

Nurses` Knowledge about Universal Precautions in Neonatal Intensive Care Unit at Pediatric Teaching Hospitals in Baghdad City: Descriptive Study

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Key words: Universal Precautions, Neonatal Intensive Care Unit

Received (June), **Accepted** (December)

ABSTRACT

Infections acquired in the hospital are important causes of morbidity and mortality in high-risk neonates who receive intensive care. The Centers for Disease Control and Prevention CDC developed a set of protocols and guidelines known as universal precautions (UPs) that apply to care of all patients in all healthcare settings, regardless of the suspected or confirmed presence of an infectious agent that may prevent and control infection transmission for neonates and health care workers. To assess the level of nurses` knowledge about universal precautions in the NICU, and find out some relations between nurses` knowledge and their demographic data. a descriptive study was conducted from 1 November 2010 to 1 April 2011. The sample consisted of all nurses who were working at the NICU of pediatric teaching hospitals in Baghdad city 35 nurses. A questionnaire was prepared based on the WHO and CDC guidelines on UPs and was pre-tested before finalization. Data has collected through the application of questionnaire and interview techniques. The results revealed that nurses` knowledge about general information, personnel protective equipment (PPE), soiled patient-care equipment, needles and other sharps, and patient placement (isolation) was good, while about hand hygiene, patient resuscitation, and respiratory hygiene/cough etiquette was accepted. Unfortunately their knowledge about recapping the used needles and wearing surgical mask >3 feet to prevent contamination was poor. In general, of the total sample, (71.4 %) has accepted level of knowledge while (28.6 %) has good knowledge regarding all aspect of universal precautions. most of the participants have accepted level of knowledge regarding all aspects of universal precautions. They have poor knowledge regarding recapping the used needles and regarding wear the surgical mask >3 feet to prevent droplet transmission. The study recommends that the nurses should be modifying and reinforcing their knowledge about universal precautions by continues educational programs and raises their awareness. Encourage transmission barriers use (hand hygiene, personal protective equipment), and especially the most important and simple procedures to reduce infection transmission "hand hygiene".

معارف الممرضين حول الاحتياطات العامة في وحدة العناية المركزة لحديثي الولادة لمستشفيات بغداد التعليمية للأطفال:دراسة وصفية

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مفتاح الكلمات :الاحتياطات العامة ،وحدة العناية المركزة لحديثي الولادة

الخلاصة

العدوى المكتسبة (الخمج) في المستشفيات تعد من أهم أسباب الأمراض والوفيات عند حديثي الولادة عالية الخطورة الذين يتلقون العناية المركزة. وقد وضع مركز السيطرة على الأمراض المعدية CDC مجموعة من البروتوكولات والمبادئ التوجيهية المعروفة باسم الاحتياطات العامة (Universal Precautions) والتطبيقات لرعاية جميع المرضى في جميع وحدات الرعاية الصحية (بغض النظر عن احتمالية أو تأكيد وجود العامل المسبب للعدوى) والتي تسيطر أو قد تمنع انتقال

العدوى لحدیثی الولادة والعاملین فی مجال الرعاية الصحية. تقييم مستوى معرفة الممرضین نحو الاحتیاطات العامة فی وحدة العناية المركزة لحدیثی الولادة، وإيجاد بعض العلاقات بین معرفة الممرضین والبیانات الديموغرافية الخاصة بهم. أجريت دراسة وصفية بدأت من الأول من شهر تشرين الثاني لسنة 2010 ولغاية الأول من شهر نيسان لعام 2011، اشتملت عینة الدراسة جمیع الممرضین العاملين فی وحدة العناية المركزة لحدیثی الولادة التابعة لمستشفيات الأطفال التعليمية فی مدينة بغداد والمؤلفة من 35 ممرض وممرضة. تم إعداد أداة البحث (الاستبانة) اعتماداً علی المبادئ التوجيهية لمنظمة الصحة العالمية ومركز السيطرة علی الأمراض والوقاية منها CDC وقد اختبرت الاستبانة قبل وضع الصیغة النهائية لها جمعت البیانات من خلال تطبيق الاستبانة وتقنية المقابلة. كانت معرفة الممرضین مقبولة فیما يتعلق بنظافة الیدين وإعاش المریض، وأداب السعال/ نظافة الجهاز التنفسي، بينما كانت معرفتهم جيدة فیما يتعلق بالمعلومات العامة ومعدات الوقاية الشخصية وأدوات رعاية المریض الملوثة والإبر والأدوات الحادة الأخرى، ومكان المریض (الحجر الصحي). للأسف كانت معرفتهم دون المستوى المطلوب (ضعيفة) فیما يتعلق بإعادة غطاء الإبر المستخدمة وارتداء القناع الجراحي بمسافة 3 أقدام لمنع انتقال التلوث. بشكل عام، 71.4% من إجمالي العينة كان مستوى معرفتهم مقبولة فیما يتعلق بالاحتیاطات العالمية. معظم المشارکین لديهم مستوى مقبول من المعرفة فیما يتعلق بالاحتیاطات العامة، لكن معرفتهم كانت ضعيفة بشأن إعادة غطاء الإبر المستخدمة وارتداء القناع الجراحي بمسافة <3 أقدام لمنع انتقال التلوث. توصي الدراسة بتعزيز معرفة الممرضین حول الاحتیاطات العالمية من خلال رفع الوعي وتفعيل برنامج التعليم المستمر وتشجيعهم علی استخدام حواجز انتقال الخمج (نظافة الیدين، ومعدات الوقاية الشخصية) وخصوصاً الإجراء الأكثر أهمية وبساطة للحد من انتقال العدوى "نظافة الیدين".

1. INTRODUCTION

Infections acquired in the hospitals are important causes of morbidity and mortality in high risk neonates who receive intensive care. It constitutes an important health problem throughout the world, affecting both developed and developing countries (1). Many infections in the hospitals are caused by pathogens transmitted from infected health care workers (HCWs) to neonates, or from one newborn to another by way of HCWs in NICU who have not washed their hands between the newborns, or they do not practice universal control measures as well, the close physical contact between health care personnel and the newborns like feeding or changing solid diapers provides abundant opportunities for the transmission of infectious materials in NICU (2).

In 1996, the Centers for Disease Control and Prevention (CDC) issued the Universal precautions. It is a set of guidelines that apply to care of all patients in all healthcare settings, regardless of the suspected or confirmed presence of an infectious agent that may prevent and control infection transmission for neonates and health care workers (3).

Universal precautions refer to many practices such as: Hand hygiene ,Personal Protective Equipment (PPE),needle stick and sharps injury prevention ,respiratory hygiene (Cough Etiquette), dispose of all contaminated sharp objects in an appropriate puncture-proof container ,dispose of all contaminated personal protective equipment in an appropriate container marked for bio-hazardous waste(2) (3).

All nurses, in all roles and settings can demonstrate a leadership in infection prevention and control by using their knowledge, skills, and judgment to initiate appropriate and immediate infection control procedures (3). An effective knowledge about hospital infection and prevention can reduce the rate of infection and its consequence (4).

2. MATERIALS AND METHODS

A non-probability (purposive) sample of 35 nurses was selected from Children Welfare Pediatric Teaching Hospital, Child's Center Pediatric Teaching Hospital, and Ibn Al-Beldi Maternal and Child Teaching Hospital in Baghdad city. The study has conducted from 1st November 2010 to 1st April 2011. A questionnaire was prepared based on the WHO and CDC guidelines on UPs and was pre-tested before finalization. It was consisted of 41 structured questions, concerning (general information, hand hygiene, personnel protective equipment, solid patient equipment, needles and other sharps, patient resuscitation, patient placement, respiratory hygiene /cough etiquette). Data has collected through the application

of questionnaire and interview techniques. The score of the knowledge level was good (correct answers more than 80 %), accepted (correct answers 50 - 80 %), and unaccepted (correct answers less than 50 %). The validity and reliability were determined and the data were analyzed through the application of descriptive and inferential data analysis through using the statistical package for social science (SPSS) version (17) and chi-squared test was used to test the association between variables.

3. RESULTS

Table (1) describes that third of participants within 30-39 years-old age (n= 12; 34.3%), more than half of them female (n= 21; 60%), less than half of them has diploma in nursing (n= 17; 48.5%), most of them married (n= 29; 82.9%), two fifth has < 5 years working in nursing (n= 14; 40%), more than half has < 5 years of experience in NICU (n= 21; 60%), and majority of them did not participate in training courses about UPs(n= 32; 91.4%).

Table (1): Participants' Socio-demographic Characteristics (N=35)

List	Variable	Frequency	percent
1	Age		
	20-29	10	28.6
	30-39	12	34.3
	40-49	10	28.6
	50-59	3	8.5
2	Gender		
	Female	21	60
	Male	14	40
3	Level of Education		
	Nursing School	15	42.9
	Diploma	17	48.5
	College	3	8.6
4	Marital Status		
	Married	29	82.9
	Not married	6	17.1
5	Years of Working in Nursing		
	< 5	14	40
	6-10	13	37.1
	11-15	6	17.1
	16-20	2	5.7
6	Years of Experience		
	< 5	21	60
	6-10	10	28.6
	11-15	4	11.4
7	Participation in Training Courses		
	Yes	3	8.6
	No	32	91.4

Table (2) Participants' Level of Knowledge related basic principles of UPs

List	Variable	F	%
1	General Information		
	Good	18	51.4
	Acceptable	17	48.6
	Total	35	100
2	Hand hygiene		
	Good	14	40
	Acceptable	20	57.1
	Poor	1	2.9
	Total	35	100
3	PPE= personnel protective equipment		
	Good	20	57.1
	Acceptable	13	37.1
	Poor	2	5.7
	Total	35	100
4	soiled patient-care equipment		
	Good	25	71.4
	Acceptable	10	28.6
	Total	35	100
5	Needles and other sharps		
	Good	35	100
6	Resuscitation		
	Good	14	40
	Acceptable	16	45.7
	Poor	5	14.3
	Total	35	100
7	Patient placement (isolation)		
	Good	33	94.3
	Acceptable	2	5.7

	Total	35	100
8	Respiratory hygiene/cough etiquette		
	Good	12	34.3
	Acceptable	21	60
	Poor	2	5.7
	Total	35	100
9	Total Knowledge		
	Good	10	28.6
	Acceptable	25	71.4
	Total	35	100

The study shows that the participants have a good level of knowledge in the following items: (51.4%) concerning general information, (57.1%) regarding PPE, (71.4%) in soiled patient-care equipment, (100%) in needles and other sharps, and (94.3%) in patient placement (isolation). The table shows also the participants have accepted level of knowledge regarding the following items: (57.1%) in hand hygiene, (45.7%) in patient resuscitation, and (60%) in respiratory hygiene/cough etiquette. In general the result concluded that (71.4%) has acceptable level while (28.6 %) has good level from total items of knowledge regarding UPs (table 2).

Table (3-A) Participants' Knowledge related to general information

List	Item	know	Don't know	Mean (SD)	Sig.
		f (%)	f (%)		
General Information about UPs					
1	UPs decrease blood-borne viruses	23 (65.7%)	12 (34.3%)	1.34 (0.481)	A
2	For suspected or infected patient	27 (77.1%)	8 (22.9%)	1.22 (0.426)	G
3	break down chain of infection	22 (62.9%)	13 (37.1%)	1.37 (0.490)	A
4	Vaccination decrease transmission	23 (65.7%)	12 (34.3%)	1.34 (0.481)	A
5	UPs for protect patient only	24 (68.6%)	11 (31.4%)	1.31 (0.471)	G
6	UPs used for all patient	24 (68.6%)	11 (31.4%)	1.31 (0.471)	G
7	UPs used in NICU	22 (62.9%)	13 (37.1%)	1.37 (0.490)	A

Cut-off-point: 1-1.33= Good; 1.34-1.67 = Accepted; 1.68-2.00 = Poor (A = Acceptable; G= Good; P = Poor)

This table shows that the participant has accepted level of knowledge in the general information in points (1, 3, 4, and 7) that were (1.34 ± 0.481) , (1.37 ± 0.490) , (1.34 ± 0.481) , (1.37 ± 0.490) respectively.

Table (3-B) Participants' Knowledge related to hand hygiene

List	Item	Know	Don't know	Mean (SD)	Sig.
		f (%)	f (%)		
Hand hygiene					
1	After blood & body fluid contact	25 (71.4%)	10 (28.6%)	1.28 (0.458)	G
2	After gloves remove	21 (60%)	14 (40%)	1.40 (0.497)	A
3	Between patients	24 (68.6%)	11 (31.4%)	1.31 (0.471)	G
4	With water & soap	20 (57.1%)	15 (42.9%)	1.42 (0.502)	A
5	Invisible hand contamination	22 (62.9%)	13 (37.1%)	1.37 (0.490)	A
6	From contaminated to clean area	25 (71.4%)	10 (28.6%)	1.28 (0.458)	G
7	Contact patient care equipment	22 (62.9%)	13 (37.1%)	1.37 (0.490)	A
8	The important procedure	24 (68.6%)	11 (31.4%)	1.31 (0.471)	G

Cut-off-point: 1-1.33= Good; 1.34-1.67 = Accepted; 1.68-2.00 = Poor (A = Acceptable; G= Good; P = Poor)

This table shows that the participant has accepted level of knowledge in hand hygiene in points (2, 4, 5, and 7) that were (1.40 ± 0.497) , (1.42 ± 0.502) , (1.37 ± 0.490) , (1.37 ± 0.490) respectively.

Table (3-C) Participants' Knowledge related to personal protective equipment

List	Item	Know	Don't know	Mean (SD)	Sig.
		f (%)	f (%)		
Wearing of PPE					
1	Contact with blood & fluid body	24 (68.6%)	11 (31.4%)	1.31 (0.471)	G
2	Contact with mucus membrane	23 (65.7%)	12 (34.3%)	1.34 (0.481)	A
3	Contact with intact skin	20 (57.1%)	15 (42.9%)	1.42 (0.502)	A
4	Change between patient	17 (48.6%)	18 (51.4%)	1.51 (0.507)	A
5	Change between procedures	31 (88.6%)	4 (11.4%)	1.11 (0.322)	G
6	During blood splash procedures	23 (65.7%)	12 (34.3%)	1.34 (0.481)	A
7	Wearing gowns	21 (60%)	14 (40%)	1.40 (0.497)	A
8	Protect nurses	21 (60%)	14 (40%)	1.40 (0.497)	A
9	Wash gloves	19 (54.3%)	16 (45.7%)	1.45 (0.505)	A

10	Used gloves frequently	21 (60%)	14 (40%)	1.40 (0.497)	A
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Cut-off-point: 1-1.33= Good; 1.34-1.67 = Accepted;1.68-2.00 = Poor (A = Acceptable; G= Good; P = Poor)

This table shows that the participant has accepted level of knowledge in PPE in points (2, 3, 4, 6, 7, 8, 9 and 10) that were (1.34 ± 0.481) , (1.42 ± 0.502) , (1.51 ± 0.507) , (1.34 ± 0.481) , (1.40 ± 0.497) , (1.40 ± 0.497) , (1.45 ± 0.505) , (1.40 ± 0.497) respectively.

Table (3-D) Participants' Knowledge related to solid patients care equipment

List	Item	Know	Don't know	Mean (SD)	Sig.
		f (%)	f (%)		
Solid patient equipment					
1	Wear gloves	24 (68.6%)	11 (31.4%)	1.31 (0.471)	G
2	Handle in manner	27 (77.1%)	8 (22.9%)	1.22 (0.426)	G
3	Hand washing	25 (71.4%)	10 (28.6%)	1.28 (0.458)	G
4	Clean then disinfect equipment	26 (74.3%)	9 (25.7%)	1.25 (0.443)	G

Cut-off-point: 1-1.33= Good; 1.34-1.67 = Accepted;1.68-2.00 = Poor (A = Acceptable; G= Good; P = Poor)

Fortunately this table shows that the participant has good level of knowledge in all aspects of solid patients care equipment.

Table (3-E) Participants' Knowledge related to needle & other sharps

List	Item	Know	Don't know	Mean (SD)	Sig.
		f (%)	f (%)		
Needles & other sharps					
1	Recapping used needle	10 (28.6%)	25 (71.4%)	1.71 (0.458)	P
2	Break or bend needle	30 (85.7%)	5 (14.3%)	1.14 (0.355)	G
3	Puncture resistance container	21 (60%)	14 (40%)	1.40 (0.497)	A

Cut-off-point: 1-1.33= Good; 1.34-1.67 = Accepted;1.68-2.00 = Poor (A = Acceptable; G= Good; P = Poor)

Unfortunately this table shows that the participant has poor knowledge in point (1) that was 1.71 (0.458) while they have accepted knowledge in point (3) that was 1.40 (0.497).

Table (3-F) Participants' Knowledge related to patient resuscitation & patient isolation

List	Item	Know	Don't know	Mean (SD)	Sig.
		f (%)	f (%)		
Resuscitation					
1	Direct contact	20 (57.1%)	15 (42.9%)	1.42 (0.502)	A
2	Use mouthpiece to protect nurses	24 (68.6%)	11 (31.4%)	1.31 (0.471)	G
Patient placement (isolation)					
1	Prevent hospital infection	23 (65.7%)	12 (34.3%)	1.34 (0.481)	A
2	Protect infection environment	27 (77.1%)	8 (22.9%)	1.22 (0.426)	G
3	Prevent transmission infection	21 (60%)	14 (40%)	1.40 (0.497)	A

Cut-off-point: 1-1.33= Good; 1.34-1.67 = Accepted;1.68-2.00 = Poor (A = Acceptable; G= Good; P = Poor)

In this table regarding to patient resuscitation the participant has accepted knowledge in point (1) that was 1.42 (0.502), they have also accepted knowledge regarding isolation in points (1 & 3) that were 1.34 (0.481), 1.40 (0.497) respectively.

Table (3-G) Participants' Knowledge related to respiratory hygiene/ cough etiquette

List	Item	Know	Don't know	Mean (SD)	Sig.
		f (%)	f (%)		
Respiration hygiene					
1	Symptomatic person used mask	27 (77.1%)	8 (22.9%)	1.22 (0.426)	A
2	Used tissue without touch	22 (62.9%)	13 (37.1%)	1.37 (0.490)	A
3	Hand washing	18 (51.4%)	17 (48.6%)	1.48 (0.507)	A
4	wearing surgical mask >3 feet	10 (28.6%)	25 (71.4%)	1.71 (0.458)	P

Cut-off-point: 1-1.33= Good; 1.34-1.67 = Accepted;1.68-2.00 = Poor (A = Acceptable; G= Good; P = Poor)

In this table the poor knowledge appear in point (4) that was 1.71 (0.458), while the accepted knowledge in points (1, 2, and 3) that were 1.22 (0.426), 1.37 (0.490), 1.48 (0.507) respectively.

Table (4) Association between Participants' Socio-demographic Characteristics and their Knowledge about universal precautions

Age	Knowledge		Total	Chi- square
	Good	Accepted		
20-29	6 (17.2%)	4 (11.4%)	10 (28.6%)	χ^2 obs =2.44 df=3 χ^2 Crit=7.81 P- value =0.060 Significant of level at $P \leq 0.050$.
30-39	2 (5.7%)	10 (28.6%)	12 (34.3%)	
40-49	1 (2.8%)	9 (25.8%)	10 (28.6%)	
50-59	1 (2.8%)	2 (5.7%)	3 (8.5%)	
Total	10 (28.6%)	25 (71.4%)	35 (100%)	
Gender	Knowledge		Total	Chi- square
	Good	Accepted		
Female	4 (11.4%)	17 (48.6%)	21 (60%)	χ^2 obs =2.30 df=1 χ^2 Crit=3.84 P- value =0.127 Significant of level at $P \leq 0.050$.
Male	6 (17.1%)	8 (22.9%)	14 (40%)	
Total	10 (28.6%)	25 (71.4%)	35 (100%)	
Level of Education	Knowledge		Total	Chi- square
	Good	Accepted		
Nursing School	4 (11.4%)	11 (31.4%)	15 (42.8%)	χ^2 obs =2.54 df=2 χ^2 Crit=2=5.99 P- value =0.968 Significant of level at $P \leq 0.050$.
Diploma	5 (14.3%)	12 (34.3%)	17 (48.6%)	
College	1 (2.9%)	2 (5,7%)	3 (8.6%)	
Total	10 (28.6%)	25 (71.4%)	35 (100%)	
Marital Status	Knowledge		Total	Chi- square

	Good	Accepted		
Married	10 (28.6%)	19 (54.3%)	29 (82.9%)	χ^2 obs =1.37 df=1 χ^2 Crit=3.84 P- value =0.089 Significant of level at $P \leq 0.050$.
Not married	0 (0.0%)	6 (17.1%)	6 (17.1%)	
Total	10 (28.6%)	25 (71.4%)	35 (100%)	
Years of Working in Nursing	Knowledge		Total	Chi- square
	Good	Accepted		
<5	8 (22.9%)	6 (17.1%)	14 (40%)	χ^2 obs =11.37 df=3 χ^2 Crit=7.81 P- value =0.009 Significant of level at $P \leq 0.050$
6-10	1 (2.9%)	12 (34.3%)	13 (37.2%)	
11-15	0 (0.0%)	6 (17.1%)	6 (17.1%)	
16-20	1 (2.9%)	1 (2.9%)	2 (5.7%)	
Total	10 (28.6%)	25 (71.4%)	35 (100%)	
Years of Experience	Knowledge		Total	Chi- square
	Good	Accepted		
<5	2 (5.7%)	19 (54.3%)	21 (60%)	χ^2 obs =9.33 df=3 χ^2 Crit=7.81 P- value =0.011 Significant of level at $P \leq 0.050$.
6-10	6 (17.1%)	4 (11.4%)	10 (28.6%)	
11-15	2 (5.7%)	2 (5.7%)	4 (11.4%)	
Total	10 (28.6%)	25 (71.4%)	35 (100%)	
Training Courses	Knowledge		Total	Chi- square
	Good	Accepted		
Yes	1 (2.9%)	2 (5.7%)	3 (8.6%)	χ^2 obs =2.38 df=1
No	9 (25.7%)	23 (65.7%)	32 (91.4%)	

Total	10 (28.6%)	25 (71.4%)	35 (100%)	χ^2 Crit=3.84 P- value =0.849 Significant of level at $P \leq 0.050$.
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Table (4) shows that there was no association between the participants' age, gender, level of education, marital status, and training courses with their level of knowledge (P-value was 0.060, 0.127, 0.968, 0.089, & 0.849) respectively.

The same table shows a significant association between participants' years of working in nursing and in the current unit with their level of knowledge (P-value was 0.009 & 0.011) respectively.

4. DISSCUSION

Table (1) describes that third of participants (34.3%) within 30-39 years-old, the researchers see that the nursing care at NICU is hard and requires good practice & patience that we think it appear in this age group. More than half of them (60%) were females; we think that working in such area required females emotions, this result agree with similar studies in Iraq about nosocomial infection in NICU (5), in the United Arab Emirates about standard precautions (6), & in Mazandaran Province towards universal precautions (7) that more than the nurses were females.

The same table shows also less than half of them (48.5%) has diploma in nursing, this result supported by a study in Iraq for infection control measures (8) which show the same result. Most of them (82.9%) were married this result was supported by a study in Iraq at NICU about nosocomial infection that has the same result (5). (40%) of them has < 5 years working in nursing this result similar to a study in Mazandaran Province that 40.6% had 0–5 years of experience in their job (7). More than half of them (60%) have < 5 years of experience in NICU which was agree with a study among nurses in the United Arab Emirates (6). Finally majority of them (91.4%) did not participate in training courses about infection control measures this finding similar with two studies in Iraq that the majority of nurses did not participate in such courses (5 & 8).

The finding in table (2) shows in point 9 that most of the participant (71.4%) has acceptable level of the total knowledge regarding UPs. This result was not enough, the researchers wish to increase their level of knowledge about UPs to control infection, this may be related to the lack of regular education courses on control infection especially in that hospitals. This finding agrees with other studies in developed as well as developing countries that the health care workers including nurses have inadequate knowledge about UPs (7, 9, 10 and 11).

In the same table you will see also the accepted knowledge (57.1%) of the participant for hand hygiene in point 2, (45.7%) of them for patient resuscitation in point 6, and (60%) of them for respiratory hygiene/cough etiquette in point 8. These results can be interrupted by inaccessibility of supplies and being too busy or not thinking about hand washing, in addition to individual factors as knowledge & attitude, a study in Iraq for strategy to control infection shows poor compliance in hand washing among nurses in intensive care unit (14) this result disagree with point 2. The participant did not know the appropriate use of UPs in resuscitation probably, a literature about hospital infection control say "it is important to practice good standards of hygiene for all patients whether known to be infected or not in patient resuscitation" (13). More than half of participants did not use the appropriate principles of UPs for infected person, the CDC has documented that the nursing

staff should have a background about the principles of preventing of hospital infection in all health care settings (3).

Table (3-A) shows acceptable knowledge in general information about UPs in points 1, 3, 4, and 7 that were $1.34 (\pm 0.481)$, $1.37 (\pm 0.490)$, $1.34 (\pm 0.481)$, & $1.37 (\pm 0.490)$ respectively, thus because the participant did not know that the UPs is one of the method to prevent blood born virus and to break down the chain of infection, this result disagree with a study in Iraq about knowledge and implementation of UPs that the health care workers have good knowledge in this part (9), according to literature about hospital infection control reported that "HCWs immunization reassured that they will not be at any special risk of acquiring infection" (13), and the CDC was recommended that UPs can applied in all health care setting including NICU to prevent infection transmission (3).

Table (3-B) reflect also the accepted knowledge for hand washing in points 2, 4, 5, & 7 that were $1.40 \pm (0.497)$, $1.42 (\pm 0.502)$, & $1.37 (\pm 0.490)$ respectively. We see that more than third of the participants did not wash their hands after remove gloves and this result disagree with a study in Algeria which reported that most of the nurses do it (16). More than third of them achieved hand hygiene by using just water and soap, and they did not do it for both invisible hand contamination and after contact with patient equipment, this lack of knowledge may relate to lack of importance procedure to decrease infection & work over load. You will found a literature about hospital infection control said that "nursing staff must observe proper hand hygiene and other infection control measures, through hand washing with soap and water followed by alcohol hand rub, it should performed on each enter into NICU and before and after handling infant" (13) support these result. While a study in Iraq about knowledge and implementation of UPs found hand washing was unaccepted (9).

The finding in table (3-C) revealed accepted knowledge for PPE in all points except in points 1 & 5 they were $1.34 (\pm 0.481)$, $1.42 (\pm 0.502)$, $1.51 (\pm 0.507)$, $1.34 (\pm 0.481)$, $1.40 (\pm 0.497)$, $1.40 (\pm 0.497)$, $1.45 (\pm 0.505)$, & $1.40 (\pm 0.497)$ respectively. The participant did not wear PPE in appropriate, these results may be interpreted in a way that work load and lack of knowledge regarding importance of such protective barriers. This finding similar to a study in Iraq for strategy to control infection shows that inadequate usage of PPE among HCWs in their work (14).

Fortunately table (3-D) shows good knowledge for solid patients care equipment. a literature about hospital infection control which mention that "it is nursing responsibility to keep equipment free of dirt, nursing staff should take UPs with all contaminated sharps, blood and body fluids, whether or not patient is known to be infected, and as part of nursing training, they should understand the general principles of isolation and the exact procedures for common illness" (13).

Table (3-E) shows (71.4%) of the participant has poor knowledge for recapping the used needles point 1 it was $1.71 (\pm 0.458)$, they think that it will prevent injuries for others and they did not know recapping in one hand, this result agree with a study in Iraq about knowledge and implementation of UPs shows all of the participant recap the used needle (9). The same table revealed accepted knowledge in point 3 it was $1.40 (\pm 0.497)$, this finding due to lack of knowledge regarding placed the used needle and other sharps in puncture-resistant container or being too busy to do it to protect themselves and others from infection transmission. The CDC reported that UPs are designed to protect staff from risks such as sharps injuries and body fluid spillages, and to protect patients from cross-infection (3), a study in Iraq for strategy to control infection support this result (14).

In table (3-F) the accepted appear again for patient resuscitation in point 1 it was $1.42 (\pm 0.502)$, the participant used direct contact without any barriers for protection for resuscitation, a literature about hospital infection control mention that "for resuscitation of any patient, mouth to mouth ventilation should be avoided by use alternative methods such rebreathing bag (13). Also the participant has accepted knowledge in related to patient placement (isolation) in points 1 & 3 that were $1.34 (\pm 0.481)$ and $1.40 (\pm 0.497)$

respectively, they did not know that using of UPs will protect the hospital from infection and transmission of it from patient to another, a literature about hospital infection control mention that "staff should understand the general principles of isolation and the exact procedures for common infections" (13).

Table (3-G) shows poor knowledge for wear the surgical mask >3 feet to prevent droplet transmission of the infected persons in point 4 it was 1.71 (\pm 0.458); the participant did not knew the appropriate distance to wear the mask. We must bearing in mind that universal precautions play an important role in minimizing and preventing exposure of health care workers to pathogens (15). The same table shows accepted knowledge in points 1, 2, & 3 that were 1.22 (\pm 0.426), 1.37 (\pm 0.490), & 1.48 (\pm 0.507) respectively; the participant did not apply the UPs probably with symptomatic persons like using masks and disposal of used tissues, and perform hand hygiene also lack to guideline toward respiratory precaution. This result supported by a study in Iraq for strategy of infection control that shows poor compliance in hand washing during suctioning and oxygen supply among nurses in intensive care unit (14).

Table (4) demonstrates that there is no association between participants' age, gender, marital status, their level of education, and training sessions about infection control with their knowledge about UPs. Based on researchers' point of view, these meaningless relations mean that nursing staff work in the same circumstances and facility circumstances without updating to their information and majority of them did not participate in educational sessions in infection control. Therefore they have the same level of knowledge. These results agree with studies in Iraq about nosocomial infection in NICU and infection control measures in this part (5 & 8).

Table (4) revealed a significant association between participants' years of working in nursing and in the current unit with their level of knowledge about UPs; the result shows that when one of them increases the other also, we think that the participants acquired more knowledge about infection transmission and control by increasing years of employee. These results are supported by two studies in Iraq that the years of employee in hospitals and in NICU increase knowledge about infection control (5 & 8).

Conclusion: Most of the participants have accepted level of knowledge regarding all aspects of universal precautions. They have poor knowledge regarding recapping the used needles and regarding wear the surgical mask >3 feet to prevent droplet transmission. Bearing in mind that universal precautions play an important role in minimizing and preventing infection transmission, there is a need for developing strategies to promote the use of UPs which take into account behavior change and a base of knowledge including its integration into practice. The nurses should be modifying their knowledge and raise their awareness about UPs by continues educational programs, especially the most important and simple procedures to reduce infection transmission "hand hygiene". Bearing in mind that universal precautions play an important role in minimizing and preventing infection transmission, there is a need for developing strategies to promote the use of UPs which take into account behavior change and a base of knowledge including its integration into practice.

Recommendation:

Universal precautions should be used by all health care workers when caring for all patients and when handling body fluids. All health care workers should routinely use the appropriate barrier precautions to prevent skin and mucous membrane exposure during contact with any patient's blood or bodily fluids that require. The nurses should be modifying their knowledge and raise their awareness about UPs by continues educational programs, especially the most important and simple procedures to reduce infection transmission "hand hygiene".

REFERENCES

- [1] Raka, L., Zoutman D., Mulliqi, G., Krasniqi, S., Raka, N., Dedushaj, I., Ahmeti, S., Shala, M., Vishaj, A., and Elezi, Y.(2006) "Prevalence of Nosocomial infections in high-risk units in the university clinical center of Kosova". *Infection Control and Hospital Epidemiology Journal*. Vol. 27 (4)
- [2] Smith, S., Duell, D., and Martin, B. (2004) "Clinical Nursing Skills: basic to advanced skills". 6th ed. USA: Saddle River.. P. p. 382-83.
- [3] CDC, Center of Disease Control and Prevention. (2007) "Guideline for Isolation Precautions: preventing transmission of infectious agents in health care setting 2007".. P.p 12-18, 88-100, available on [http:// www.cdc.gov](http://www.cdc.gov), access at 8/11/2007.
- [4] College of Nurses of Ontario. (2005) "Practice Universal: infection prevention and control". P.p 3-4, available on [http:// www.medscapnursing @yahoo.com](http://www.medscapnursing@yahoo.com), access at 12/1/2008.
- [5] Shauq A. H. 2008 "Assessment of the Pediatric Nurses` Knowledge about Nosocomial Infection in the NICU at Baghdad Pediatric Teaching Hospitals" (thesis). Baghdad University. College of nursing. Pp 88, 89, 111.
- [6] Sreedharan J., Muttappillymyalil J., and Venkatramana M. (2011) "Knowledge about standard precautions among university hospital nurses in the United Arab Emirates". *Eastern Mediterranean Health Journal (EMHJ)*. vol. 17 (4). Pp 332,333.
- [7] Motamed N1, BabaMahmoodi F, Khalilian A, Peykanheirati M, Nozari M. (2006) "Knowledge and practices of health care workers and medical students towards universal precautions in hospitals in Mazandaran Province". *East Mediterr Health Journal*. vol.12 (5).. P.p 653-61.
- [8] Bakey, S J. (2008) "Assessment of nurses` Knowledge toward Infection Control Measures for Hepatitis B Virus in Hemodialysis Units in Iraq" (thesis). Baghdad University. College of Nursing.. Pp 111-115.
- [9] Al-Juboury, A K. (1998) "Aids Knowledge and Implementation of Universal Precautions among Health Care Workers at Arrivals` Screening Centers in Baghdad" (Thesis). Baghdad University. College of Nursing.. Pp 73, 74, 79-81.
- [10] Juntaradee, M., Yimyaem, S., Soparat, P., Jariyasethpong, T., and Danchaivijitr, S. (2005) "Nosocomial infection control in district hospitals in north Thailand". *Journal of Medical Association of Thailand*. Vol. 88 (10).. P. 120. available on [http://www.medscapnursing @yahoo.com](http://www.medscapnursing@yahoo.com), access at 5/1/2008.
- [11] Anupam K, and Taneja K. (2010) "Health Care Workers and Universal Precautions: Perceptions and Determinants of Non-compliance". *Indian J Community Med*. Vol. 35(4). P.p 526–528.
- [12] Chan R1, Molassiotis A, Chan E, Chan V, Ho B, Lai CY, Lam P, Shit F, Yiu I. (2002) "Nurses' knowledge of and compliance with universal precautions in an acute care hospital". *International Journal of Nursing Studies*. Vol. 39(2). P.p157-63.
- [13] Howard, J & Casewell M. (1994)"Hospital Infection Control: policies & practical procedures". W.B. Saunders. London.. P.p. 2, 26, 96, 144, 178, 187.
- [14] Ali, S A. (2004) "Strategy to Control Hospital Associated Infection for Cardiac Surgery Hospitals in Iraq" (dissertation). Baghdad University. College of Nursing. Pp136, 137, 142, 144.
- [15] Salehi A & Garner P. (2010) "Occupational injury history and universal precautions awareness: a survey in Kabul hospital staff". *BMC Infectious Diseases Journal*. vol. 10(19). P.p 123-25
- [16] Beghdadli B1, Belhadj Z, Chabane W, Ghomari O, Kandouci AB, Fanello S. (2008). "Universal precautions practices among nurses in a university hospital in Western Algeria". *BMC Infectious Diseases Journal*. Vol. 20 (5). P.p 445-53.