

Nurses' knowledge toward Dressing Pin Track External Fixation in Orthopedic Ward at Al-Emamin Al-Khadamin Teaching City

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Background: Dressing can be used to provide moisture around area of pin track hole to control nosocomial infection may be exogenous or endogenous transmission; exogenous pin track complication are acquired from sources outside the body such as medical personnel, visitors, equipment, and health care environment, an endogenous pin track complication develops from sources within body

Objective: To assess orthopedic nurses' knowledge toward dressing pin track external complications in orthopedic ward and to find out the relationship between the orthopedic nurses' knowledge socio-demographic characteristics of gender, age, educational level, marital status, and their knowledge related to pin track infection for external fixation.

Methodology: A descriptive analytic study was conduct on non-probability (purposive sample) of (40) orthopedic nurses who had work in orthopedic ward at Al-Emamin Al-Kadhumian teaching city in Baghdad city; (20) orthopedic nurses for the study group and (20) orthopedic nurses for the control group. The data were collected for the period from May 24th, 2016 to June 5th, 2017 using an interview technique and the questionnaire which were consisted of (2) sections which include; first part, socio-demographic data and second part, questions about definition and general information about the dressing of pin hole external fixation and descriptive statistical analyses were used to analyze the data.

Results: The results of the study indicated that the majority of the study sample (60%) were male, and (35%) at age group (30-39) years old, (75%) were married of the study sample and (50%) were graduate from institute. That there was a statistically no significant association at ($P \leq 0.05$) between the study group of pin track dressing of orthopedic nurses' knowledge related to (age, gender, marital status) but there was a significant association related to the educational level.

Conclusions: The study results indicate an insufficient orthopedic nurses' knowledge of pin external fixation dressing who done of orthopedic ward. But the results of the study group of orthopedic nurses' knowledge which is exposed to the educational program benefited from the implementation of the educational program, and their knowledge was successfully enhanced and established.

Recommendations: based on the findings, the study recommended to prepare a special training program to promote orthopedic nurses' knowledge concerning dressing of pin external fixation, distribution a handbook in orthopedic wards and encourage orthopedic nurses to complete their academic study to be enhance knowledge and practices to provide efficient care.

Index Terms: orthopedic Nurses' knowledge, dressing pin external, orthopedic ward

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I. Introduction

Orthopedic wards are hazardous places for acquirement of pathogens, not only pin hole wounds will be infected with microorganism but in adequately sterilized instruments, environment medical surfaces and utilization of orthopedic nurses' knowledge and practice for dressing around pin external fixation without hand washing before any procedure. All of them assist to transmission infection complications from patient to another patient ⁽¹⁾. The purpose of pin external dressing to promote wound healing around pin. Assess the healing process and prevent transmission infection of external fixation, dry, sterile and clean dressing of pin external fixation reduce infection of microbes ⁽²⁾. The role of pin external fixation is to firmly protect and support fracture bone and joint to correct position even prevent post fracture complication from infection and detect moving bone while it heals. Pin external fixations were chosen according different types of fracture, and injury of wound, external fixations device was made of either carbon or stainless and consist from three-parts pin are inserted in bone, bars connect and joint to connect pin with bar outside of skin to maintain of mobility to prevent loosely of external fixation even reduce of delay of bone fracture union ⁽³⁾. Unsterile and moist dressing, infection, loosening pin, un healing wound, pin hole abscess, chronic systematic diseases, tissue necrosis and another multi variables are these complications causing delay of bone fracture site and occurs sets of signs and

symptoms of inflammation, swelling, bacterial infection after increase of white blood cells of the body (4). Over 70% Staphylococcus Aureus bacterial infection is common of complication of orthopedic pin external fixation cases in ward. Reside pin sepsis was a high rate dilemma caused by group A Beta-Hemolytic Streptococcus and Alpha-Hemolytic Diplococcus in musculoskeletal system (5).

II. Methodology

A descriptive design study was carried out to assess orthopedic nurses' knowledge concerning dressing of pin track fixation. A purposive (Non-probability) sample of (40) orthopedic nurses who had done in orthopedic ward in Al-Emamin Al-Khadamin Medical City; (20) orthopedic nurses for the study group and (20) orthopedic nurses for the control group. The data were collected of carried out during the period from May 24th 2016 to June 5th 2017. The researchers collected the samples by interview teaching to the orthopedic nurses before implementing the educational program before test was done for both (study and control group) related to orthopedic nurses' knowledge concerning pin track dressing for external fixation and the researcher used a questionnaire format for orthopedic nurses' knowledge. Three weeks later, the post-test was given to both groups, after the program has been finished with the study group. The researcher using the most recent and relevant literature through educational program. Questionnaire form filled by the orthopedic nurses. Questionnaires form consists of two parts; the first part is about the sociodemographic data information of orthopedic nurses; the second part is about involves essential care for orthopedic nurses' knowledge about pin track dressing for external fixation. The content validity of the instrument was recognized through displaying it on (30) experts with competence and the reliability have been determined through the pilot study was based on the test-retest method. Ten orthopedic nurses who work at orthopedic ward, experts had at least 10 years of experience in their specialist with 26 years and the application of the Pearson correlation coefficient. The results of the study reliability were calculated by using correlation coefficient statistical method between the test and retest orthopedic nurses. The methods of descriptive and inferential statistics are used when the data have been analyzed.

III. Results

Table (1): Distribution of orthopedic nurses' knowledge by their Sociodemographic characteristics

Variables	Study Group			Control Group		
	Frequency	percentage	Cumulative percent	Frequency	percentage	Cumulative percent
1- Gender						
Male	12	60	60	12	60	60
Female	8	40	100	8	40	100
Total	20	100		20	100	
2- Age (Years)						
20-29	5	25	25	4	20	20
30-39	7	35	60	10	50	70
40-49	4	20	80	4	20	90
50 and above	4	20	100	2	10	100
Total	20	100		20	100	
3- Marital status						
Married	15	75	75	12	60	60
Single	3	15	90	6	30	90
Divorced	1	5	95	0	0	90
Widowed	1	5	100	2	10	100
Total	20	100		20	100	

Table (1): (Continued)

4- Level of education	Frequency	percentage	Cumulative percent	Frequency	percentage	Cumulative percent
Nursing School	1	5	5	7	35	35
Secondary Nursing School	7	35	40	0	0	35
Nursing Institute	2	10	50	3	15	50
Medical Institute	6	30	80	6	30	80
Academic Nurse	4	20	100	4	20	100
Total	20	100		20	100	

Table 1: The demographic data characteristics of orthopedic nurses shows that the majority of (60. %) were female for the study group and (60%) were male and (40%)were female in control group. Most of the study group (35%) from the age group (30-39) years and (20-29) (25%) for study group and (50%)from the age group (30-39) years and(20%) for (20-29)(40-49) years for the control group. Most of (75%)were married of the

study group and (60%) were married of the control group Relative to their level of education, the majority of number of them were secondary nursing school graduation (35%) ,(30%) were medical nursing institute these for the study group, while (35%) were nursing school for the control group

Table (2): Mean of Score Comparison of pretest between the Study and Control Groups of dressing of pin external fixations

Orthopedic nurses' knowledge related dressing for pin external fixation		Study Group		Control Group	
		Pre- Test		Pre- Test	
		M.S	S.D	M.S	S.D
1.	Wearing gloves, gown for disinfection and cleaning procedure	1.90	0.85	2.10	0.78
2.	Wearing clean gloves to remove old dressing for each pin track infection case	2.10	0.86	1.80	0.83
3.	Cleaning pin site by using normal saline and 70% alcohol to remove crusts around pin fixation	2.20	0.69	1.85	0.86
4.	Sterilizing wound and cleaning device which is near pin external fixation	1.80	0.76	1.45	0.69
5.	Sterilizing external fixation for each pin by surgical Butadiene solution by putting small size dressing gauzes	1.80	0.83	1.95	0.82
6.	Dressing external new fixation pin after cutting and preparing small pieces of gauze around pin	1.40	0.50	1.10	0.31
7	Starting procedure of pin track dressing from bottom to top and using circular motion around site of pin	1.20	0.61	1.45	0.69
8	Wearing double gloves when present severe infection for pin track infection	1.45	0.69	1.15	0.37
9	Removing and putting old dressing inside bag related trolley of dressing before putting new dressing	1.60	0.59	1.45	0.61
10	Putting new dressing by using surgical pens for each parts of pin external fixation	1.50	0.69	1.55	0.75
11	Exchange exudates wet or full dressing of pin external fixation	2.35	0.81	2.55	0.76
12	Sterile external fixation as a whole from down to up and circulation motion of pin external track	1.65	0.59	1.25	0.44
13	Remove gloves after completing dressing procedure for each orthopedic patient to prevent transmission from patient to another	2.10	0.79	1.35	0.59
14	Avoiding put creams and ointment s around pin track infection	1.40	0.59	1.20	0.62

Table (2): The results of the orthopedic nurses' knowledge study group and control group showed there are differences between mean of score of pre-test for orthopedic nurses' knowledge related of dressing for pin track fixation. Item was low to moderate in some items.

Table (3): Mean of Score Comparison of posttest between the Study and Control Groups of dressing pin external infection

Orthopedic Nurses knowledge concerning dressing for pin track infection of external fixation		Study Group		Control Group	
		post- Test		post-test	
		Mean of score.	Standard deviation	Mean of score.	Standard deviation
1.	Wearing gloves, gown for disinfection and cleaning procedure	3.00	0.00	2.50	0.69
2.	Wearing clean gloves to remove old dressing for each pin track infection	2.65	0.58	1.60	0.75
3.	Cleaning pin site by using normal saline and 70% alcohol to remove crusts around pin fixation	2.85	0.37	1.85	0.81
4.	Sterilizing wound and cleaning device which is near from pin external fixation	2.70	0.65	1.45	0.60
5.	Sterilizing pin fixation for each pin by surgical Butadiene solution by putting small size dressing gauzes	2.85	0.37	2.05	0.75
6.	Dressing new pin external fixation after cutting and preparing small pieces of gauze around pin	2.50	0.68	1.05	0.22
7.	Starting procedure of pin track dressing from bottom to top and using circulator motion around site of pin	2.65	0.67	1.40	0.68
8.	Wearing double gloves when present severe infection for pin track infection	2.45	0.61	1.00	0.00
9.	Separated old dressing before putting new dressing inside container for trolley of dressing	2.40	0.68	1.35	0.49
10.	Putting new dressing by using surgical pens for each parts of external fixation	2.55	0.75	1.25	0.44
11	Exchange exudates-wet or fluid dressing and infected of pin external fixation	2.75	0.55	2.65	0.67
12	Sterile external fixation of orthopedic patient as a whole device from down to up and circulation motion of pin hole to reduce infection	2.40	0.68	1.25	0.44
13	Remove gloves after completing dressing procedure for each orthopedic patient to prevent transmission from orthopedic patient to	2.65	0.67	1.35	0.49

	another				
14	Putting creams and ointment around pin track infection of external fixation is permitted	2.70	0.47	1.15	0.48

Table (3) shows that mean of score of posttest for study and control group of orthopedic nurses' knowledge related of dressing for pin track fixation. Item was high on study group and low rate of items of control groups, after implementation of educational program for study group

Table (4): Mean of Score Comparison of pretest and posttest between the Study Groups of dressing pin external fixation

Orthopedic Nurses knowledge concerning dressing for pin track infection of external fixation		Study Group		Study Group	
		pre- Test		post-test	
		Mean of score.	Standard deviation	Mean of score.	Standard deviation
1.	Wearing gloves, gown for disinfection and cleaning procedure	1.90	0.85	3.00	0.00
2.	Wearing clean gloves to remove old dressing for each pin track infection	2.10	0.86	2.65	0.58
3.	Cleaning pin site by using normal saline and 70% alcohol to remove crusts around pin fixation	2.20	0.69	2.85	0.37
4.	Sterilizing wound and cleaning device which is near from pin external fixation	1.80	0.76	2.70	0.65
5.	Sterilizing pin fixation for each pin by surgical Butadiene solution by putting small size dressing gauzes	1.80	0.83	2.85	0.37
6.	Dressing new pin external fixation after cutting and preparing small pieces of gauze around pin	1.40	0.50	2.50	0.68
7.	Starting procedure of pin track dressing from bottom to top and using circulator motion around site of pin	1.20	0.61	2.65	0.67
8.	Wearing double gloves when present severe infection for pin track infection	1.45	0.69	2.45	0.61
9.	Separated old dressing before putting new dressing inside container for trolley of dressing	1.60	0.59	2.40	0.68
10.	Putting new dressing by using surgical pens for each parts of external fixation	1.50	0.69	2.55	0.75
11	Exchange exudates-wet or fluid dressing and infected of pin external fixation	2.35	0.81	2.75	0.55
12	Sterile external fixation of orthopedic patient as a whole device from down to up and circulation motion of pin hole to reduce infection	1.65	0.59	2.40	0.68
13	Remove gloves after completing dressing procedure for each orthopedic patient to prevent transmission from orthopedic patient to another	2.10	0.79	2.65	0.67
14	Putting creams and ointment around pin track infection of external fixation is permitted	1.40	0.59	2.70	0.47

Table (4) shows that mean of score of pretest and posttest for study group of orthopedic nurses' knowledge related of dressing for pin track fixation. Item was moderate in pretest but high rate in posttest, after given lecture, videos and posters in educational program.

Table (5): Association between the study group's Age and their knowledge total items rate in the post test

Age (Years)	Total items rate of orthopedic nurses' knowledge for the study group posttest		Total
	Moderate	High	
20-29	0	5	5
30- 39	1	6	7
40- 49	0	4	4
50 and above	0	3	4
Total	1	18	20

Df =3 χ^2 crit. = 7.815 P ≤ 0.05 χ^2 obs. 0.991

Df=degree of freedom, χ^2 crit=chi-squire critical, P= probability, χ^2 ob = Chi- Squire Observed
 Table (5) shows that there is no significant difference between total items rate of orthopedic nurses' knowledge related to pin track dressing for external fixation.

Table (6): Association between the study group's Gender and their knowledge total items rate in the post test

Gender	Total items rate of orthopedic nurses' knowledge for the study group posttest		Total
	Moderate	High	
Male	11	1	12
Female	7	0	8
Total	18	1	20
Df =1 χ^2 crit. = 3.841 P ≤0.05 χ^2 obs. 0.814			

Df=degree of freedom, χ^2 crit=chi-square critical, P= probability, χ^2 ob = Chi- Square Observed
 Table (6) shows that there is no significant difference between total items rate of orthopedic nurses' knowledge related to pin track dressing for external fixation.

Table (7): Association between the study group's Mitral status and their knowledge total items rate in the post test

Mitral status	Total items rate of orthopedic nurses' knowledge for the study group posttest		Total
	Moderate	High	
Married	13	1	15
Single	3	0	3
Widowed	1	0	1
Divorced	1	0	1
Total	18	2	20
Df =3 χ^2 crit. 7.815 P ≤0.05 χ^2 obs. 4.571			

Df=degree of freedom, χ^2 crit=chi-square critical, P= probability, χ^2 ob = Chi- Square Observed

Table (7) shows that there is no significant difference between total items rate of orthopedic nurses' knowledge related to pin track dressing for external fixation.

Table (8): Association between the study group's Educational level and their knowledge total items rate in the post test

Educational level	Total items rate of orthopedic nurses' knowledge for the study group posttest		Total
	Moderate	High	
Nursing School	0	0	0
Secondary Nursing School	1	6	7
Nursing Institute	0	2	2
Medical Institute	0	6	6
Academic Nursing	0	4	4
Total	1	18	20
Df =4 χ^2 crit. 9.488 P ≤0.05 χ^2 obs. 11.377			

Df=degree of freedom, χ^2 crit=chi-square critical, P= probability, χ^2 ob = Chi- Square Observed

Table (8) shows that there is significant difference between total items rate of orthopedic nurses knowledge related to pin track dressing for external fixation.

IV. Discussion

Discussion of orthopedic nurses' socio-demographic characteristics of the studied sample (Table 1):

Through the results of data analysis of socio-demographic characteristics of the studied sample of table (1), it has been noticed that approximately the highest proportion of sample (60%) were orthopedic male nurses for equally for control and study group, the researcher noticed orthopedic male nurses more than orthopedic female nurses were worked in the orthopedic ward. The results were similar to a study done by Bader,2012 in Iraq ⁽⁶⁾, who showed that men were the majority (70%) of orthopedic male nursing staff in orthopedic ward. Through the data analysis distribution of demographic variables, that the age groups were frequently from (30-39) years their mean age range was (35%) for the orthopedic nurses' knowledge of pin track external fixation dressing of study group, and for the control group the age of (30-39) years their mean range was (50%). This result disagrees with Venkartramana (2010) ⁽⁷⁾ who reported that the highest proportion of the orthopedic nurses were their range age was 40 years (21 and over years old). In regard to marital status, the majority of orthopedic nurses (75%) were married for the study group and (60%) of control group orthopedic nurses were married. This result was no influence on pin track infection of external fixation with study of Nuha, et al., ⁽⁸⁾ who showed the majority of orthopedic nurses were married, the researcher suggested that the married orthopedic nurses are not effect on their knowledge about pin track infection of external fixation in ward. while another study come agrees with Aiken,2008⁽⁹⁾ who showed that higher percentage of the educational level.

Discussion of the mean of score for orthopedic nurses' knowledge related to dressing for pin track of external fixation for study and control groups of table (2):

The results of table (2) the analysis of orthopedic nurses' knowledge related dressing for pin track fixation are low to moderate items of mean of score for study group and have a low knowledge level with low mean of score of control groups of pretest, this results agree with Nancy, 2006⁽¹⁰⁾ who reported that orthopedic patient and nurses knowledge was poor. While A corner stone of pin infection of external fixation result less uses of, dry dressing, aseptic technique, hand washing, un sterility of dressing around of pin and antimicrobial agent in orthopedic.

Discussion of the mean of score for orthopedic nurses' knowledge related to pin track dressing of external fixation for study groups with regard to the post-test table (3):

The results of table (3) the analysis orthopedic nurses' knowledge related dressing of pin track fixation are low items in pre-test while high rate items in pre-test for study group after an educational program lecture implementation, this result agrees with Joseph, et al.⁽¹¹⁾ who mentioned the orthopedic nurses' knowledge have improved after the implementation of educational program about pin track dressing for external fixation. A sterile dressing utilized to protect the wound around pin from contamination.

Discussion of the Mean of Score for orthopedic nurses' knowledge related to pin track dressing of external fixation for study groups with regard to the pre-test and post-test between the Study Groups table (4):

The results of table (4) the analysis orthopedic nurses' knowledge related dressing of pin track fixation are low items to moderate in pre-test while high items in post- test for study group after an educational program lecture implementation, this study finding that orthopedic nurses knowledge have improved after the implementation of educational program about pin track infection for external fixation.

Discussion of association between the study group posttest orthopedic nurses' knowledge related pin track dressing for external fixation Table (5):

Age: The data analysis of table (5) shows that there is no significant difference between total items rate of orthopedic nurses' knowledge related to pin track dressing for external fixation with their age at ($P \leq 0.05$), this result disagrees with Joseph, et al 2010⁽¹¹⁾ who reported removed dressing immediately after moisture of previous dressing.

Gender: the data analysis of **table (6)** shows that there is no significant difference between total items rate of orthopedic nurses' knowledge related to pin track dressing for external fixation with their age at ($P \leq 0.05$), this result disagrees with Maksimovic⁽¹²⁾ who demonstrated that there was no significant relationship between orthopedic nurses' knowledge and gender.

Marital status: the data analysis of **table (7)** shows that there is no significant difference between total items rate of orthopedic nurses' knowledge related to pin track dressing for external fixation with their age at ($P \leq 0.05$), Nuha' who reported that there was no significant relationship between orthopedic nurses' knowledge and marital status.

Educational level: the data analysis of **table (8)** shows that there is significant difference between total items rate of orthopedic nurses' knowledge related to pin track dressing for external fixation with their age at ($P \leq 0.05$), this result agrees with Aiken,2008 who showed that higher percentage of the educational level.

V. Conclusion

From the present study findings, the researchers have got the following conclusions:

1-Ahigh percentage of orthopedic nurses who work in orthopedic ward were male at age group (30-39) years old, 35%, and the similar percentage of the age in the control group was from orthopedic nurses as percentage 50% of age group (30-39) years old.

2-the result of the study group are female and male similar percent with gender items in control group for each male and female.

3-Most of the result of the study level of education of orthopedic nurses of the study group are secondary school graduates while the great part of level of education of control groups had nursing medical institute graduates.

4- The majority of the orthopedic nurses in study and control groups are married. The result percentage of married in study group of (75%) and (60%) of control group.

5-The mean of score findings for the study group indicate that there is a high orthopedic nurses' knowledge related pin track infection for skeletal external fixation in the posttest period, while remains poor in the posttest for the control group. The findings of the study indicate that there is non-significant difference between (ages, gender and marital status) with orthopedic nurses' knowledge of pin track infection of external fixation for the study group posttest). The findings of the study indicate that there is a significant difference between level of educational with orthopedic nurses' knowledge of pin track infection of external fixation for the study group posttest.

VI. Recommendations

The study recommends the importance of excessive information between orthopedic nurses related pin track external fixation by distributed through standard or guide hand books to orthopedic nurses, explanatory posters for external fixation devices, increasing activation programs from continuing educational units in each hospital through modern technology (audio-visual). Encourage orthopedic nurses to complete their academic study to provide efficient care and prevent infection of pin track for external fixation.

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