Donut cushion while the control group received conventional occupational therapy. The study assessed 31 patients with bed sores who have been in prolonged bed. This inclusion criteria were Bed sore with grade 1 and grade 2, Norton scale grades with medium risk and low risk, both genders and exclusion criteria were patients with spinal injuries, severe wound, burns and other skin complications. And the outcome of the pre and post-test between control and experimental group were analysed. Results indicated a significant improvement in healing pressure ulcers in prolonged bed ridden patients, as evidenced by the analysis of pre-test and post-test scores for both groups. The p-value was less than 0.05, leading to the acceptance of the alternative hypothesis.

Keywords: Pressure ulcer, Donut Cushion, positioning, bed ridden patients

INTRODUCTION

Pressure ulcers are a type of injury that breaks down the skin and tissues when an area of skin is placed under constant pressure for certain period causing tissue Ischemia cessation of nutrition and oxygen supply to the tissue necrosis [1]. Constant pressure resulting in 'distortion or deformation damage' is probably the most accurate description of a pressure ulcer. There is a localised, acute ischaemic damage to any tissue caused by the application of external force (either shear, compression or a combination of the two). The development of pressure injuries is complex and multifactorial. External and internal factors

co-occur to form these ulcers. Externally, prolonged pressure, friction, shear force, and moisture can lead to tissue deformation and ischemia. Internal factors such as malnutrition, anaemia, and endothelial dysfunction can speed up the process of tissue damage. Decreased mobility, skin moisture, poor nutritional status, and loss of sensory perception stand out as the most common risk factors. However, researchers have also identified older age, cognitive impairment, and comorbid conditions affecting tissue healing. Pressure ulcer is a serious health issue for patients in all kinds of settings [2]. In patients with normal

sensation, mobility, and mental status, prolonged pressure causes discomfort and pain, prompting a change in body position. However most patients with bedsores lack those characteristics. A patient's attendant typically reports pressure injuries. Due to reduced sensation at the lesion site, patients may be unaware of their injuries. Pus or blood discharge may stain patients clothes or bedsheets. The clinical presentation may vary between different body sites as skin, soft tissue, and muscle resist external pressure differently. The most common anatomical locations are the sacrum, ischial tuberosity, greater trochanter. Other areas at risk include the occiput, scapula, elbow, heel, lateral malleolus, shoulder, and ear. The muscle become ischaemic and necrotic before skin breakdown can occur, which can be deceiving to the clinician's observation, undermining the depth or extent of the ulcer. The incidence of bedsores varies from 0.4 to 38% in major hospitals, 2.2 to 23.9% in those on long term care and settings. There are 4 grades of bed sores they are Grade 1, Grade 2, Grade 3, Grade 4. Decreased mobility, skin moisture, poor nutritional status and loss of sensory perception stand out as the most common risk factors.

However researchers have identified older age cognitive impairment and comorbid affecting tissue healing. Prolonged pressure on tissue can cause capillary bed occlusion, reducing oxygen levels that form the foundation pressure ulcer area [3]. Over time the ischemic tissue begins to accumulate toxic metabolic. subsequently, tissue ulceration and necrosis occur. Immortality of only two hours in a bedridden patients or patient underlying surgery is sufficient. Occupational therapy in the treatment and prevention of bedsores is explaining the method of wheelchair fitting and cushioning. The importance of correct wheelchair prescription is focused. Occupational therapists educates the use of pressure gauges in clinical practice and it is demonstrated and the examples of the use of Denne gauge are given [4]. Elevating the head of the bed no higher than 30 degrees unless medically necessary. Repositioning patients in bed at least every 2 hours [5]. Occupational therapists also use practical considerations such as checking clothing, what is important for the person to be able to do what support does a person have, like the patient is independent or they need any

assistance, patient and family education [6]. Donut cushion is a cushion with a 10 cm diameter circular area open in the centre. Placement of the Donut shaped cushion on the scapular region limits contact of this area from the bed, which is the most frequent site of postoperative pressure injury [7]. The Role of the occupational Therapist in the treatment and prevention of bedsores is explaining the method of wheelchair fitting and cushioning. The importance of correct wheelchair prescription is focused. Suitable support surfaces, clothing and bedding which minimize the risk of tissue damaged are detailed together with appropriate methods of transferring from one surface to another. The importance of multidisciplinary team approach and the necessity for education in pressure sore prevention of hospital staff, patients, and relatives. Occupational therapist educates the use of pressure gauges in clinical practice and it is demonstrated and the examples of the use of Denner gauge are given.

MATERIALS AND METHOD

This study was conducted according to the guidelines of the declaration of Helsinki and was approved by the institutional scientific

review board (ISRB) of the Saveetha college of occupational therapy (SCOT/ISRB/064/2023).

This study was conducted at Saveetha hospital and other home based patients. Norton scale was used to screen the patient with medium and low risk bed sores. Braden scale was used to assess the patients with grade 1 and grade 2. This is a quasi experimental study with 31 patients with bed sores (16 in experimental group and 15 in control group). Donut cushion along with positioning was given to patients with bed sore in experimental group and normal bed mattresses along with occupational therapy intervention was given to patients with pressure ulcer in control group. Patients with bed sores who have been in prolonged bed were invited to participate in the study. This inclusion criteria were Bed sore with grade 1 and grade 2, Norton scale grades with medium risk and low risk, both genders and exclusion criteria were patients with spinal injuries, severe wound, burns and other skin complications. The ethical committee authorized and provided the permission to conduct study.

RESULTS AND DISCUSSION:

The results portrays the demographic distribution for control group. The results showed in **Table 1** portrays the result of statistical analysis of pre and post test of control group. Since the p value of 0.00 is lesser than 0.05, alternate hypothesis is accepted. Hence, there is statistically significant difference between pre- test and post test scores in the Control Group of the BRADEN SCALE. This suggests that the intervention received by the control group had significant improvement. **Table 1** and **Figure 1** showed scores in the pre and post test of control group. The mean value in the pre test is 10.4667 and in post test 12.333. The 'z-value is -3.502 and the 'p' value is 0.00*. It is considered to be statistically significant since the control group underwent conventional OT. This Study Was in Accordance with the positive results with previous study Cochrane Database Syst Rev (2020) published by Chunhu Shi, Shi Jo C Dumville, Nicky Cullum, Sarah Rhodes and Elizabeth [8].

The results portrays the demographic distribution for experimental group. The results showed in **Table 2** portrays the result of statistical analysis of pre and post test of Experimental group, since the p value of 0.00 is less than 0.05, alternate hypothesis is accepted. Hence, there is statistically significant difference in Experimental Group between pre-test and post test scores of BRADEN SCALE. This suggests that the intervention received by the experimental group had significant improvement. **Table 2** and **Figure 2** showed the scores in pre and post test of Experimental group. The mean value in pre test is 10.125 and in post test is 13.8125. The 'Z-value is -3.562 and the 'p' value is 0.00*. It is considered to be statistically significant since the experimental group underwent Modified Adaptive aid (Donut Cushion) in bed sores. The positive results are in accordance with previous study. This study was supported in an previous study by Saudi J Anaesth, (2022 Jan-Mar) published by Min Hee Heo, Ji Yeon Kim, Jang Su Park *et al*, [9].

Table 1: Statistical analysis of pre- test and post- test in control group

Test	Mean	SD	N		Z value	P value
Cntr_Pre	10.4667	1.40746		15	-3.502	0.00*
cntr_post	12.3333	1.44749		15		

* Significant at 5% alpha level

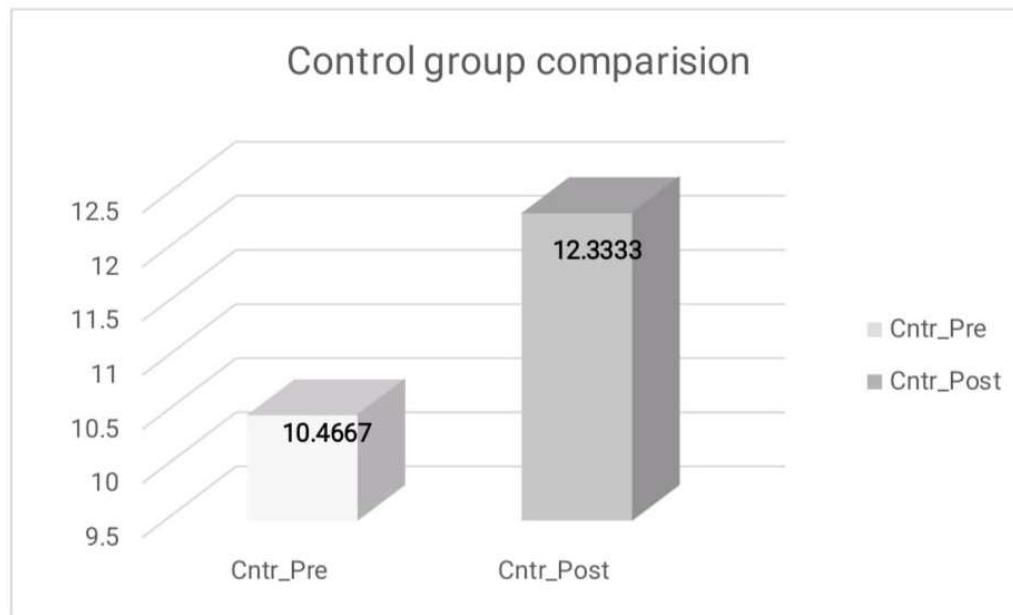


Figure 1

Table 2: Statistical analysis of pre- test and post- test in experimental group

Test	Mean	SD	N		Zvalue	pvalue
Expt_Pre	10.125	1.08781		16	-3.562	0.00*
Expt_Post	13.8125	1.7595		16		

* Significant at 5% alpha level

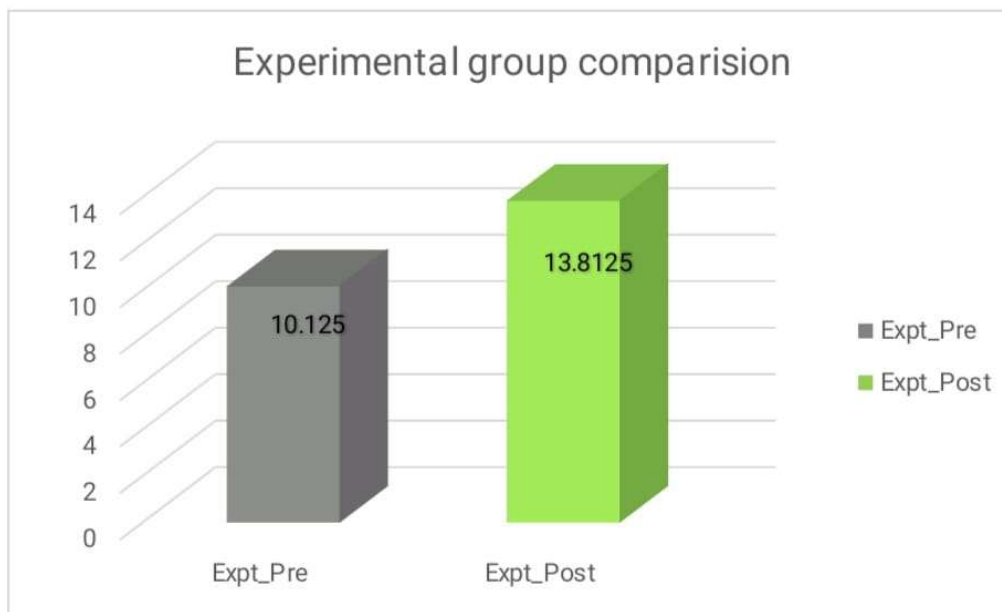


Figure 2

Table 3: Statistical analysis between the post- test scores of the control and experimental group

Group	Mean	SD	N		Z value	P value
Cntr_Post	12.3333	1.44749		15	2.51	0.012*
Expt_Post	13.8125	1.7595		16		

*Significant at 5% alpha level

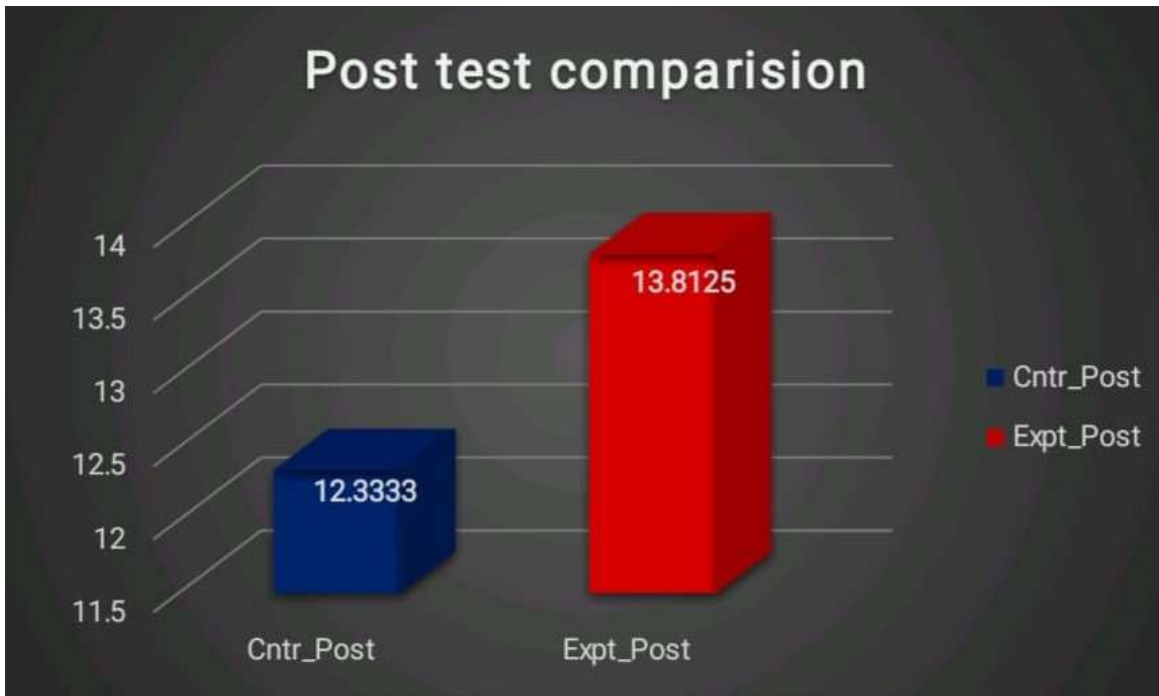


Figure 3

The purpose of this study was to examine the effect of modified adaptive aid donut cushion along with occupational therapy intervention on pressure sore on prolonged bed ridden patients with neurological conditions. The study was conducted in Saveetha Medical College and Hospital, Thandalam. A total of thirty (31) patients were selected who have pressure sores. They were selected based on convenient sampling using the selection criteria described in the

methodology and randomly allocated to the experimental 16 and control group in 15 samples. The study included both male and female. The experimental group received the interoception activities for 32 sessions for 35 mins to 45 minutes each, while the control group received conventional therapy for the same time period. The results showed in **Table 1** portrays the demographic distribution for control group. The results showed in **Table 2** portrays the

demographic details for experimental group. The results portrays the demographic distribution for control group. The results showed in **Table 1** portrays the result of statistical analysis of pre and post test of control group. Since the p value of 0.00 is lesser than 0.05, alternate hypothesis is accepted. Hence, there is statistically significant difference between pre- test and post test scores in the Control Group of the BRADEN SCALE. This suggests that the intervention received by the control group had significant improvement. The results portrays the demographic distribution for experimental group. The results showed in **Table 2** portrays the result of statistical analysis of pre and post test of Experimental group, since the p value of 0.00 is less than 0.05, alternate hypothesis is accepted. Hence, there is statistically significant difference in Experimental Group between pre-test and post test scores of BRADEN SCALE. This suggests that the intervention received by the experimental group had significant improvement. The outcome of the statistical analysis of the control and experimental group are displayed in **Table 3**. Since the p value of 0.012 is lesser than 0.05, alternate hypothesis is accepted. Hence,

there is statistically significant difference in post test scores between Experimental and Control Group of the BRADEN SCALE. This suggests that the intervention received by the experimental group had more improvement when compared to the control group. The mean value of the control group is 12.3333 and the experimental group is 13.8125. The 'Z-value is 2.51 and the 'p' is 0.012. since the p-value 0.012 is lesser than 0.05 alternate hypothesis is accepted. There was an statistical significant difference in post test between the experimental and control group, there was an improvement in post test scores of experimental group compared to the controlled groups. The positive results are in accordance with previous study management and treatment of pressure ulcers (Sisli Etfal Hastan Tip Bul 2019) [10] shows an significant difference between post test of control and experimental group, hence shows that Donut Cushion are effective in healing Pressure Ulcer.

CONCLUSION

This study concluded that the usage of modified adaptive aid (Donut Cushion) shows a significant improvement in the healing of pressure Ulcer. And at the same

time showed a markable improvement. An individualized session administered over a longer duration must be studied to note the long term effects.

This study is based on using an adaptive aid to heal pressure ulcer, during which 36 sessions were conducted over a period of 3 months. By increasing the number of sessions and durations, improvement will be better. So, future researchers can extend the duration of the study to have effective results.

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