IJNH Innovational Journal of Nursing and Healthcare (IJNH)

www.ijnursing.com

Research article

To assess the effectiveness of self-instructional module (SIM) on knowledge regarding negative pressure wound therapy among staff nurses of selected hospitals, Udaipur Rajasthan

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Abstract

Aim: To assess the effectiveness of self-instructional module (SIM) on knowledge regarding negative pressure wound therapy among staff nurses of selected hospitals, Udaipur Rajasthan.
Objectives: 1.To assesses the knowledge of negative pressure wound therapy among staff nurses. 2. To evaluate the effectiveness of self-instructional module on negative pressure wound therapy 3.To find out the association between pre-test knowledge scores with selected demographical variables.
Materials and methods: A pre-experimental one group pre-post test design was used. A standardized tool was used for data collection which was validated by the experts. The consisting of 120 staff nurses in selected hospitals at Udaipur by using purposive sampling technique method. The tool comprised by using structured questionnaire. The pre-test was conducted and the self-instructional module administered. The collected data were analyzed with descriptive statistics using frequency, percentage, mean and inferential analysis using "chi-square" test.
Results: The results revealed that the pre-test mean was 10.08 which increased to 22.08 in the post-test and there a significant association between the knowledge and demographic variables such as professional qualification and duration of the experience.
Conclusion: The study concludes that self-instructional module (SIM) was significantly effective in increasing the knowledge regarding negative pressure wound therapy among staff nurses.

Key words: self-instructional module, wound therapy, staff nurses.

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1. Introduction

"Wounds are like water set to boil- they heal best left unwatched"
-Gabrielle zevin
Nowadays, acute and chronic wounds affect at least 1% of the population and represent a significant risk factor for hospitalization, amputation, sepsis, and death.

Access this article online

Website: www.ijnursing.com | ISSN No: 2454-4906

How to cite this article: Dashrath Kumar Menaria, Dinesh Kumar Sharma, Aakash Chavda. To assess the effectiveness of self-instructional module (SIM) on knowledge regarding negative pressure wound therapy among staff nurses of selected hospitals, Udaipur Rajasthan. Inno J Nur Health 2018; 4(1): 32-37.

Providing successful wound management has become the goal for all health institutions. [1]
Wound healing is a complex and dynamic process of restoring cellular structures and tissue layers. Wound healing involves integrated physiology process. Healing of the wound always follows a regular pattern. The human adult wound healing process can be divided into 3 distinct phases: the inflammatory phase, the proliferative phase, and the remodelling phase. [2]
Chronic wounds are wounds that have failed to proceed through the normal process of healing. There are varying etiologies of chronic wounds in the U.S. and Indian population, which all create a burden upon the health care system.

The healthcare expenditures for chronic wounds have been estimated to be up to $25 billion dollars per year. [3]

Common types of chronic wounds include venous insufficiency ulcers, arterial leg ulcers, diabetic foot ulcers, and pressure ulcers. These wounds can affect a large number of people with varying degrees of severity. Venous insufficiency ulcers are a large proportion of chronic wounds as a whole, with over 50% of chronic leg ulcers occurring as a result of a venous etiology. Amputations related to diabetic foot wounds have been associated with high cumulative mortality – up to 70 percent within 10 years from the first amputation due to a diabetic foot ulcer. Annual prevalence of venous insufficiency ulcers in those 65 and older has been estimated to be 1.69 per 100 person-years. [4]

There are a variety of modalities available for chronic wound treatment, with some targeted toward specific types of wounds, such as compression for venous insufficiency ulcers. Routine wound care may involve any or all of the following: debridement (removal of material from the wound bed to permit healing), wound dressings (including gauzes, films, hydrogels, hydrocolloids, alginates, and foams), barrier products, and topical or systemic antimicrobials. In addition to these various wound dressings and medications, there are other adjunctive treatment modalities, such as skin substitutes, hyperbaric oxygen, and negative pressure wound therapy (NPWT).[5]

Negative pressure wound therapy (NPWT) consists of the use of a negative pressure therapy or suction device to aspirate and remove fluids, debris, and infectious materials from the wound bed to promote the formation of granulation tissue. Although the exact mechanism has not been elucidated, it is hypothesized that negative pressure contributes to wound healing by removing excess interstitial fluid, increasing the vascularity of the wound, reducing oedema, and/or creating beneficial mechanical forces that lead to cell growth and expansion. [6]

Vacuum-assisted closure (VAC) therapy is designed to promote the formation of granulation tissue for faster healing in the wound beds of patients with acute and chronic wounds. In essence, the technique is very simple. A piece of foam with an open-cell structure is introduced into the wound and a wound drain with lateral perforations is laid on top of it. When the exposed end of the drain tube is connected to a vacuum source, fluid is drawn from the wound through the foam into a reservoir for subsequent disposal. The plastic membrane prevents the ingress of air and allows a partial vacuum to form within the wound, reducing its volume and facilitating the removal of fluid. The foam ensures that the entire surface area of the wound is uniformly exposed to this negative pressure effect, prevents occlusion of the perforations in the drain by contact with the base or edges of the wound, and eliminates the theoretical possibility of localized areas of high pressure and resultant tissue necrosis. [6]

Need for the study

In India, the incidence of postoperative infections in various hospitals varies from 10-25%. Wound infection affects nearly 20% of postoperative cases and they contribute up to 57% of extra hospital days at 42% of extra costs. [7]

Diabetes is a serious chronic disease. In 2003 the global prevalence of diabetes was estimated at 194 million. This figure is predicted to reach 333 million by 2025. .Extensive epidemiological surveys have indicated that between 40% and 70% of all lower extremity amputations are related to diabetes. According to diabetes vital published by the international diabetes Federation(IDF), there were an estimated 40 million persons with diabetes in India in 2007 and this number is predicted to rise to almost 70 million people by 2025. The countries with the largest number of diabetic people will be India, China, and USA by 2030. [8]

Pressure ulcers or pressure sores not only cause suffering to the patients but also increases the workload on health care professionals. Pressure ulcers have been viewed as negligence, especially nursing care. It is assumed that pressure ulcers are preventable. But high prevalence of pressure ulcers among indoor patients have various contradicting factors including patients' medical history, present environment and past events which predisposes them to develop pressure ulcers.[9]

Frykberg RG, Williams DV. (2007), were conducted a study to assess the benefits of negative-pressure wound therapy (NPWT) versus traditional wound therapies in reducing the incidence of lower-extremity amputations in patients with diabetic foot ulcers. Patients with diabetic foot ulcers from commercial payers (n=3,524) and Medicare (n=12,795) were retrospectively analyzed. Patients were divided into NPWT and control/traditional therapy groups on the basis of administrative codes. Amputation incidences with NPWT versus traditional therapy were 35% lower in the Medicare sample and 34% lower in the commercial payer sample. Whereas overall amputation rates increased progressively with increasing wound debridement depth in both control groups, the same increasing trend did not occur in the NPWT groups. The study concluded that the Patients with diabetic foot ulcers in the Medicare sample treated with NPWT had a lower incidence of amputations than those undergoing traditional wound therapies.[10]

There is now sufficient evidence to show that negative pressure wound therapy is safe, and will accelerate healing, to justify its use in the treatment of diabetes-associated chronic leg wounds, decubitus ulcer, and burn and open abdominal wounds. There is also evidence, though of poor quality, to suggest that healing of other wounds may also be accelerated. NPWT therapy was

useful in the treatment of diabetic foot infection and ulcers, which after debridement, may present with exposed tendon, fascia and/or bone. These included ray amputation wounds, wounds post-debridement for necrotising fasciitis, wounds post-drainage for abscess, a heel ulcer and a sole ulcer. It was able to prepare ulcers well for closure via split-skin grafting or secondary closure in good time. This reduced cost of NPWT therapy, as therapy was not prolonged to attain greater reduction in wound area. NPWT also provides a sterile, more controlled resting environment to large, exudating wound surfaces.

Objectives:

1. To assess the pre-test knowledge score regarding negative pressure wound therapy among staff nurses.
2. To develop and distribute the self-instructional module regarding negative pressure wound therapy among staff nurses.
3. To assess the post test knowledge score regarding negative pressure wound therapy among staff nurses.
4. To assess the effectiveness of self-instructional module regarding negative pressure wound therapy among staff nurses.
5. To find out the association between pre-test knowledge scores with selected demographical variables.

Hypothesis:-

H1- There will be a significant difference between pre-test and post-test knowledge score regarding negative pressure wound therapy among staff nurses.
H_2- There will be a significant association between pre-test knowledge score with selected socio-demographic variables.

Population

Population refers to the entire aggregate of individuals or objects having common characteristics.
In the present study, the population consists of staff nurses at the selected hospital at Udaipur.

Sample and sample size

The sample consists of a subset of a population selected in a research study. The samples selected for the present study comprises of staff nurses at Geetanjali medical college and hospital & GBH American hospital at Udaipur. The Sample size for the present study consists of 120 staff nurses.

Research setting

The present study has been conducted at Geetanjali medical college and hospital & GBH American hospital, Udaipur. The selection of the hospital was done on the basis of:

- Geographical proximity
- Feasibility of conducting a study
- Availability of sample

Sampling technique

The Sample was selected through a purposive sampling technique because of the limited amount of time and availability of subjects according to the sampling criteria. In the present study, 120 staff nurses were selected by purposive sampling technique.

2. Method

The method adopted for the present study was evaluative approach as the study aimed at the development of an intervention (Self Instructional Module) for assessing the knowledge of 120 staff nurses in Geetanjali hospital & American hospital in Udaipur. This approach would help the investigator to evaluate the effect of a specific intervention that is "self-instructional module" on the variable that is 'knowledge' of staff nurses regarding negative pressure wound therapy in selected hospitals at Udaipur. In this study, samples were drawn by using the no probability purposive method. Data were collected using structured knowledge questionnaire.

Research approach

The research approach adopted for the present study was evaluative approach as the study aimed to assess the effectiveness of self-instructional module on knowledge regarding negative pressure wound therapy 120 staff nurses in selected hospitals (Geetanjali and American hospitals) at Udaipur. This approach would help the investigator to evaluate the effect of the specific intervention on the variable that is 'knowledge' of staff nurses regarding negative pressure wound therapy.

Research design

The term 'research design' refers to the plan or organization of a scientific investigation. Research design helps the researcher in the selection of subjects, manipulation of experimental variables, control of extraneous variables, the procedure of data collection and the type of statistical analysis to be used to interpret the data. In the present study, pre-experimental one group pre-post test design was selected for the study. The primary objectives of the study were to assess the effectiveness of self-instructional module.

The design chosen for the study is presented in the table as:

Table no 1- Pre- experimental one group pre and post test design.

Group	Pre-test	Intervention	Post-test
	O_1	X	O_2

Key:
O_1 - Assessment of knowledge by pre-test.
X -Provide the self-instructional module regarding negative pressure wound therapy.
O_2 - Assessment of knowledge by post-test.
The study design depicts that a pre-test was given in the form of structured knowledge questionnaire on negative pressure wound therapy, the self-instructional module was given and a post-test to assess the gain in knowledge using the same self-administered knowledge questionnaire.

Ethical consideration

After obtaining permission from research committee of Geetanjali College of Nursing, prior permission was obtained from the Leena Joseph nursing superintendent of the Geetanjali medical college and hospital & Dr. Dev Kothari Director of the GBH American hospital, Udaipur and consent were taken from each participant who had participated in the study.

Description of the tool

The self-administered questionnaire consists of two parts:

Part - I: Consist of selected socio-demographic variables such as age in years, gender, professional qualification, work experience, the area of work experience, attended any seminar. This section consists of 6 items.
Part -II: Consist of the structured questionnaire on Negative pressure wound therapy. This section consists of 30

Variables of the study

- **Dependent variable:** In this study dependent variable is knowledge level of staff nurses regarding negative pressure wound therapy.
- **Independent variable:** In this study independent variable is Self-Instructional Module regarding negative pressure wound therapy.
- **Demographic variable:** In this study, the selected demographic variables are age in years, gender, professional qualification, work experience, area of work experience, attended any seminar.

3. Result

The knowledge of negative pressure wound therapy among staff nurses was assessed. The calculated value is greater than the table value at 0.05 levels. Hence the research hypothesis (H_1) is accepted that there is a significant difference between pre-test & post test knowledge score. There is an association between pre-test knowledge score with selected demographic variables; hence the research hypothesis (H_2) is accepted

Table no 2: Area wise pre test knowledge score of Respondents regarding NPWT

N=120

Area	Maximum score	Mean	Mean %	SD
Ana. & phy. of skin	2	0.83	41.5	3.44
Wound &types of wound	2	0.66	33	2.15
Healing process	3	0.91	30.66	3.15
Definition of NPWT	2	0.62	31	2.15
Indication &contraindication of NPWT	3	0.79	34.66	3.30
Equipment &process of npwt	15	5	33.33	14.15
Complication of NPWT	3	0.94	31.33	2.15
Total	30	9.75	33.64	30.49

Table 2: Depict that the maximum mean percentage obtained by the respondents is 41.5% with SD of 3.44 in the aspect of about anatomy and physiology of skin, and the minimum mean percent obtained by the respondents is 30.66 with SD of 3.15 in the aspect of the concept of the Healing process.

Table no 3: Area wise post test knowledge score of respondents regarding NPWT

N=120

Area	Maximum score	Mean	Mean %	SD
Ana. & phy. of skin	2	1.5	75	6.15
Wound &types of wound	2	1.41	70.5	4.10
Healing process	3	2.16	72	9.00
Definition of NPWT	2	1.49	74.5	3.15
Indication &contraindication of NPWT	3	2.16	72	8.10
Equipment &process of NPWT	15	11.45	76.33	18.61
Complication of NPWT	3	2.25	75	3.30
Total	30	22.42	73.61	52.41

Table 3: Area wise analysis shows the result reveals that the maximum mean percent obtained by the respondents is 76.33% with SD of 18.61 in the aspect of the process of NPWT 74.5% with SD of 3.15 in the aspect of Definition of NPWT.

Table no 4: Distribution of respondents by the level of knowledge.

N=120

Level of knowledge	Score	Frequency		Percentage	
Inadequate knowledge (0-50%)	0-15	Pre-test	Post-test	Pre-test	Post-test
		110	0	91.67	0
Moderately adequate knowledge (50-75%)	16-22	10	54	8.33	45
Adequate knowledge (75-100%)	23-30	0	66	0	55
Total		60	60	100	100

Table 4: The table represents the post-test knowledge level of respondents regarding negative pressure wound therapy. The result showed that 55% of the respondents had adequate knowledge and 45% of the respondents had moderately adequate knowledge regarding negative pressure wound therapy.

Table no 5: effectiveness of the self instructional module regarding by comparing pre and post-test score regarding

N=120

	Mean	Mean (%)	SD	Enhan-cement	Enhac-ement (%)	df	t	Inference
Pre-test	10.08	33.6	2.57	12	40%	119	38.70	S
Post -test	22.08	73.6	1.60					

S = Significant

Table 5: The result reveals that the mean post-test knowledge score 22.08(73.6%) is greater than the mean pre-test knowledge score 10.08(33.6%). The above table also depicts that the enhancement in the knowledge of respondents is 12 (40%) supporting the post test knowledge score are higher than the pre test knowledge score. The data further represent that the't' value of 38.70 is significantly higher than the table value 1.65 at 0.05 level of significance. This indicates that there was the difference in pre test and post test knowledge score and further the data supports that the self-instructional module regarding negative pressure wound therapy is effective in improving the knowledge score of respondents.

H_1: There is a significant difference between the pre and post test knowledge score of staff nurses on negative pressure wound therapy. The hypothesis was tested at 0.05 levels. The calculated' value 38.70 is significantly higher than the table value 1.65 at 0.05 level of significance. This indicates that there is a significant difference between the pre-test and post test knowledge score hence the hypothesis is accepted and proved

H2: There is a significant association between pre-test knowledge score regarding negative pressure wound therapy with selected demographic variables.
The Chi-square test was carried out to determine the association between the pre-test knowledge and demographic variables such as age, gender, professional qualification, duration of work experience, area of work experience, attended any seminar.

4. Discussion

The present study has been undertaken to "assess the effectiveness of self-instructional module on knowledge regarding Negative pressure wound therapy among staff nurses in selected hospitals at Udaipur".
The findings of the study are discussed under the following headings.

Section I: Description of demographic variables of the respondents

Age in years: The majority of the respondents 55% belongs to the age group of 21-25 years, 35% respondents were 26-30 years and 10% respondents were 31-35 years.

Gender: The majority of the respondents 55% were male and 45% of respondents were female.

Professional qualification: The majority of the respondents 50% were GNM, 25% respondents were B.Sc. Nursing, 15% respondents were P.B.Sc. Nursing and 10% respondents were M.Sc. Nursing.

Duration of work experience: The majority of the respondents 60% had Below 1 year, 30% had 1 to 5 year and 12% had 6 to 10 year.

Area of work experience: The majority of respondents 40% work in the surgical ward, 25% respondents work in the Medical ward, 25% work in ICU and only 10% respondents were worked in Emergency.

Attended any seminar: The majority of respondents 75% not attended any seminar and 25% respondents attended the seminar.

Section II: Assessment of pre-test knowledge of respondents regarding negative pressure wound therapy.

The level of knowledge among respondents regarding Negative pressure wound therapy was assessed in pre-test out of 120 respondents 91.67% had inadequate knowledge, 8.33% respondents had the moderate knowledge and no respondents had adequate knowledge on Negative pressure wound therapy.
Hence it was necessary for the investigator to improve the knowledge of respondents by giving information regarding Negative pressure wound therapy.

Section III: Assessment of post-test knowledge of respondents regarding negative pressure wound therapy.
The level of knowledge among respondents regarding Negative pressure wound therapy was assessed that in post-test out of 120 respondents 45% had the moderate knowledge and 55% had adequate knowledge. The overall mean of pre-test knowledge among respondents regarding Negative pressure wound therapy was 10.08 with a standard deviation of 2.57 and mean of post-test was 22.08 with a standard deviation of 1.60.
This revealed that the respondents had significantly higher knowledge after exposure to the self-instructional module.

Section IV: Effectiveness of self instructional module on negative pressure wound therapy among respondents by comparing pre and post-test knowledge score regarding.
The result reveals that the mean post-test knowledge score 22.08(73.6%) is greater than the mean pre-test knowledge score 10.08(33.6%). The above table also depicts that the enhancement in the knowledge of respondents is 12 (40%) supporting the post test knowledge score are higher than the pre-test knowledge score. The data further represent that the't' value of 38.70 is significantly higher than the table value 1.65 at 0.05 level of significance. This indicates that there was the difference in pre-test and post test knowledge score and further the data supports that the self-instructional module regarding negative pressure wound therapy is effective in improving the knowledge score of respondents.

Section V: Association between pre-test knowledge score of respondents regarding negative pressure wound therapy with selected demographic variables.
This study revealed that there is a no significant association between knowledge of respondents and demographic variables such as age (1.94), gender (2.83), area of work experience (0.32) and attended any seminar (2.5). Hence the research hypothesis is rejected at 0.05 level of significance.

There is a significant association between knowledge of respondents and demographic variables such as professional qualification (9.3) and duration of work experience (6.91). Hence research hypothesis H2 is accepted.

Conclusions

This study concludes that there is an improvement in the level of knowledge of staff nurses which indicates that the self-instructional module is effective. The demographic variables of staff nurses significantly associated with the pre-test knowledge score. The development of staff nurses will help the staff nurses to enhance their knowledge.

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