Evaluation of nurses' practices toward orthopaedic wound infection

Thair R. Bader, M.Sc.N.*
Haleema Y. Kadhim, PhD**

*** Assistant Instructor, Al-Karkh Health Directorate, Al-Kadhimiyah Teaching Hospital**
****Assistant professor, Head of Adult Nursing Department, College of Nursing, University of Baghdad**

المستخلص

الهدف: تقويم ممارسات الممرضين العاملين في ردهات الكسور تجاه السيطرة على خمج جروح العظام، وتحديد العلاقة بين هذه الممارسات والصفات الديموغرافية للممرضين.

المنهجية: أجريت دراسة وصفية في وحدات الكسور في مستشفيات بغداد التعليمية وللمدّة من الأول من شباط ٢٠١١ ولغاية ٣٠ آب ٢٠١١. اختيرت عينة غرضيه " غير احتمالية" من (٣٩) ممرض وممرضة يعملون في ردهات الكسور في مستشفيات بغداد التعليمية. جُمِعَت البيانات من خلال إستبانة مصممة ومكونة من جزئيين، جزء شمل صفحة الصفات الديموغرافية ويحتوي (٩) فقرات وجزء شمل صفحة ممارسات الممرضين المتكون من (٤) أجزاء فرعية تحتوى على (٦٩) فقرة، وتمّ جمع المعلومات بطريقة الملاحظة المباشرة مع ممرضين الكسور. حددت مصداقية استمارة الإستبانة من خلال عرضها على (٢٠) خبيرٍ من ذوى الإختصاص وحددت ثباتيتها باعتماد الدراسة المصغرة والتي أجريت للمُدّة من الأول من نيسان ٢٠١١ ولغاية ١٥ تموز ٢٠١١. تمّ تحليل البيانات بإستعمال أساليب الإحصاء الوصفي (التكرارات، النسبة المئوية، الوسط الحسابي) والإحصاء الإستنتاجي (معامل التوافق ومعامل الارتباط) في تحليل البيانات.

النتائج: أظهرت نتائج الدراسة أن هناك نقصاً وقلة في ممارسات الممرضين العاملين في ردهات الكسور في السيطرة على خمج جروح العظام في ردهات الكسور وأظهرت النتائج عدم وجود علاقة معنوية بين ممارسات الممرضين وبين (الجنس، سنوات الخبرة في ردهات الكسور، سنوات الخدمة في مجال التمريض والمُدّة الزمنية للدورة التدريبية)، بينما أظهرت النتائج وجود علاقة معنوية بين ممارسات الممرضين وبين (العمر، الحالة الزوجية، المستوى التعليمي، المشاركة في الدورات التدريبية وعدد الدورات التدريبية التي شارك الممرضين فيها).

التوصيات: توصي الدراسة بضرورة إعداد وتصميم برنامج خاص لتدريب الممرضين في ردهات الكسور وإصدار كتيب يدوى فيما يتعلق بالسيطرة على خمج جروح العظام والتي يجب أن تطبق في ردهات الكسور، فضلاً عن إجراء دراسة لتقويم معارف الممرضين في ردهات الكسور تجاه خمج جروح العظام.

Abstract:

Objective(s): To evaluate of nurses practice toward orthopaedic wound infection and to determine the relationship between orthopaedic nurses practice and their demographic data characteristic

Methodology: A descriptive study was carried out at orthopaedic wards of Baghdad Teaching Hospital started from February 1st, 2011 to August 30th, 2011. A non-probability sample of (39) orthopaedic nurses who were working in orthopaedic wards were selected from Baghdad Teaching Hospital. The data were collected through the use of questionnaire , which consists of two parts (1)Demographic data form that consists of a(10) items and (2) orthopaedic nurses practice form that consists of (4)sections contain (69) items, by mean of direct observe technique with orthopaedic nurses. The validity of the questionnaire was determined through presenting it to (20) specialist expert and its reliability were determined through a pilot study which was carried out through the period from April 1st, 2011 to June 15th, 2011. Descriptive statistical analysis procedures (frequency, percentage, mean of score) and inferential analysis procedures (person correlation coefficient, contingency coefficient) were used for the data analysis.

Results: The findings of the study indicated that the orthopaedic nurses have inadequate or deficit in some aspects relative to wound infection in orthopaedic wards. No significant relationship was found between orthopaedic nurses practice and their gender, years of employment in nursing field, years of experience in orthopaedic wards and duration of the training session, while a significant relationship was found between orthopaedic nurses practice and their age, marital status, level of education, sharing in training session and the number of training session that orthopaedic nurses were engaged it.

Recommendations: The researcher recommend that special training session , concerning wound infection and standards orthopaedic nurses practice toward wound infection control that should be followed in orthopaedic wards ,and booklets should be designed and presented all orthopaedic nurses, in addition to make a new study that can evaluate orthopaedic nurses knowledge concerning wound infection control in orthopaedic wards.

Keywords: Orthopaedic wound, nurses' practice, and orthopaedic nurses

Introduction:

Orthopaedic wound infection is a clinical syndrome caused by the invasion and multiplication of invading microorganism, a disease- producing microorganism in body tissues [1].Wound infection is the second most common nosocomial infections may be exogenous or endogenous, exogenous wound infections are acquired from sources outside the body such as, medical personnel, visitors, equipment's and health care environment, an endogenous wound infections develops from sources within the body [2]. Microorganisms are transferred from one person to the patient. These sources are team members of the orthopaedic wards such as their skin, nose, throat, dress, breath, fluids, food and environment, and mal practices such as infective hand washing , gowning , gloving, masking, cap and others practices during dressing wound as well as instruments and other equipment used on orthopaedic patients are potential means of transfer[3].A significant proportion of wound infection in orthopaedic wards occurs result from cross contamination and transmission of microorganism by the hands .Prevention of bacterial contamination by transient flora and possible subsequent infection by high contamination levels and ultimately improve hand washing practices [4]. Protective barriers reduce the risk of exposure of nurses in orthopaedic wards to potentially infection materials .The type of protective barriers include gloves ,gown, masks, cap and protective eyewear ,should be appropriate for the procedure being performed and type of exposure anticipated[5].wound infection is often diagnosed on the basis of clinical signs and symptoms are pain, redness, abscess formation, swelling area surrounding the wound, loss of function and unhealthy appearance of wound bed in orthopaedic ward [6].Orthopaedic nurses have a responsibility in the orthopaedic wards not only to assist patients, individual, families, communication and population to return to optimal good Health, but also to prevent further infection and illness. Nurses also have practices to prevent the spread of infection from one patient to another inside the orthopaedic wards [7]. Orthopaedic wards can be very dangerous places for the acquisition of infection .These infection are often caused by breaches of infectious control nurses practices and non-sterile environmental medical surfaces and/or ill employees, inadequately sterilized instruments aerosol droplets from other orthopaedic patients [8].

Methodology:

A descriptive study was carried out in order to achieve the early stated objectives. The study was initiated from February 1st, 2011 to August 30th, 2011. An official permission was obtained from the Ministry of planning/Central Council of Statistics for the acceptance of the questionnaire draft. Another approval is issued from the Ministry of Health/ The study has been conducted on the orthopaedic nursing staff who are working in orthopaedic wards at Al-Karkh general Teaching Hospital (7orthopaedic nurses),Al-Yarmook Teaching Hospital (6 orthopaedic nurses), Al-Kindy Teaching Hospital (8orthopaedic nurses), Ghazi Al-Hariri for Surgical Specialties Hospital (9 orthopaedic nurses) and Al-Sadder Teaching Hospital (9 orthopaedic nurses). A purposive "non-probability" sample of (39) orthopaedic nurses who have been working in orthopaedic wards were selected. The sample has been selected based on the following criteria: (1) those who have working in orthopaedic wards, (2) those that should have one year of experience in orthopaedic wards, (3) those who are (21) years of age and older, (4) those who have different categories (school and secondary nursing graduates, medical institute and college and more nursing graduate).while exclusion criteria (1) those who have not working in out orthopaedic ward, (2) those that should have less one years of experience wards. A questionnaire was designed and constructed by the researcher to measure the study variables

such a construction was employed through the review of literature and related studies. The questionnaire consisted of 2 parts:

Part 1: Demographic Data Form: A demographic data characteristics sheet, consisted of 9 items, which included: gender, age, marital status, level of education, number of years of employment in nursing field, number of years of experience in orthopaedic wards, sharing in training session concerned to wound infection in hospital, number of sharing in training session concerned to wound infection in hospitals and duration of the training session.

Part 2: Nurses' practices form: The second part of the questionnaire was comprised of (69) items that are concerned with nurses practices toward wound infection control in orthopaedic wards which included four section as following: Section one which includes (33) items presented the orthopaedic nurses practice relative to the (10) items to hand washing, (13) items to the wearing gloves, (4) items to the wearing gown and (6) items to the wearing mask and cap. Section two which includes (25) items presented the orthopaedic nurses practice with relationship orthopaedic patient relative to the (6) items to the environment orthopaedic ward, (5) items to the utilize instrument, (3) items to the remove garbage, (3) items to the linen and (8) items to the cast. Section three which includes (4) items presented the orthopaedic nurses practices with relationship personnel hygiene for patient to wound infection .Section four which includes (7) items presented the orthopaedic nurses practices with recording and documentation. The items have been rated and scored according to the following patterns:

1. Two-point Likert scale is used for rating the items as yes and no.

2. The two point type Likert scale is scored as 2 for Yes and 1 for no.

3. The higher grade scoring of the questionnaire (MS) the greater nurses practices toward wound infection control in orthopaedic wards.

instrument was determined through the use of panel of experts who have had more than 5 years of experience in job field .A preliminary copy of the questionnaire was designed and presented to (20) experts. A pilot study was conducted on purposive sample of (5) orthopaedic nurses which was selected from the Al- Kadhimiyia Teaching Hospital in orthopaedic ward prior to the original study .The pilot study was conducted from April 1st ,2011 until the June 15th,2011. Determination of the reliability of the questionnaire was based on the test –retest observation method. The reliability coefficient of the orthopaedic nurses practice as a whole of the questionnaire was (r=0.90).The data have been collected through the use of questionnaire and by means of the observe technique with the nurses who work in orthopaedic wards. Each orthopaedic nurse spends approximately (25-30) minute to respond to the observe. There three visit for each orthopaedic nurse to collect valid on each nurse practice. Data were analyzed through the use of statistical package of social sciences (SPSS).The statistical procedures which were applied for the data analysis and assessment of the result, included the following: a. Descriptive statistics: [frequency (f) and percentage (%), mean of score (9)] b. Inferential statistics: [b-1. pearson correlation coefficient, b-2. Contingency table structure]. Confidence level of the causes correlation ships of the contingency coefficients proposed within not less than 75% interval should be meaningful {p-value<0.25}.

Results:

Table 1. Distribution of orthopaedic nurses by their demographic data characteristic.

Demographic data characteristic	Frequency	Percent	Cum. %
Gender			
Male	24	61.5	61.5
Female	15	38.5	100.0
Total	39	100.0	
Age			
21-25	1	2.6	2.6
26-30	6	15.4	17.9
31-35	4	10.3	28.2
36-40	4	10.3	38.5
41-45	12	30.8	69.2
46-50	10	25.6	94.9
51-55	1	2.6	97.4
56 and more	1	2.6	100.0
Total	39	100.0	
Marital status			
Married	30	76.9	76.9
single	3	7.7	84.6
Divorced	4	10.3	94.9
widowed	2	5.1	100.0
Total	39	100.0	
Level of education			
Primary nursing school graduate	8	20.5	20.5
Secondary nursing school graduate	14	35.9	56.4
Nursing institute graduate	16	41.0	97.4
Nursing college graduate &more	1	2.6	100.0
Total	39	100.0	
No. of years of employment in nursing field			
1-5 yrs.	3	7.7	7.7
6-10 yrs.	4	10.3	17.9
11-15 yrs.	7	17.9	35.9
16-20 yrs.	4	10.3	46.2
21 yrs. & more	21	53.8	100.0
Total	39	100.0	
Number of years of experience in orthopaedic			
1-5 yrs.	21	53.8	53.8
6-10 yrs.	7	17.9	71.8
11-15 yrs.	5	12.8	84.6
16-20 yrs.	2	5.1	89.7
21 yrs. and more	4	10.3	100.0
Total	39	100.0	
Participation in training sessions concerned to wound infection			
Yes	25	64.1	64.1
No	14	35.9	100.0
Total	39	100.0	
Numbers of training sessions concerning wound infection in orthopaedic wards			
None	14	35.9	35.9
One training session	3	7.7	43.6
Tow training session	3	7.7	51.3
Three training session and more	19	48.7	100.0
Total	39	100.0	

Table 1. (Continued)

Duration of the training session	Frequency	Percent	Cum. %
Not present	14	35.9	35.9
Less than one week	15	38.5	74.4
One week	4	10.3	84.6
More than week s	6	15.4	100.0
Total	39	100.0	

Cum. =Cumulative

having 21 and more years of employment in nursing, while (53.8 %) having 1-5 years of experience in orthopaedic wards. The results of the sample (35.9%) had no opportunity to be involved in sharing training session which established by the hospital concerned wound infection and the results of number of the sharing in training session, the majority of the sample (48.7%) having three &more training sessions and (7.7%) having one training session and same the result in two training sessions. In regard to the duration of the training session, the majority of the study sample (38.5%) was less one weak in any training session and they did not have any time of training session related to wound infection control in orthopaedic wad.

Table (1) indicated that the majority of the study sample (61.5%) was male and the remaining was female, most of them were (41-45) years old and accounted for (30.8%). Only one orthopaedic nurse was within the age groups of (21-25) years, (51-55) years, (56&more) years and accounted for (2.6%). In regard to the subject marital status, the majority of the sample were married and they accounted for (76.9%) of the whole sample. Relative to their level of education, the greater number of them were nursing institute graduate and they accounted for (41.0%) of the sample and (2.6%) of them were nursing college graduate. Concerning number of years of employment in nursing field, the majority of the sample (53.8%)

Table 2. Practices of the orthopaedic nurses with 2 Points levels scale by total frequency, mean score and comparative significant

List	Items	M.S of 1st.observe	M.S of 2nd observe	M.S of 3rd observe	Total M.S	C.S.
1	Orthopedic nurses practices (Hand washing)					
	1.1 Removing of all jewelry before hand washing	1	1.02	1	1	*L.
	1.2Cleaning and cutting nails finger	1	1.02	1	1	L.
	1.3 Washing hands before treating the orthopedic patient	1.02	1.02	1.02	1.02	L
	1.4 Using soap and water for washing hand	1.02	1.o7	1.02	1.04	L.
	1.5 Using antimicrobial soap for hand washing	1.02	1.02	1.07	1.04	L.
	1.6 Using a water less solution for hand washing	1.05	1.05	1.02	1.04	L.
	1.7 Using alcohol and emollient gel for hand washing	1.02	1	1.02	1.02	L
	1.8 Washing hands from above down ward	1	1	1	1	L.
	1.9 Drying the hands after washing	1.02	1	1	1	L.
	1.10 Washing hands after complete treated patient	1.41	1.48	1.48	1.46	**M.
2	Gloving practice:					
	2.1 Wearing gloves after wash and dry hands	1.13	1.10	1.02	1.9	L.
	2.2 Wearing gloves for dressing wound procedures	2	2	1.95	1.98	***H.
	2.3 Wearing sterile gloves when giving :					
	2.3.1 Blood for patient	1.15	1.13	1.13	1.14	L.
	2.3.2 Touch body fluid for patient	1.7	1.7	1.7	1.7	L.
	2.3.3 Touch body secretion for patient	1.87	1.82	1.74	1.82	H.

Table 2. (Continued)

List	Items	M.S of 1st.observe	M.S of 2nd observe	M.S of 3rd observe	Total M.S	C.S.
	2.4Wearing sterile gloves for procedure involving contact with sterile area of the body.	1.25	1.25	1.15	1.22	L.
	2.5 Changing gloves after contact with infected :					
	2.5.1 Equipment and instrument.	1.23	1.15	1.23	1,21	L.
	2.5.2 Old wound dressing for orthopaedic patient.	1.51	1.61	1.56	1.56	M.
	2.5.3Patients body.	1.41	1.4	1.30	1.37	M.
	2.6 Using double gloves in need.	1	1.05	1.07	1.05	L.
	2.7 Removing gloves when moving from a contaminated area to clean area for patient wound.	1.15	1.10	1.17	1.14	L.
	2.8 Using clean gloves during the clean procedure for own protection	1.71	1.64	1.53	1.63	M.
	2.9 Removing gloves after leave patient room	1.89	1.74	1.7	1.88	H.
3	Gowning practice :					
	3.1 Wearing sterile gown when dressing wound for each patient	1.25	1.28	1.23	1.25	L.
	3.2Wearing gown over uniform cloth	1.71	1.71	1.51	1.64	M.
	3.3Avoidance contacting the gown by the hands	1	1	1.05	1.01	L.
	3.4Discarding soiled gown at the end of each work day	1.17	1.15	1.12	1.16	L.
4	Masking and cap practice :					
	4.1 Wearing disposable mask to cover nose and mouth	1.15	1.17	1.15	1.16	M.
	4.2 Wearing mask once time only	1.02	1.05	1.02	1.03	L.
	4.3 Wearing mask for own protecting infected:	1.02	1.02	1.07	1.04	L.
	4.4 Wearing disposable cap	1	1	1	1	L.
	4.5 Using cap for once time	1	1	1.02	1	L.
	4.6 Discarding gown and cap in baggage place	1.02	1	1	1	L.
1	Orthopaedic patient practice about (environment):					
	1.1 Providing privacy for each patient	1.25	1.17	1.15	1.19	L.
	1.2 Supplying specific dressing try for orthopaedic wards containing (sterile solutions, gauze for different size, tape, sterile equipment and non-sterile equipment)	1	1	1.84	1.28	L.
	1.3 Cleaning the environment of the orthopaedic ward involving (try surface, box and table of the patient)	1.15	1.23	1.30	1.23	L.
	1.4 Checking place the orthopaedic patient in ward involving:					
	1.4.1 Providing adequate ventilation	1.48	1.28	1.33	1.35	M.
	1.4.2 Providing good lighting	1.66	1.46	1.41	1.51	M.
	1.4.3 Providing patients chair characteristic by firm back with arm to support and comfort	1.51	1.28	1.20	1.30	M.
2	Sterilize equipment items:					
	2.1 Using specific sterilize dressing equipment for each patient	1.82	1.74	1.69	1.75	H.
	2.2 Sterilize disposable equipment for more than one times each patient	1.41	1.46	1.46	1.45	M.
	2.3 Using sterilize a physical method like (steam and boiling hot water)	1.69	1.66	1.53	1.60	M.

Table 2. (Continued)

List	Items	M.S of 1st observe	M.S of 2nd observe	M.S of 3rd observe	Total M.S	C.S.
	2.4 Using sterilize chemical method for equipment like:					
	2.4.1 Formalin	1	1	1.02	1	L.
	2.4.2 Sidex	1	1	1	1	L.
3	Remove garbage					
	3.1 Placing disposable items in a plastic strong bags	1.20	1.15	1.17	1.17	L.
	3.2 Putting labels on bag and name of orthopaedic material	1.12	1.05	1.05	1.07	L.
	3.3 Putting the needle ,syringe ,solid dressing and cast in plastic bag	1.92	1.79	1.69	1.8	L.
4	linen					
	4.1 Bagging the linen solid when contain infected agent	1.05	1.05	1.02	1.04	L.
	4.2 Changing solid linens with blood ,fluid and excretion	1.58	1.64	1.48	1.60	M.
	4.3Cleaning the used linens by the send the laundry	1.07	1.07	1.07	1.07	L.
5	Casting					
	5.Inoticing the nurse wound dressing under the cast	1.38	1.33	1.17	1.30	M.
	5.2 Writing the nurse report for any increase in (pain, fever, bad Oder and numbness in the side cast)	1	1	1	1	L.
	5.3 Drying the cast over the wound area	1.33	1.23	1.15	1.24	L.
	5.4 Checking and cover the wound by the gauze and cotton inside cast	1.79	1.71	1.51	1.70	H.
	5.5 Refusing touch the wound area by strange things inside cast	1.10	1.02	1.12	1.08	L.
	5.6 Encouraging movement exercise for the orthopaedic patient cast	1.23	1.10	1.10	1.4	L.
	5.7 Working the nurse sport exercise for effect part very gently	1.10	1.07	1.10	1.10	L.
	5.8 Using electrical drill for removing cast	1.84	1.71	1.69	1.75	H.
1	Nurses Practice about the personnel hygiene					
	1.1Making general hygiene for patient once day	1	1	1	1	L.
	1.2 Providing sterile soap	1	1	1.02	1	L.
	1.3 Using soluble lubricate to prevent dryness skin	1.02	1	1.02	1.01	L.
	1.4 Using soft towel to clean the skin orthopaedic patient	1	1	1	1	L.
1	Practice about recording and documentation					
	1.1 Monitoring and recording orthopaedic patient investigation including (complete blood picture , white blood cells ,hemoglobin and platelet)	1.02	1.02	1	1.04	L.
	1.2 Recording signs and symptoms of wound infection like (bad odor and pus)	1.02	1	1	1	L.
	1.3Recording vital signs like :					
	1.3.1 Recording temperature	1.20	1.20	1.10	1.17	L.
	1.3.2 Recording pulse	1.05	1.05	1.05	1.05	L.
	1.3.3 Recording respiration	1.02	1	1	1	L.
	1.3.4 Recording blood pressure	1.10	1.10	1.10	1.10	L.
	1.4 Noticing signs and symptoms of wound infection like(redness ,fever, tumor and loss of function)	1.89	1.69	1.66	1.75	H.

***L=Low**M=Moderate=High, C.C=Contingency Coefficient, S=Significance**

Table (2) reveals orthopaedic nurse's practice toward wound infection control in orthopaedic ward. These results were categorized which include orthopaedic nurses practice; these include hand washing, gloving, gown, mask and cap. Practices concerning orthopaedic patient environment ward these include sterilize equipment, remove garbage, linen and casting. Practice concerning personnel hygiene of practice concerning orthopaedic patient recording and documentation.

Table 3. Causes of the contingency coefficient and significant levels among demographical characteristics and orthopaedic nurses

Demographic Characteristics	Nurses' practices		C.S.
Gender	C.C	0.201	NS
	P-value	0.200	
	Confidence level	0.8	
Age	C.C	0.266	S
	P-value	0.887	
	Confidence level	0.113	
Marital status	C.C	0.433	S
	P-value	0.030	
	Confidence level	0.97	
Level of education	C.C	0.212	S
	P-value	0.608	
	Confidence level	0.392	
Number of years of employment in hospital	C.C	0.149	NS
	P-value	0.927	
	Confidence level	0.073	
Numbers of year of experience in orthopaedic wards	C.C	0.149	NS
	P-value	0.987	
	Confidence level	0.073	
Training session in hospital	C.C	0.121	S
	P-value	0.448	
	Confidence level	0.552	
Number of training session	C.C	0.164	S
	P-value	0.782	
	Confidence level	0.218	
Duration of the training session	C.C	0.201	NS
	P-value	0.650	
	Confidence level	0.35	

C.C=Contingency Coefficient; C.S.= Comparative significance; NS= Non-significant; P-value= Level of probability at p= ≤0.05; S= Significant

This table shows that there is a no significant relationship between nurses practices and their gender, years of employment in nursing, years of experience in orthopaedic ward and duration of the training session; there is a significant relationship between nurses practice and their age, marital status, level of education, training session and number of training session.

Discussion:

Throughout the course of the present study, it has been noticed that approximately half of the study sample (61.5%) were males. The highest proportion (30.8%) of them was 41-45 years old. This finding comes along with a study [8] which indicated that the majority (70%) of the nurse staff in orthopaedic were males, their mean age was 35 years (range: 40-60years). And this finding agree with a study[9] who showed that the majority (56.3%) of the nurse staff in orthopaedic wards were males their mean range age was 40 years (21-64 years old) [10], but these findings were disagreed with another study [10] which

reported that the majority of orthopaedic nurses in orthopaedic wards were females, with age group (25-30) years. In regard to marital status, the majority (76.9%) of the sample were married. Concerning the level of education, most of them (41.0%) were nursing institute graduates [11]. This finding comes with a study which showed that the higher percentage of the educational level (40.6%) were institute graduate [11]. While, in another study showed that the majority graduate in orthopaedic ward had bachelor degree of science in nursing [12]. Regarding years of employment in nursing field, more than half of the study sample had (21 and more years) employment years in nursing field in hospital that represented (53.8%) which was conducted orthopedic nurse at the gulf medical college hospital and research center, UAE. Showed that the majority of the nurse staff experience had an average of 10 months -22 and more years of experience in nursing field [10], while in a study which was conducted orthopaedic nurse experience in nursing field (1-5 years) [13]. Regarding years of experience in orthopaedic wards, most of them had (1-5 years) experience years in orthopaedic wards who accounted (53.8%), and this finding comes in agreement with [10] who reported that the majority of the orthopaedic nurse staff had experience less than 5 years in orthopaedic wards. Reported that (71.9%) in orthopaedic ward The findings indicated that more than half of the study sample (64.1 %) had sharing in training sessions and the majority (48.7%) of the study sample had numbers of training sessions to be involved (three training sessions and more). Concerning duration of training session the majority (38.5%) of the study sample. Based on the researcher point of view, all orthopaedic nursing staff in orthopaedic wards should identify factors affecting on the performance that causes failure in orthopaedic nurse's practice. All orthopaedic nurses who have a clinical responsibility for orthopedic patient must include wound infection prevention and control through to develop training session in practice hand washing, aseptic technique and clean equipment dressing of wound. Improve their knowledge and practice concerning wound infection control. The result indicated that was no significant comparison relative to (1.1- 1.9), while the last items (1.10) is significant and moderate practice which was concerned with practice hand washing. That studies have demonstrated that the skin underneath rings is more heavily colonized than compared to areas of the skin on the fingers without rings, and concentration of micro-organism increase correlated with the number of rings worn [15]. Removing rings before hand washing may decrease microorganism on hands after hand washing .Lack of information of the orthopaedic nurses that colonization lead to infection in wound. Bacterial colony counts on hands after hand washing were similar among persons wearing rings and those not wearing ring, where increasing the number of ring and jewelry worn lead to more difficult wearing gloves and causes tear to glove more readily [16]. Keeping nails short is considered key because the majority of flora on the hands are found under the finger nails [17]. Hand carriage of gram negative organism, artificial finger nails or extenders have been epidemiologically implicated in multiple out breaks involving fungal and bacterial infection in wound in orthopaedic wards. One of the joint commission national patient safety goals require clinicians to reduce the risk of health care associated wound infections through compliance with current World Health Organization (WHO) or Centers for Disease Control (CDC) hand washing guidelines to reduce the transmission of infection in wounds agents from orthopaedic nurses to patients as well as best practice for preventing wound site infections through contaminated hands of the orthopaedic nurse [17]. Mentioned that studies have shown a correlation between microorganism from nurse care providers hand with patient [18]. Hand washing is important measure to reduce the risk of transmitting skin microorganisms from one person to another or from one site to another on the same patient. The finding results agree with a study [23] which that who states that hands and forearms are higher than elbows to prevent contamination and to allow water to run from above down ward. For

hand washing solutions are to remove or kill as many bacteria as possible from the hands [19]. Who reported that alcohol rubs were move effective for reducing bacterial colony [22]. The hand antisepsis was superior to hand washing, hand antisepsis and antimicrobial as a corner stone of infection control to reduce cross-contamination in orthopaedic ward [23]. Hand cleaning with soap and water before patient care was associated with significance higher than hand antiseptic agent. The findings disagree with a study antimicrobial plain soap and waterless agents are considered adequate for routine mechanical, remove transient bacteria from the skin but does not kill the bacteria and remove the soil [20]. Based on the researcher's point of view, the lack of nurses' practice concerned with hand washing practice. The cause of using soap and water only is due to inadequate supply of antimicrobial agents that are causing skin irritation and dryness, while the effect of antiseptic hand rub is to inhibit flora on the skin. It was explained in standard precautions for wound infection in orthopaedic ward by CDC, and the orthopaedic nurse who works in orthopaedic ward should be reinforced and engaged in training sessions which provide more explanation about the benefit washing hand practice with chemical solutions. While the items of low practice between orthopaedic nurse inward in gloving practice (2.1, sub-items 2.3.1 ,2.3.2,2.4 , sub-item 2.5.1, 2.6 and 2.7), the results of the study agree with a study wearing two Paris of sterile gloves during given care or dressing wound for orthopaedic penitent. Double gloving to lessen their risk of exposure to infection in wound in ward. Items (2.3.3, 2.9, sub-item 2.5.2, 2.5.3, 2.8, 2.9) were significant and good practice [20]. Double gloving has been shown to be an effective method to reduce potential for contact with bodily fluid, secretion and excretion for patient at any procedure in ward table (2). The study findings are supported by the double gloving provide protection of extra layer and have reduced the numbers of perforations to inner layer of glove [19]. That increase number of skin bacteria occurs under the gloves. If hands are washed with a non-antimicrobial soap. Because sometimes they do not have adequate medicated soap or less of alcohol rub to hand washing as sources of nosocomial infection and lead to vehicle pathogen to the wound. It is appropriate to wash hands before gloves wearing and change glove between contact patients and encouraged after glove removal should be hand wash [21]. This cross sectional study was conducted among orthopaedic nurses toward opinion of gloving of hands during patient care and to determine the situation of nurse's hands gloving practice in Gulf Medical College Hospital and Research Center, Ajman, United Arab Emirates (UAE). Changing of gloves is an important factor in hand hygiene between patient contact during giving care, and change gloves after contact with each orthopaedic patient. The findings results disagree with hand washing is strongly encouraged after removal of gloves [10]. The researcher found that the majority of the literature indicated an incomplete practice among trained orthopaedic nurses of the principle and application of universal precautions, because the gloves are worn to reduce the likelihood that microorganisms present on the hands of nurses will be transmitted to orthopaedic patient wound during dressing or care procedure in ward. While the items of gowns practice are low practices between orthopaedic nurses in ward (3.1, 3.3, and 3.4). Emphasized drying the hands before touch the sterile gown and glove worn because the moisture left on the arm will be absorbed through cloth gown. Due to growth of increase microorganisms, gloves, gown, and mask are called personnel protective equipment (PPE) [22]. Wearing a gown is important to provide barrier protection to cross contamination to and from entering the patient during care procedure. This gown is worn only once and discards after complete dressing wound in ward. The results disagree with [15] that personnel protect equipment is vital for protecting orthopaedic nurse and all medical staff in ward in hospital as general from acquired infection during patient care procedure and from droplet or air born transmitted disease during dressing wound procedure. Removing PPE after orthopaedic patient care without contaminated skin or

clothes is important The items of mask and cap practice are low between orthopaedic nurse in ward (4.2, 4.3, 4.4, 4.5, 4.6), the results agree with British Standards Institution (BSI), mask and cap are helps prevent the wearer from inhaling large practical aerosols, which travel short distances about 3 feet and small practical droplet nucleus. It protects orthopaedic nurses and other patients from any exposure to pathogen, a mask and cap is worn only once. The results supports with World Health Organization (WHO) replace the mask and cap with a clean or dry when it becomes humid. It is single use items and should be discarded after use, washing hands by soap and water or alcohol based hand rub after mask and cap disposal. The researcher found, all orthopaedic nurses in ward not wearing the mask and cap during care procedure, amounts of the mask and cap in ward is enough for all, because deficit in practice and knowledge in literature for important these PPE to prevent infection transmission from one to another leading to the wound infection. Table (3) presents the relationship between nurses' practice and their gender. It shows that there was no significant relationship at p-value (0.200) level between nurses' practice and their gender. It was showed in a study which was carried out to evaluate the effectiveness of information booklet on the practice of the orthopaedic nurse that there was no significant association between nurses' practice and their age. Table (3) also showed that there is a significant relationship at p-value (0.887) level between nurses' practice and their age. This result disagreed with the study which was who represented that there was no significant relationship between nurses' practice and their age [10], and showed that practice was highest in 30-40 years old age group and lowest in the > 50 years group of the staff. Table (3) presents the relationship between nurses' practice and their marital status. It shows that there was significant relationship at p-value (0.030) level between nurses' practice and their marital status, this relationship within not less than (75%) interval of confidence level should be meaningful. That means, orthopaedic nurses work in the same circumstances in hospitals of Baghdad city; therefore, they had the same level of practice concerning infection control for wound in orthopaedic wards. Table (3) presents the relationship between nurses' practice and their level of education. It shows that there is a significant relationship at p-value (0.608) level between nurses' practice and their level of education. It has been expected that the higher level of education preparation is the better of practice acquired as the majority of the study sample had specialist diploma in orthopaedic ward. This result was agreed with the study which that was who have shown that there were significant associations between nurses' practice and their levels of education as the graduate orthopedic nurses have scored better than diploma nurses [11]. Table (3) presents the relationship between nurses' practice and years of employment in nursing field in hospitals. It shows that there is no significant relationship at p-value (0.927) level between nurses' practice and years of employment in nursing field in hospital. This finding agreed with a study which that was no significant association between nurses' practice and length of clinical employment in nursing [13]. Table (3) presents the relationship between nurses' practice and years of experience in orthopaedic wards. It shows that there was no significant relationship at p-value (0.927) level between nurses' practice and years of experience in orthopaedic wards. Tables (3) present the relationship between nurses' practice and their sharing in training sessions which established in hospitals. The findings indicated that there were significant relationships between nurses' practice and sharing in training sessions in hospital at p-value (0.448), between nurses' practice and number of sharing in training sessions at p-value (0.782). These findings come along with a study that have showed that previous training was found as a significant effect on practice and knowledge of wound infection of universal precautions and methods of safe disposal were significantly higher among previously trained nurses compared with untrained nurses [15]. Table (3) presents the relationship between orthopaedic nurses' practice and duration of the training session that

nurses' sharing in it. It shows that there was no significant relationship at p-value (0.650) level between nurses' practice and duration of the training sessions, showed that orthopaedic nurse should be educated and challenge all of the difficulties and problems by training session, and eliminates the need for classrooms or commuting and scheduling specific class time [23].

Recommendations:

1. Special training sessions should be designated and presented to all orthopaedic nurses that include specific education concerning hand washing, aseptic technique in cleaning, sterilization and disinfection procedure.
2. Training session should be designated as regular refresher courses to the orthopaedic nurses and including the updated information about wound infection control outside of Iraq.
3. A booklet should be designated and distributed to all orthopaedic nurses including standard wound infection control that must be applied and followed in orthopaedic wards.
4. Orthopaedic Nurses who have the highest educational level should be assigned and worked in ward.
5. Further studies are necessary in order to evaluate orthopaedic nurses' knowledge toward wound infection control in orthopaedic wards.

References:

1. Bowler,P., Duerden, B. and Armstrong, D. Wound microbiology and associated

approach to wound management, clinical microbiology review, 2001; 14(2):244-69. Available from http://www.Ukessays.com/essays/nursing/wound management. php.

2. Mirza, A. and Custodio, H. Hospital Acquired infection 2010; available from http://emedicine.medscape.com/article/9670220.updatejulay, 20, 2010.

3. Stellenberg, L. and Bruce, C. *Nursing practice: medical surgical nursing for hospital and community, African*, ed, Churchill living stone: elsevier limited, 2007; P.P.727-734, available from www.elseverhealth.com .

4. Pittet, D., Dharan, S., Tonveneav, S., Sauvan, v., Thomas, V. and Perneger, M. Bacterial contamination of the hands of hospital staff during routine patient care. *Archives of internal Medicine*, 1999; 159(8): 82182. Available from http://wwwpremierlegalorg/lawyer-attornev-.

5. Parker, J. Surgical scrub and surgical attire, *operating room journal*, 2002; 34,2, P.P.1-

6. Waledan, U. Essential of orthopaedic nurse care: medical news today, 2008, available from Waledan U. edu/nursing information.

7. Pyre, K. Risk factors, assessment play into orthopaedic surgical site infection prevention. 2011; available from http://wwwinfectioncontrolltoday.com/.

8. Haleim, K., Ibraheim, Z. and Tahlawy, E. Surgical site infection and associated risk factors in Egyptian orthopaedic patients. *Journal of American Science*, 2010; 6(7). Available http://www.americanscienc

9. Maksimovic, D.L., Bumbasiveric, M., Marinkovic, J. and Vlajinac, H. surgical site infections in orthopaedic patients: prospective cohort study: *The Creation Medical Journal*. 2008; 49(1): 58-65. Available from www.CMJ.hr.

10. Venkatramana, M., Jayadevan, S. and Jayakumay, M. Opinion and practice of gloving among orthopaedic nurse in a university teaching hospital, 2010, Vol. 4, issue. 2.

11. Aiken, L., Clarke, S., Sloane, D., Lake, E. and Cheney, T. Effect of hospital care environment on patient mortality and nurse out comes. *Journal of nursing administration*, 2008; 38(5).

12. Khan, M. Antiseptics, iodine, povidone iodine and traumatic wound cleansing, 2006; 16(4).

13. Agrawal, A., Jain, S. and Raza, H. *Pathogenic bacteria in an orthopaedic hospital in India*, 2008; 2(2): P.P.120-123.

14. Robert, S. *Universal precaution: improving the knowledge of trained nurses*, 2000; 9(1): P.P. 43-47.

15. Center for Disease Control and Prevention (CDC). 2000, available from http://www.cdc.gov\mmwr\preview\mmwrhtml\rr5217al.htm.

16. Carlson, T. Infection control: Today's wound clinic, 2011, VOL-issue. 1 available from www.CDC.Gov/nccidad/dhapar-Mrsa-cahtml/.

17. Kelsall, R., Griggs, K., Bannister, C. Should finger rings be removed prior to scrubbing? 2006; 62(4) 450-452.

18. Carlson, T. Infection control: Today's wound clinic. 2011; VOL-issue. 1 available from www.CDC.Gov/nccidad/dhapar-Mrsa-cahtml/.

19. Dargatz, T., Weese, J. Rousseau, D., Dounowska, M., Morley, P. and Dargatz, D. Pilot study to evaluate hygiene protocols on the reduction of bacterial local on the hands, 2006, Vol. 47, No. 7.

20.Tanner, J. and Parkinson, H. Double-gloving to reduce surgical cross-infection, 2006; cochrance data base of systematic reviews, 2 art, No. cd003087, Doi 10. 1002/14651858. Cd003087.pub2.

21. Hurst, D. Infection control: Double gloving in the OR, 2010; Vol. 3, No. 4, P. 3. available from http://www.nursingcenter.com/index.asp.

22. American academy orthopaedic surgeons (AAOS): yourorthopaedicconnection 2007; available from http://orthoinfo.aaso.org/popout.cfm ? loc=htp:

23. Rose, N. and Dawkins, H. The changing nature of medical technology development, 1994; P. 3.

24. Pieper, B. Wound management in vulnerable populations. *Rehabilitation nursing*, 2005.

25. Bamberge, R., Sullivan, P. and Kerr, K. Diagnosis of wound Infections: current culturing practices of wound care professionals, 2002; 14(9): P.P.314-327.