

A Study to Assess the Effectiveness of Transdermal Oxygen Therapy in Healing Bedsores Among Neurological Patients in Selected Hospitals of Guwahati, Assam

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Abstract— OBJECTIVES: To assess the effectiveness of transdermal oxygen therapy in healing bedsores and also to find out the association with the selected demographic variable such as age, gender, diagnosis, duration of diagnosis and wound stage.

Design, setting: A pre experimental one group pre-test post-test design was used. Purposive sampling technique was used for obtaining 30 neurological patients with bedsores of selected Hospitals of Guwahati, Assam. Pre-test and post test score of the sample were assessed by using PUSH tool score.

Measurement: The technique used by the investigator in the study was Measurement and observation checklist. The pre-test score of the bedsores was measured using the PUSH tool on the first day before starting with the oxygen therapy and then dressing was applied over the bedsores. From the next day onwards for seven consecutive days' post test score of the bedsores ulcer were taken and 14 observations were made.

RESULTS

Out of 30 samples majority 19 (63.33%), were in the age group of more than 51 years, 18 (60%) were males, 19 (63.33%) were diagnosed with stroke, 17 (63.33%) were hospitalized for more than 3 weeks, 18 (60%) were diagnosed for more than 2 months, 26 (86.66%) has no history of diabetes mellitus and 18 (60%) were in the third stage pressure ulcer. Majority of the samples 30 (100%) has shown improvement in the healing process of pressure ulcer. The mean before and after intervention were 11 and 7 respectively. The transdermal oxygen therapy was effective which was proved by paired t test at 0.05 level of significance as the calculated value of "t" was 27.75 respectively was highly significant at 0.05 % level. So, it signifies that the transdermal oxygen therapy helps in healing the pressure ulcer. There was no association of the pressure ulcer with any of the associated demographic variables

Keywords: Transdermal oxygen therapy, pressure ulcer, neurological patients, Critical Care

IMPLICATIONS FOR CLINICAL PRACTICE

- Pressure ulcers develops in neurological patients is result of complex and multi factorial approach
- Nurses can provide better care to the client with bedsores to fasten the healing process.
- The transdermal oxygen therapy is effective for rapid healing of pressure sore
- Nurses can also put greater emphasis on the prevention of pressure ulcer in the client.

Index Terms—About four key words or phrases in alphabetical order, separated by commas.

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I. INTRODUCTION

Pressure ulcers also known as Pressure sores, bedsores or decubitus ulcer, are localised injuries to the skin and or to the underlying tissue that usually occur over a bony prominence as a result of pressure, or pressure in combination with shear and or friction. Bedsores most commonly develop in individuals who are not moving about, such as those being bedridden or confined to a wheelchair. It is widely believed that other factors can influence the tolerance of the skin for pressure and shear, thereby increasing the risk of pressure ulcer development.

Pressure ulcers have been described as one of the costliest and physically debilitating complications in the 20th century. Pressure ulcers are the third most expensive disorders after cancer and cardiovascular diseases. (1)

The incidence of pressure ulcers is different in each clinical setting. Incidence of rates as low as 0.4% to high as 38% have been reported in the patient department while prevalence has been reported as 3.5% to 69% [8-11]. In long term care facilities, the reported incidence is below the incidence between 2.2% to 23.9% while in home care setting the incidence varies from 0 to 17%. (2)

In Indian setting the prevalence of pressure ulcers in hospitalised patients have been reported to be 4.94%. In spinal cord injury patients, pressure ulcers occur in 30 – 85% of patients during the first month of injury. Also, paraplegics and quadriplegics are likely to have multiple ulcers. (3)

Another finding of the study was that majority of the patients (83%) who had developed bedsores were completely dependent for all their activities. The study concluded that "An overall incidence of 6% bedsores in a tertiary care is a matter of concern for the health care administrators. This calls for appropriate equipment, adequate manpower and administrative concern and accountability. (4)

One of the new interventions developed to treat pressure ulcers is transdermal oxygen therapy or topical wound therapy. Studies show that delivering oxygen therapy directly to the wound site accelerates the angiogenesis, the collagen synthesis, the fibroblast growth processes and suppresses the bacterial growth, which in turn facilitates tissue regeneration. This method has several advantages, including fewer complications and lower cost and more safety. (5)

Studies have revealed that incidence of pressure ulcers was as high as 68% among brain and spinal cord injuries involving paralysis because of sensory motor deficiencies pressure ulcers are serious problems. It has been estimated that 3%-5% all hospital patients will develop pressure sores either just before or during or after admissions. In hospitals the

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incidence of pressure ulcer is seen to range from 2.7% to 29.5%. Therefore, considering all these views in mind, the investigator was fascinated to conduct the research on bedsore and to see the effectiveness of transdermal oxygen therapy on bedsore healing as it is a cost-effective method to treat pressure ulcer. (6,7)

II. RESEARCH DESIGN

The research design was the one group pre-test post-test design. O1XO2, Where, O1 – Assessment of bedsore before administration of transdermal oxygen therapy, X – Intervention i.e. administration of 10 litres per minute of transdermal oxygen therapy for 20 minutes in bedsore and O2- Assessment of bedsore after administration of transdermal oxygen therapy.

SETTING: The study was conducted in Guwahati Neurological Research Centre (GNRC), Guwahati, Assam. It was set up in 1987, and it is one of the very first hospitals offering super speciality tertiary care in North East India. It has established as a centre of excellence in Neuroscience, Cardiac Sciences and Critical Care. For more than two decades GNRC has treated more than half a million patients from Assam, other North eastern states and neighbouring countries like Bhutan, Nepal and Bangladesh. The coveted British Standard Institute, London has accredited the organisation with ISO 9001-2000 and 14001-2004. At a global level the ICMR has also accredited this centre for medical research centre. It is also recognised research centre under the department of science and technology government of India.

Presently it has a bed strength of 200 including 60 numbers of ICU beds. Various cases of neurological and neurosurgical cases are treated in the hospital. Annually about 60% to 70% of cases are treated in the hospital. Specialised Neurologists and Neuro surgeons are available and the hospital is well equipped with modern technologies.

SAMPLE: For this study the sample size was 30 (thirty) number of neurological patient with bedsore. Non-Probability Purposive sampling technique was used to collect the samples.

III. CRITERIA FOR SAMPLE SELECTION:

Inclusion criteria were: 1) Neurological patient with bedsore whose dressing is done only with betadine solution. 2) Neurological patient with bedsore present at the time of the data collection.

Exclusion criteria in the study were: 1) Neurological patient with cellulitis or any other wound. 2) Neurological patients receiving topical antibiotics on the bedsore site.

TOOLS AND TECHNIQUES: The technique used by the investigator in the study were Measurement and observation checklist. Tools used in the study were: a) Questionnaires on demographic data. b) PUSH tool checklist.

After approval from Independent Ethics Committee, INS Trust, permissions were obtained from the concerned authority of the Hospital where the study was conducted. Participants family member were informed details about the study purpose and an informed consent was obtained from each sample prior to investigations.

IV. MAJOR FINDINGS OF THE STUDY

The major findings of the study were as follows:

Demographic Data: Age: One (3.34%) belong to 20-30 years, ten (33.33%) belong to 41-50 yrs. and nineteen (63.33%) belong to more than 51 years of age. Gender: Male were eighteen (60%) and female were twelve (40%). Duration of hospital stay: Two (6.16%) were hospitalized for less than a week, four (13.33%) for 1-2 week, seven (23.33%) for 2-3 week and nineteen (63.33%) were hospitalized for more than 3 weeks. Diagnosis: Eleven (36.66%) were diagnosed with head injury and Nineteen (63.33%) were diagnosed with stroke. Duration of Diagnosis: Nine (30%) were diagnosed for less than one month, three (10%) were diagnosed from 1-2 month and eighteen (60%) were diagnosed for more than 2 months. History of Diabetes Mellitus: Four (13.33%) has previous history of Diabetes Mellitus and twenty-six (86.66%) has no previous history of Diabetes Mellitus. Wound stage: Eighteen (60%) were in the second stage of bedsore and twelve (40%) were in the third stage of bedsore.

Assessment of bedsore before and after Transdermal Oxygen Therapy

The first and second objective was to assess the bedsore before and after transdermal oxygen therapy and it has been found that in the pre-test assessment the pressure ulcer score was high but with administration of the transdermal oxygen therapy in the bedsore it has fasten the healing process. Thirty samples were taken for the study and it has shown 100% of the samples have shown improvement in the healing process.

The third objective was to assess the effectiveness of transdermal oxygen therapy in healing pressure ulcer among neurological patients: The improvement was statistically tested by “paired-t” test. The calculated value of “t” was 27.75 which is higher than the tabulated value 1.699 at 0.05 % level of significant. So, H01 is rejected and the hypothesis H1 is accepted. It indicates that the mean post test score of bedsore score is significantly lower than the mean pre-test score which proves that the treatment is effective.

The fourth objective was to find out the association between the bedsore with selected demographic variables. In the present study there is no significant association between post-test pressure ulcer score and the selected demographic variables such as age, gender, and diagnosis, duration of diagnosis and wound stage.

V. DISCUSSION

The main objective was to assess the bedsore before and after transdermal oxygen therapy and it has been found that in the pre-test assessment the pressure ulcer score was high but with administration of the transdermal oxygen therapy in the bedsore it has fasten the healing process. Thirty samples were taken for the study and it has shown 100% of the samples have shown improvement in the healing process. This study is supported by JalilAzimian, NahidDehganNayeri, EnisPourkhaleghi and Monireh Ansari (2015), conducted a randomised control trial to evaluate the effect of transdermal wound healing on II to IV pressure ulcers.

The experimental group received 12 days transdermal wound oxygen therapy. After 12 days the number of patients with complete wound healing in the experimental group is significantly higher than that of control group and the total mean of the experimental group was significantly lower than

that of control group (8) .Data also supported by the study done by Loree et.al,(2009), conducted a retrospective study on 38 patient with wounds for 9 monthswith follow up ranging from 1-8 months. The findings shows that 38 wounds in 15patients healed on topical oxygen (9). Another study-Azimian J (2015), conducted a randomized control trial study to evaluate the effects of transdermal wound oxygen therapy on pressure ulcer healing for 100samples selected through convenient method of sampling. Patients with stage II-IVbedsore were assigned to either controlled or experimental group. The experimental group received 12 day TWOT. Wound status was assessed 7 times before intervention as well as 6 days after intervention. Results showed that after12 days of TWOT number of patients with complete wound healing in experimental group was significantly higher than of control group.(8)

LIMITATION: Bedsore healing may also be promoted by water mattress, position change, mobilization, nutrition and medication etc.

VI. VRECOMMENDATION FOR FUTHER RESEARCH

A similar study can be conducted in another field like in wound healing. Study can be conducted with both the experimental and the control group for more effective results. Transdermal oxygen therapy may be beneficialin treating different wounds for hospitalized patient. A similar study can be conducted for a longer duration of time to achieve furthermore, good results.

VII. CONCLUSION

All the samples 30 (100%) has shown improvement in the healing process of pressure ulcer. The mean before and after intervention were 11 and 7 respectively. The transdermal oxygen therapy was effective which was proved by paired t test at 0.05 level of significance as the calculated value of “t” was 27.75 respectively was highly significant at 0.05 % level. So, it signifies that the transdermal oxygen therapy helps in healing the pressure ulcer. There was no association of the bedsore with any of the associated demographic variables. Therefore, the study concluded that the treatment is effective in healing bedsore.

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