

## Assessment of Nurses' Knowledge and Practices Regarding Wound Vacuum Assisted Closure Therapy

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**Abstract:**Wound vacuum assisted closure (VAC) therapy was developed to facilitate wound healing. Nurses who are responsible for patients with wounds need a particular level of expertise and education to ensure optimum wound care.

**Aim:** The aim of the study is to assess the nurses' knowledge and practices regarding wound VAC therapy.

**Methods:**A quantitative descriptive, exploratorydesign was used in this study. **Setting:** Surgical inpatient and surgical intensive care unit (ICU) at King Abdulaziz University Hospital (KAUH). **Subject:** A convenient sampling was selected from all surgical inpatient nurses, and surgical ICU nurses at KAUH. **Tools:** Tool I: questionnaire to assess nurses' knowledge regarding wound VAC therapy. It has two parts: part I:Nurses' Demographic data sheet. Part II: Questionnaire to assess nurses' knowledge base regarding wound VAC therapy. Tool II: Questionnaire to assess nurses' practices regarding wound VAC therapy.

**Result:**Nurses' wound VAC total knowledge test scores mean is  $(37.32 \pm 5.12)$ . Nurses' wound VAC practice assessment over all response is 2.23 out of 3 which is considered as (frequently). There were weak positive correlations between nurses' wound VAC total mean knowledge score and overall practice response. Pearson correlation coefficients were 0.206,  $p < 0.05$ .

**Conclusion:** The nurses in the study have in adequate knowledge and practices regarding wound VAC therapy.

**Keywords:**wound VAC, nurses' knowledge, VAC system, nurses' practice, negative pressure wound therapy.

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### I. Introduction

Nowadays, acute and chronic wounds affect at least 1% of the population and represent a significant risk factor for hospitalization, amputation, sepsis, and death.(Bjarnsholt, 2011) Providing successful wound management has become the goal for all health institutions. Nurses who are the first line providing care for patients with VAC therapy need to be aware of the theoretical background of VAC therapy as well as the clinical practice with VAC therapy. Nurses who are responsible for patients with wounds that do not heal properly can pose serious health problems need a particular level of expertise and education to ensure optimum wound care. However, not all health care facilities have providing the nurses with orientation regarding the new technologies in wound management. Using VAC therapy with certain types of wound has many positive outcomes such as enhanced healing and granulation tissue formation; management of highly exuding wounds; reduced dressing changes compared with more conventional dressings; reduced nurse time; reduced costs; and improved quality of life (Othman, 2012).

#### 1.1 Aim of the study:

Aim: To assess nurses' knowledge and practices related to wound VAC Therapy.

#### 1.2 Objectives:

- Assess nurses' knowledge related wound VAC therapy
- Assess current nurses' practices of wound VAC therapy.

### II. Methods

**2.1 Research Design:** A quantitative descriptive, exploratorydesign was utilized in the study.

#### 2.2Study Setting and Sampling

This study was conducted at King Abdulaziz University Hospital (KAUH); surgical inpatient and surgical ICU. A convenience sample was selected from the selected wards at KAUH. The total sample size is 76 nurses. Inclusion criteria are: Nurses who have at least 3 months of experience in the directed unit. Exclusion

criteria are nurses who are not directly working with patients such as nurse managers and nurses who refused to voluntarily participate in the study.

**2.3 Ethical Consideration:** The approval of conducting the research was taken from nursing college at King Abdulaziz University KAUH to collect the data.

**2.4 Tools:**

Two tools were used for data collection. Tools are developed by the researcher according to review of relevant literatures

**Tool I: Demographic and knowledge assessment questionnaire regarding wound VAC therapy:** It is divided into two parts:

**Part 1: Nurses' Demographic data sheet:** It includes age, gender, educational level, years of working experience and attending courses related to wound VAC therapy.

**Part 2: Questionnaire to assess nurses' knowledge base regarding wound VAC therapy.**

It contains 25 true and false questions to evaluate nurses' knowledge regarding wound VAC. The questions covered indications, contraindications, and foam selection, frequency of changing, consent, and discharge plan of patient with VAC therapy.

**Tool II: Questionnaire to assess nurses' practices regarding wound VAC therapy.**

It contains 19 items regarding handling patient with wound VAC therapy. The items covers: nursing actions prior wound VAC application, application of the VAC therapy, removal of wound VAC dressing, mobilization of patient with VAC therapy, managing troubleshooting of the VAC therapy, patient education during VAC therapy, and nursing documentation regarding VAC therapy.

The investigator visited the unit during morning shift. Then every participated nurse was given the questionnaire. Brief description of research aim and objectives was given to the nurses and given them around 30 minutes to fill them. No Internet access or reference materials will be allowed on the ward to ensure that the nurses did not seek any external assistance to answer the questions.

**2.5 validity and Reliability:**

Questionnaire was reviewed by five experts in the field of medical surgical nursing department, faculty of nursing, KAU. Wound care nurse, and head nurse of surgical unite of King Abdul Aziz University hospital also reviewed the tool Questionnaires of the current study was tested by Cronbach's alpha(alpha= 0.70).

**2.6 Data analysis:**

All statistical analysis was carried out using statistical package for social sciences SPSS version 21. Descriptive statistic was used in term of means, standard deviations, frequencies and percentages for demographic variables. Inferential statistic was carried out to test correlation and significance. One way ANOVA and independent t test was done to test the significant differences between the groups. A correlation between levels of knowledge and practice was determined using Pearson's correlation, to determine if level of knowledge is related to practice.

**III. Result**

Table I presents demographic characteristics. Around half of the participated nurses' were between 31 to 40 years old (56.6%). Most of the participated nurses were female (89.5%). The highest percentage of participated nurses held bachelor degree (BSN) (51.3%) while the lowest percentage of participated nurses held master degree (5.3%). Regarding nurses' years of experience, 44.7% of the participated nurses have between five to ten years of experience while only 13.2% of them had between one to five years of experience. Considering how frequencies nurses handle patient with wound VAC, half of the nurses (50%) said frequently they handle patients with wound VAC and 40% answered as occasionally. It is only 1 participant answered as never handle patient with wound VAC. Only 38.2% of participated nurses have attended wound care courses during the past 12 months. From those who have been attended wound care courses, 51.7% indicated that they have received verbal wound care sessions. However, none of the participated nurses reported that they received any wound care demonstration. Around one half of nurses (48.6%) were not attended wound VAC session during the past 12 months.

Table 1: Distribution of participating nurses according to socio demographic characteristics

Socio demographic characteristics	No	%
Age (years)		
20 - 30	18	23.7
31 - 40	43	56.6
41 - 50	15	19.7

<b>Gender</b>		
Male	8	10.5
Female	68	89.5
<b>Level of education</b>		
Diploma	33	43.4
BSN	39	51.3
Master	4	5.3
<b>Years of Experience</b>		
1 < 5 years	10	13.2
5 < 10 years	34	44.7
≥ 10 years	32	42.1
<b>Years you have been working in the current unit</b>		
< 5 years	28	36.8
5 ≤10 years	26	34.2
> 10 years	22	28.9
<b>How frequently do you handle patients with wound VAC</b>		
Always	6	7.9
Frequently	38	50.0
Occasionally	31	40.8
Never	1	1.3
<b>Have you receive wound care training courses in the past 12 months?</b>		
No	47	61.8
Yes	29	38.2
<b>Please indicate type of education of wound care training course</b>		
Verbal	15	51.7
Printed material	8	27.6
Computer material	6	20.7
Demonstration	0	0.0
<b>When the last time you attended wound VAC training session</b>		
1 < 6 months ago	17	22.4
6 to < 12 months ago	11	14.5
≥12 months ago	37	48.6
None	11	14.5

Table II shows mean, median and SD of total score of wound VAC knowledge test. The mean total score for the entire sample is 37.31±5.12 or 74.64% correct. The median score for wound VAC knowledge test is 39 or 78%. It indicates the cut off score which means nurses who got above median score (78%) has adequate knowledge regarding wound VAC therapy. This indicates that the total knowledge mean score is less than median score, reflecting that participated nurses have inadequate knowledge regarding wound VAC therapy.

Table II: Illustration of mean, median, and standard deviations for nurses' wound VAC knowledge test.

Knowledge test	Mean ± SD	Percentage of mean score	Median	Percentage of median score
Total Score of 50	37.31±5.12	74.64%	39.00	78%

Table III illustrates the association between socio demographic variable and total mean of wound VAC knowledge test score. ANOVA test showed that there is only significant difference between the answered groups of handling patients with wound VAC groups as p<0.05 with the highest knowledge mean (39.73± 3.06) score for those who always handle patients with wound VAC.

Table III: Association of socio demographic variables and wound VAC knowledge test total score (one way ANOVA and independent t test).

Socio demographic Variables	Categories	Mean ±SD	Significance (p-values)
Age (years)	20 - 30	37.0 ± 4.40	0.956
	31 - 40	37.3 ± 5.42	
	41 - 50	37.46 ± 5.32	
Gender	Male	35.8 ±7.04	0.386
	Female	37.4 ±4.89	
Level of education	Diploma	36.6 ± 6.24	0.346
	BSN	37.5 ±4.10	
	Master	40.5 ± 2.89	

Years of experience in nursing field	1 < 5 years 5 < 10 years ≥ 10 years	37.3 ± 4.45 37.0 ± 4.83 37.6 ± 5.72	0.897
Years you have been working in the current unit	< 5 years 5 < 10 years ≥ 10 years	38.1 ± 4.03 37.4 ± 4.86 36.2 ± 6.52	0.428
How frequently dose you handle patients with wound VAC?	Always Frequently Occasionally Never	39.8 ± 3.06 38.0 ± 3.54 36.4 ± 6.09 21.00	0.003*
Have you received wound care training courses in the past 12 months?	No Yes	37.15 ± 4.97 37.59 ± 5.43	0.720
When was the last time you attended in-service or workshop about wound VAC?	1 < 6 months ago 6 to < 12 months ago ≥ 12 months ago None	39.7 ± 2.98 34.5 ± 8.72 37.6 ± 4.22 36.1 ± 5.11	0.127

\*Statistically significance if  $p < 0.05$ .

Table IV presents' nurses' wound VAC practice assessment result. It is revealed that nurses achieve the highest mean in documentation regarding wound VAC therapy. However, the nurses achieved the lowest mean in changing the VAC dressing by themselves. Removal of VAC dressing has the lowest total mean score and percentage as it indicates that participants are not performing removal of the dressing so often. Overall, wound VAC nurses practice assessment result shows that over all response is 2.23 which is represent nurses frequently doing their practices regarding wound VAC therapy.

Table IV: Wound VAC practice assessment result

Category	Mean response	Percentage of mean
Nursing action prior application of VAC therapy	2.39 (Always)	79.8%
Application of VAC therapy	2.04(frequently)	67.94%
Removal of VAC dressing:	1.52(frequently)	50.66%
Mobilization	1.71(frequently)	57%
Education:	2.55(Always)	85.17%
Troubleshooting	2.22(frequently)	74%
Documentation	2.67 ( Always)	87.83%
Overall mean response	2.23 (frequently )	74.33%

Table V illustrates the correlation between nurses total wound VAC knowledge and practice scores. Pearson correlation was used to evaluate the possible association between nurses' wound VAC knowledge and practice scores in the total group. There were weak positive correlations between nurses' wound VAC knowledge and practice (Pearson correlation coefficients were 0.206,  $p < 0.05$ ), as shown in table V. Therefore, nurses with greater wound VAC knowledge reports better wound VAC practice.

Table V: Correlation between wound VAC total knowledge mean score and overall practice mean score. (Pearson Correlation)

		Total practice mean score
Total knowledge mean score	Pearson Correlation	0.206
	Sig. (2-tailed)	0.007*

#### IV. Discussion

This study shows that the majority of participants were female 89.5% while only 10.5% are male. This indicates that the number of female nurses is higher than male nurses as the nature of nursing profession is more likely to be a female job. The result of this study is matched with Gabrielle B et al, 2016 who found that the majority (80%) of nurses are female.

Also, the current study result showed that around one half of nurses were aged between 31 to 40 years old which indicate that nurses are mostly in the middle age. These results differ from Gabrielle B 2016 who found that the predominant age group of nurses was between 26 to 30 years, with 55%, but they are broadly consistent with Phan T et al 2016 who found that the average age of nurses was 31.24 ( $\pm 6.65$ ) years old. Around one half of the selected sample had bachelor degree in nursing, while only 40% had nursing diploma. As the research setting is a university hospital (KAUH), nursing staff are selected to be more educated therefore most of the nurses has bachelor degree in nursing. These results are similar with Margaret B et al (2014) who found that 52% of the nurses were holding bachelor degree.

The result of this study also shows that nurses handle patient more frequently. There is only one nurse who never handle patient with wound VAC therapy. This indicates that there are many patients using wound VAC therapy and nurses tend to handle patients with VAC therapy more frequently. Two third of the participated nurses were not attended any wound care workshop or in-service training in the past 12 months. Many reasons for not attending wound care courses could be include lack of educational support from clinicians and education team in the hospital. It could be also due to lack of time as many nurses ask to attend during their off day which could be difficult for them. However, the findings of the current study do not support the previous research which was done by Carol P (2012) who found that 61% of the nurses were attended wound care training courses but consistent with Gabrielle B who found that (67.3%) of nurses said they had not received sufficient education about the care of wounds.

The result of the current study shows that participated nurses has inadequate knowledge regarding wound VAC therapy as the total mean score is less than total median score. There are many reasons could lead to insufficient nurses' level of knowledge regarding wound VAC therapy such as lack of support from wound care team and nursing education and lack of support from the companies that provide the machines. Absent of proper communication between staff could be a reasons since many staff learn from each other.

In addition, the current study showed that there is no significance differences related to nurses' level of education and wound VAC knowledge. Also, there is no significance difference between age groups and nurses wound VAC knowledge score. However, Carol P (2012) found that there is weak positive relation between level of education, and age with nurses' knowledge score.

The current study found that nursing practices regarding wound VAC therapy achieved overall response (frequently) when it compared to waited mean. This indicates that nurses do wound VAC practices; however, still they do not reach the best responses (always).

The result of the study shows that nurses always carried out nursing assessment before VAC application. This finding is consistent with Yeliz S (2016) who found that most of the nurses do holistic assessment for the wounds and the patients. It is clear from the current study result that nurses achieved high mean response in documentation and nursing education regarding wound VAC and wound condition which means it is done always by the nurses. This result is matched with Martindell (2012) who said that patient's education is essential. Patients must understand concepts of wound VAC as well as risks and benefits of this therapy.

The study showed is that there were low positive correlations between nurses' total wound VAC knowledge score and wound VAC overall practice response. This indicates that once nurses knowledge regarding wound VAC improved through education and training, nurses' practice of wound VAC will be improved too. PAT M (2012) agreed with the current study result as she found that when nurses had updated their knowledge on wound care in the previous two years application to practice was significantly enhanced.

## V. Conclusion and Recommendation

Based on the findings of the current study, nurses have inadequate knowledge and practice regarding wound VAC therapy. Nurses practices regarding wound VAC needs to be improved to achieve the maximum responses. Recommendation: The current study can serve as a guild line to develop a hospital policy and procedures regarding wound VAC therapy. Nurses are encouraged to attend continues education and workshop to improve their knowledge and practice regarding wound VAC therapy.

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