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Effect of Training Program on Performance of Nurses Caring for Patient with Negative Pressure Wound Therapy

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Abstract:*Negative pressure wound therapy (NPWT) is a new noninvasive modality in wound management .The application of NPWT dressing is not difficult but it requires an understanding of how the therapy works and training in the use of device. Staff undertaking dressing changes should have the appropriate knowledge and training to ensure optimum wound care.*
Aim:*The aim of thestudy is to evaluate effect of training program on performance of nurses caring for patient with negative pressure wound therapy.*
Methods:*Aquasi experimental study design was used in this study.*
Setting:*Orthopedic units in Main Mansoura university hospital and emergency hospital.*
Subject:*Sampling was all nurses in orthopedic units in Main Mansoura university hospital and emergency hospital.****Tools:****Tool I: questionnaireto evaluate nurses' knowledge regarding NPWT. It has two parts: Part I: Nurses' demographic data sheet. Part II: Questionnaire sheet to assess nurses' knowledge base regarding NPWT. Tool II: Performance checklist for applying NPWT dressing.*
Result*: Nurses' NPWT total knowledge test scores mean are (21.1±54.4), (32.2±2.3), (30.2±2.6)Pre, post and second post respectively.Nurses' NPWT total practice test scores mean are (34.4±4), (68. 9± 6.1), (73.9± 3.9) pre, post and second post respectively.*
Conclusion*: Nurses' performance toward NPWT was improved after application of a training program on NPWT.*

Keywords*:Training program, negative pressure wound therapy, nurses' knowledge, nurses 'practice*

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I. Introduction

Acute and chronic wounds are a major cause of morbidity and impaired quality of life. They affect at least 1% of the population and represent a significant risk factor forhospitalization, amputation, sepsis, and even death. Thetreatment of large wounds remains a significant challenge topractitioners, a cause of pain and discomfort to the patient (Nagaraj,Hosmani and Shankar,2015).Negative pressure wound therapy (NPWT) is very fast developing method of the wounds treatment. Using NPWT can be recommended in wide spectrum of clinical indications; this type of treatment has become one of the essential elements for the modern and comprehensive treatment of wounds (Banasiewicz, 2014).Negative pressure wound therapy accelerates wound healing in chronic, acute and complex wounds. The technique includes negative pressure andan airtight wound and the suction force created by the NPWT equipment that helps to drain excess fluid leading to the removal of edema and bacterial count reduction, thus promoting granulation tissue formation as well as affecting blood flow andperfusion in the wound (Ma,Li,Shou and Jian,2017).As wound care is the nursing duty and nurses are responsible for patients with NPWT. Nurses need a particular level of knowledge and skills about how to apply this new modality to ensure optimum wound care (Sabour,Elgamil and Elhadi,2017).

1.1 Aim of the study

To evaluate effect of training program on performance of nurses caring for patient with negative pressure wound therapy.

1.2 Objectives

Evaluate nurses' performance after implementation of training program on NPWT.

II. Methods

2.1 Research design
Aquasi experimental design was utilized in this study.

2.2 Study setting and sampling
This study was conducted atorthopedic units in Main Mansoura university hospital and emergency hospital. Sample was 40 nurse worked in orthopedic units dealing with patient apply NPWT.

2.3 Ethical consideration: Anapproval was taken from nurses who agreed to participate in the research process.

2.4 Tools of data collection
The following tools were used to collect data

ToolI: Interview questionnaire sheet: Developed by the researcher and divided in two parts.
Part 1: Socio-demographic Data Sheet: It was consisted of general characteristics of nurses who participate in thestudy including age, level of education, years of experience, job, attendance of previous training program on NPWT, place and duration of previous training.

Part2:Nurses' knowledge sheet regarding negative pressure wound therapy
It was constructed and reviewed by utilizing the most recent and relevant literatures, which included a series of questions to assess nurses' theoretical and applied knowledge related to negative pressure wound therapy and machine alarms. This part consisted of 36 question 11multiple choice question and 25 true or false questions such as NPWT definition, advantages, disadvantages, precautions, complications, device alarms and what refers to.

Tool II: performance checklist for applying negative pressure wound therapy
It was consisted of 26step of applying negative pressure wound dressing (Taylor,Lillis andLynn,2015).including review medical order, hand washing ,preparing equipment's, identifying the patient, Keep patient privacy and explaining the procedure, Assessment patient need for analgesics ,good positioning, Using sterile technique, Using personal protective equipment, Removing previous dressing, Cleansing and assessment and measurement of the wound, Wiping pre wound ,Cutting and foam placement, Trimming of dressing drape, Application of therapeutic regulated accurate care pad, Assessing sealing of the drape, Labeling of the drape and checking of the drape.

2.5 Validity and Reliability
Content validity was conducted to test the tool for appropriateness, comprehensiveness, relevance, correction and clearance through seven experts, from the medical and nursing staff at Mansoura University. Experts were from different academic categories (professors and assistant professors). Their opinions were elicited regarding the tool format, layout, consistency and scoring system .Testing reliability of proposed tool was done by Cronbach's alpha.

2.6 Data analysis
All statistical analyses were performed using SPSS for windows version 20.0 (SPSS, Chicago, IL). Data were tested for normality of distribution prior to any calculations. Continuous data were normally distributed and were expressed in mean ±standard deviation (SD) while categorical data were expressed in number and percentage. The comparisons were determined using one-way analysis of variance (ANOVA test). Chi-square test was used for comparison of variables with categorical data. Statistical significance was set at $p<0.05$.

III. Result

Table (1) illustrates that(52.5%) of the nurses were from 2o years to less than 30 years old with mean age(29.6 ±7.4).As regards to years of experience(47.5%) had (10 to 20)years of experience with mean (10.7 ±8.1).In relation to educational level,(52,5%) were diploma nurse,(37.5%) were institute nurse and the least were bachelor's nurse. In relation to occupation (92.5%) were bed side nurses and (7.5%) were head nurses**.**

Table(1) The socio demographic data of the nurses		
Items	**No=40)**	**%**
Age (years)		
20>30	21	52.5
30>40	14	35.0
40>50	5	12.5
Mean ±SD	29.6 ±7.4	
Experience		
<10	16	40.0
10- 20	19	47.5
>20	5	12.5
Mean ±SD	10.7 ±8.1	
Educational level		
Diploma nurse	21	52.5
Technical nurse	15	37.5
nurse'Bachelors	4	10.0
Occupation		
Bed side nurse	37	92.5
Head nurse	3	7.5

Table(2) reveals that there was statistically significant difference in total knowledge score and total practice score of nurses pre ,post and after three months ($p<0.001$) .The results showed that the majority of nurses had fair knowledge(65%) regarding negative pressure wound therapy before the educational program .After implementation of the educational program ,all the sample had good Knowledge(100%,97.5%,respectively)post and after three months . Regarding nurses' practice with negative pressure wound therapy before the educational program(90%average).After implementation of the educational program the majority had adequate practice level(97.5%,100%respectively) post and after three months($p<0.001$)

Table(2) Comparison of total knowledge score and total practice score through the study								
	Pre		Post		After 3 months		Chi square test	
	n	%	N	%	n	%	X^2	P
Total knowledge score								
Poor	2	5.0	0	0.0	0	0.0		
Fair	26.0	65.0	0	0.0	1	2.5		
Good	12	30.0	40	100.0	39	97.5	68.860	<0.001
Mean ±SD	21.1 ±5.4		32.2 ±2.3		30.2 ±2.6		103.250*	<0.001
Total practice score								
Inadequate	2	5.0	0	0.0	0	0.0		
Average	36	90.0	1	2.5	0	0.0		
Adequate	2	5.0	39	97.5	40	100.0	106.903	<0.001
Mean ±SD	34.4 ±7.9		68.9 ±6.1		73.9 ±3.9		487.628*	<0.001
** F value, ANOVA test*								

IV. Discussion

This study showed that all participants were females this reflect the nature of nursing profession is a job for female. The result of the study was harmonized with (Sabur, Elgamil, and Elhadi, 2017) who found that the majority of nurses are female. Also, the current study showed that around one half of nurses were aged between 20 to 30 years old, this result is consistent with Abdel-aziz (2014) who found that the mean of age of nurses was (26.4 ± 4.8) this differ from the study by Sabur,Elgamil and Elhadi (2017) who found that around half of nurses were mostly in the middle age between 31to 40.

Around one half of the sample had nursing diploma while only 10% were bachelor degree in nursing this means that majority of nurses dealing with wound and in contact with patient are diploma nurses. Thisresult is incongruent with Margaret et al (2014) who found that around half of the nurses were holding bachelor degree.

This study's results showed that the mainstream of nurses have fair knowledge regarding negative pressure wound therapy before implementing the educational program. From the researcher point of view this attributed to several factors such as, insufficient level of knowledge regarding negative pressure wound therapy because nurses didn't consider wound care as nursing role, lack of formal source of knowledge about wound care, lack of specialized structured training program about wound care ,lack of time due to natural workload in their workplace as the numbers of nurses did not had enough time to attend any educational sessions and lack of motivation to gain new knowledge.This result is in congruent with Emere (2006) who found that nearly half of the nurses didn't see care of the wound as nursing duty.

In addition, Surme, Kartin and Curuk (2016) advocated that nurses had inadequate awareness about nursing rules. Additionally, this may be related with fact that wound dressing is done generally by the medical staff other than nurses.

This is consistent with the study by Sabur, Elgamil and Elhadi (2017) which demonstrates that nurses have insufficient information concerning wound VAC therapy. There are various causes that could direct to deficient nurses' knowledge, for example absence of support from wound care manager, absence of support from the corporations or manufactures producing the appliances and lack of proper communication between wound care staff that could be a purpose as nursing staff learn from each other.

Level of knowledge was improved post immediate implementation of the program to good level with highly statistically significant improvement. This could be due to simple explanation language, recent teaching strategy, media, educational booklet used, re-demonstration, in addition to pen and note were provided to nurses to get feedback and facilitate their understanding.

This finding is supported by a previous study by Pancrbo-hidalgo, Garcia-fernandiz, Lopez-ortega and Lopez-medina (2007) that showed that nurses' knowledge was affected by professional training and education.

Also, this result was in congruent with Tahseen and Batool (2015) who reported that there were significant differences in nurses' knowledge post immediate implementation of educational program about wound care.

In this study after 3 months posttest level of knowledge still good but there were slight decrease in total knowledge score. This result is in agreement with study done by Samia, Hala, Warda and Tarek (2011) who found that there are partial loose of improved knowledge after two months of implementation of educational program .

This result might be clarified by the fact that, knowledge retention is usually influenced by passing of time. This influence is toward the decreased level of recall and retention.

The majority of the nurses in this study had an average total practice score before implementation of the educational program this is due to novelty of the NPWT dressing application in the unit ,dressing application were done by only doctors .Nurses were not attended any workshops about negative pressure wound therapy ,lack of time.

This result in congruent with Hadley and Roques(2006) who reported that moderate level of practice among staff may be related to certain aspects; the nursing staff shortage, inadequate time of patients care. Likewise, Kwekkeboom et al (2006) reinforced this result by stressing that targeting precise requirements of staff of nurses at different care settings requires training programs.

This study was in the matching track with Clinton et al (2006), Levett-Jones et al (2006) and Jarrett et al (2007) who stressed that the educational programs have a duty to offer the nursing staff with the essential behavioral skills basic to efficient work practice.

This study revealed that a statistical significant progress in the studied nurses' entire practice score immediately post and after three months of the program's interference was present. This high statistically significant progress after the program's application might be as a result of the program's effect which not only stressed on the gaining the knowledge, but also it did stress on applied training to increase the information and alter the work practice by means of appropriate sessions, different teaching approaches as lectures, discussions, demonstrations and re-demonstrations, usage of media as handout with pictures and information in addition to the obtainability of adequate supplies and resources required for the work achievement.

This encouraged the studied nurses to attain the anticipated purposes through rewarding and encouraging positive attitude and discouraging negative attitudes. Furthermore, repeated reinforcement for both practice and knowledge was done in every session and their awareness to have a good annual report as the authority supported the researcher to motivate nurses by having a good annual report.

This result is consistent with Ibrahim's study (2013) that showed progress in the total practice score of nurses after the program's application with statistical significant difference between before and after the program's application. The previously mentioned result can be clarified by Eslamian, Moeini and Soleimani (2015) argument which stated that the continuous education was proved to raise the professional behavior of the nursing staff and increase the patient management awareness and nursing practice

Furthermore, this current study revealed that there is no significant relation to nurses' socio demographic data and NPWT knowledge or practice score. Yet, Carol (2012) found that there is a week positive relation between level of education, age and nurses' knowledge score.

It was also found that the number of experience years did not have any effect on the level of knowledge as it is often presumed that many years of experience in wound management must lead to knowledge. Though, when suitable educational feedback is not delivered by the organizational management and reinforced by health care policy makers, and knowledge sharing is not tracked across the staff, as might be the case in many clinical institutes, years of experience are not a guarantee of proficiency Zarchi, Latif, Haugaard, Hjalager and Jemec(2014).

The investigator found that the participants' level of knowledge could be improved by providing them with the continuous educational programs to enrich the retaining of knowledge. The educational intrusions and program should emphasize on the understanding and meaning instead ofmemorization, along with adequate time to learn the complexsubjects and planned practical engagement with tasks.

In the study there were a highly significant difference in nurses' knowledge and practice pre and post application of the program and the study hypothesis was achieved.

V. Conclusion And Recommendation

Based on the finding of this study, the following can be concluded: nurse's knowledge and practice can be improved by application of an educational program regarding a specific topic as negative pressure wound therapy applicationThe hospital should motivate nurses and allow them to update their knowledge by giving them extra time for self-learning.Encourage ward-based education through demonstrations and workshops rather than lectures only. This will help close the gap between theory and practice in wound care performance.

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