بسم الله الرحمن الرحيم

Shendi University
Faculty of Graduate and Scientific Research

Impact of Implementing Infection Control Program for Nurses to Reduce Nosocomial Infection in Kassala Pediatrics Hospitals

A thesis submitted for fulfillment of the requirement for Ph.-D in pediatric nursing

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قال تعالى:

﴿اقْرَأْ بِاسْمِ رَبِّكَ الَّذِي خَلَقَ*خَلَقَ الْإِنْسَانَ مِنْ عَلَقٍ*اقْرَأْ وَرَبُّكَ الْأَكْرَمُ*الَّذِي عَلَّمَ بِالْقَلَمِ*عَلَّمَ الْإِنْسَانَ مَا لَمْ يَعْلَمْ﴾

صدق الله العظيم

Dedication

To Whose helping to make me who I am , for teaching me to be proud of who I am , for showing me how to be strong , for giving me the courage not to be weak , & giving me the strength to always strive for better , no matter what ...

My mother, father and brother…

To my unique source of success, the person who always supports me, encourage me; drive me to be a better through my life.

Eiman Adel Altayeb

***To** anyone who one day inspire me and drew a smile on my face, those whom perfume my life with givens and happiness*

My students

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It is not easy for me to do this work in this form without the kind, experienced and confident guidancenm ***my supervisor***

Dr. : Haroun Hassan Abdel Gadir

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For guidance and encouragement to produce a perfect work

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I would to thanks nurses staff member of Kassala specialized hospital for pediatrics and Kassala teaching hospital especially "Sakina Ali, Mawada Mohamed, Safa Mohamed and Mawahib Musa, Nawal Gad karim and Abd Almajeed" for their support and cooperation during madding my research.

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List of abbreviation

Abbreviation	Term
ABHR	alcohol-based hand rubs
BSIs	Blood stream infections
CDC	Centre of Disease Control
COSHH	Control of substance hazard to health
CVCs	Central Venous Catheters
HAIs	Hospital acquired infections
HCWs	Healthcare workers
HEPA	high efficiency particulate air
HICPAC	Health care Infection Control Practices Advisory Committee
LTCF	Long term care facilities
MDROs	Multidrug resistance organisms
MRSA	Methicillin-resistant Staphylococcus Aureus
NICE	National institute for health care excellence
NIs	Nosocomial infections
NNIS	National Nosocomial Infections Surveillance System
PEEP	Positive End Expiratory Pressure
PICUs	Pediatric Intensive Care Units
PPE	Personal Protective Equipment
RSV	Respiratory syncytial virus
SICPs	Standard Infection Control Precautions
UKCC	United Kingdom Central Council
UTI	Urinary Tract Infection
U.S	United State
WHO	World Health Organization

Abstract

Nosocomial infections are important causes of morbidity and mortality in pediatric hospitals and it drawing increasing attention from patients, insurers, governments and regulatory bodies. This is due to the growing recognition that most of these are preventable. This quasi-experimental study was carried out in Kassala state in two pediatric hospitals from September 2013 – May 2014 to evaluate impact of implementing infection control session on nurse's knowledge and practice and to detect the incidence of nosocomial infection. Questionnaire, observational check lists and hand hygiene form and observational sheet for nosocomial surveillance. The study involved 50 nurses varied in their experience in pediatric care. Most of those have no previous training course or attending infection control course before. There was an increase in mean of good knowledge about infection control concept from (19.1%) before implementation of program to (71.1%) after implementation of program. There was improvement of knowledge regarding clinical case identification and prevention of nosocomial infection with significant P value = 0.000. The study shows clearance of negative attitude of nurses about using normal saline as disinfecting solution. The program of measure was motivation of nurses hand hygiene practice and compliance in optimum way because there was increase in mean knowledge of nurses regarding hand hygiene. The study shows that nurses were mostly concerned about themselves acquiring infection more than transmit infection to pediatric patients so they wash their hands after touching the patient (44%), touching patient surrounding (36%) and after risk of exposure to patient fluids (30%) more frequent before intervention more than cleaning their hands before touching the patient. These practices persist after implementing the program.

The nurses psychomotor skills that related to pediatric care before implementation improved from (51.3%) to (64.3%) in follow up phase of study. The study revealed that previous contact with infection control courses increased both knowledge and practice of nurses in infection control procedures. The overall incidence of nosocomial infection was (0.7%) during the surveillance period. where intravenous catheter infection incidence was (35%) followed by nosocomial pneumonia (25%), (20%) was urinary tract infections and gastrointestinal infections; this nosocomial infection was due to long stay in hospital (20%) of children stay, patient transition movements between hospital wards (60%) and long duration of stay of a peripheral catheter (52%).

We recommend Introduction of basic infection control program to the curriculum of all nursing colleges as well as to other paramedical and technical staff training institutes to improve graduate nurse's knowledge, attitude and practice regarding infection control procedures. Updating nurse's knowledge about infection control guidelines through continuous professional development. Provide hospitals with sinks and antiseptic soaps in wards and nurse's office with acceptable numbers.

ملخص البحث

العدوى المكتسبة داخل المستشفيات هي من أهم أسباب الاعاقات والوفيات بمستشفيات الأطفال، مما ادي الي الاهتمام المتزايد من قبل المرضى وشركات التأمين والحكومات و الهيئات الادارية. ويرجع ذلك إلى الاعتراف المتزايد بأن معظم هذه الامراض يمكن الوقاية منها. هذا الدراسة شبه التجريبية في ولاية كسلا في مستشفيين للأطفال في الفترة من سبتمبر 2013 - مايو 2014 لتقييم أثر تنفيذ دورة مكافحة العدوى في المعرفة والممارسة للممرضات و للكشف عن حالات العدوى المكتسبة داخل المستشفيات. و قد تم جمع المعلومات بواسطة الاستبيان، وقوائم التحقق واستمارة تقصي نظافة اليدين واستمارة رصد لمراقبة العدوي المكتسبة بالمستشفيات ، وشملت الدراسة 50 ممرضة، اوضحت الدراسة ان (32%) من الممرضات لديهن خبرة أكثر من 6 سنوات في العمل بوحدات رعاية الاطفال؛ و معظمهم (72%) لم يتلقين اي دورة تدريبية في مجال رعاية الاطفال و أن معظمهن (78%) لم يتلقين أي دورة عن مكافحة العدوى من قبل. اظهرت الدراسة ان هنالك زيادة في متوسط المعرفة حول مفهوم مكافحة العدوى حيث كانت (19.1%) قبل تنفيذ البرنامج التدريبي و اذدادت الي (71.1%) بعد تطبيق البرنامج التدريبي وكذلك هنالك زيادة في متوسط معرفة الممرضات حول الاحتياطات القياسية لمكافحة العدوي بعد تنفيذ البرنامج التدريبي (79.5%) بدلا عن (22.5%) قبل تنفيذ البرنامج التدريبي؛ اثبتت الدراسة ان معرفة الممرضات بشأن عمليات التعقيم والتطهير اذدادت بصورة عامة من (15.2%) قبل أن تطبيق البرنامج التدريبي الي (70.4%) بعد تطبيق البرنامج التدريبي؛ و اظهرت الدراسة تحسنا في كيفية تعرف الممرضات علي تحديد العدوي المكتسبة داخل المستشفيات عن طريق المظاهر السريرية للعدوي و كذلك الوقاية من العدوى المكتسبة داخل المستشفيات مع دلالة إحصائية قوية، و الملفت للانتباه في هذه الدراسة أن هناك بعض الممرضات (38%) ما زلن يتمسكن باستخدام اليود لتطهير الجلد حتى بعد تنفيذ البرنامج التدريبي، و كما اثبتت الدراسة ترك الممرضات لاستخدام محلول ملح الطعام كمادة مطهره للجلد. شجع البرنامج التدريبي الممرضات لاتباع الطرق المثلي في نظافة الايدي و اتضح ذلك من خلال الزيادة في متوسط المعرفة من (24.4%) قبل تنفيذ البرنامج التدريبي إلى (81.2%) بعد تنفيذ البرنامج التدريبي، كما اذداد التزام الممرضات بنظافة الايدي من (29%) قبل تلقي البرنامج التدريبي إلى (60%) بعد تنفيذ البرنامج التدريبي ولكن (54%) الممرضات من اوضحن ان عدم كفاية صنابير المياه تشكل العقبة الرئيسية في الالتزام بنظافة الايدي. كما عكست هذه

الدراسة أن معظم الممرضات يقلقن من اكتساب العدوي من الاطفال المرضي أكثر من قلقهن من نقل العدوى للاطفال للمرضى حيث ان (44%) منهن كن يقمن بنظافة أيديهن بعد لمس الاطفال المرضي ، (36%) بعد لمس البيئة المحيطة بالاطفال المرضي و(30%)بعد خطر التعرض لسوائل الاطفال المرضي قبل تعرضهم للبرنامج التدريبي أكثر من نظافة أيديهن قبل ملامسة الاطفال المرضي، و إزداد هذا السلوك بصورة واضحة حتى بعد تنفيذ البرنامج. فيما يتعلق بالمهارات التمريضية ذات الصلة بالوقاية من عدوي بمستشفيات الاطفال اثبتت الدراسة ان هنالك تحسن في اداء الممرضات من (51.3%) قبل تلقيهن للبرنامج التدريبي إلى (64.3%) بعد تعرضهن للبرنامج التدريبي؛ و ايضا اوضحت الدراسة الممرضات اللائي تلقين دورات في مكافحة العدوي لديهن معرفة و خبرة و عملية كافية فيما يختص بإجراءات مكافحة العدوى المكتسبة داخل المستشفيات. أظهرت الدراسة ان كان معدل الإصابة بالعدوي المكتسبة داخل المستشفيات منخفضا وقد بلغ (0.7%) خلال فترة اجراء المسح مقارنة بعدة دراسات دولية، وقد كانت عدوى القسطرة الوريدية الطرفية من اكثر الاصابات (35%) و يليها الالتهاب الرئوي (25%)، و (20%) من الاصابات تمثلت في التهابات المسالك البولية و التهابات الجهاز الهضمي علي التوالي ، و قد عزت الدراسة هذه الاصابات الي طول قامة الاطفال بالمستشفى (20%) ، و تحويل الاطفال المرضي داخل عنابر المستشفي (60%) ومدة تواجد القسطرة الوريدية الطرفية (52%).

أوصت الدراسة بضرورة إدخال مقرر مكافحة العدوى في مناهج جميع كليات التمريض و المعاهد الصحية و مراكز تدريب ممارسي مهنة التمريض وذلك لتحسين معلوماتهم ومواقفهم و ممارساتهم فيما يتعلق بإجراءات مكافحة العدوى، وتحديث معلومات الممرضات فيما يتعلق بإجراءات مكافحة العدوى من خلال التدريب اثناء العمل وكذلك يجب توفير مصادر و معينات نظافة الايدي و توفيرها في كل عنابر المستشفيات ومكاتب التمريض.

بسم الله الرحمن الرحيم

برنامج تعليمي وتدريبي للمرضات للتقليل من العدوي المكتسبة داخل المستشفيات

مقدمة :

إن الإصابة بأمراض مكتسبة في المستشفيات (عدوى المستشفيات) مشكلة يعاني منها الكثيرون في جميع أنحاء العالم، و هذه الأمراض هي التي تتم الإصابة بها أثناء القيام بأنشطة الرعاية الصحية أو ترتبط بها وذلك مقارنة بتلك الأمراض الكامنة فعلاً عند القيام بتلك الأنشطة، وتعتبر تلك الأمراض التي تنشأ أو تتم الإصابة بها داخل المستشفيات من أهم أسباب الوفاة، كما أنها تتسبب في ارتفاع حدة الإصابة ببعض الأمراض لدى المرضى الذين يتلقون خدمات الرعاية الصحية، وهذه الأمراض التي تأتى كمضاعفات لأنشطة الرعاية الصحية تتسبب في إهدار موارد الرعاية الصحية وزيادة التكلفة، حيث يرتبط ذلك بزيادة تعاطى الأدوية وإجراء الدراسات المعملية وتوفير المؤن للمرضى بالإضافة إلى إطالة فترة البقاء بالمستشفيات، الأمر الذي قد يؤثر بالسلب على حياة المرضى حتى بعد الخضوع للعلاج، ومن ثم لا بد من مكافحة هذه العدوى والحد من انتشارها حتى مع قلة الموارد لأنها عالية المردور.

يعتقد الكثير من العاملين بالرعاية الصحية أن تطبيق الممارسات السليمة لمكافحة العدوى شيء يتطلب أجهزة ومعدات غالية، ولكن ذلك ليس حقيقياً، فإمكانية اتباع هذه الممارسات في الأماكن ذات الإمكانيات المحدودة هي نفس إمكانية اتباعها في الأماكن ذات الإمكانيات الكبيرة، لأن هذه الممارسات تعتمد في اتباعها على المعرفة الصحيحة و اعتياد القيام بالإجراءات السليمة

أهداف البرنامج التدريبي:

الهدف العام:

يهدف هذا البرنامج التدريبي الي تزويد الممرضات بالمعلومات و المهارات التمريضية اللازمة لتقليل انتشار العدوي المكتسبة داخل مستشفيات الاطفال و كيفية اجراء المسوحات علي الاطفال لاكتشاف حالات العدوي المكتسبة داخل المستشفيات.

الاهداف الخاصة:

بنهاية هذا البرنامج التدريبي سوف تكون الممرضة قادرة علي ان:

- تعرف العدوي.
- تشرح سلسلة العدوي.
- تتعرف علي انواع العدوي المكتسبة داخل المستشفيات.
- تحدد العوامل التي تساعد علي انتشار العدوي المكتسبة داخل المستشفيات.
- تحدد اعراض و علامات العدوي المكتسبة المستشفيات.
- تتعرف علي الاجراءات و السياسات المتعلقة بالتحكم في العدوي المكتسبة داخل المستشفيات.
- تطبق المهارات التمريضية الخاصة بالاحتياطات القياسية لمكافحة العدوي باقسام مستشفي الاطفال.
- تطبق المهارات التمريضية اللازمة التي تختص بالطفل المقيم بالمستشفي.
- تقدر اهمية مكافحة العدوي داخل المستشفيات.

الجزء الأول :

- مقدمة عن العدوي
- العدوي المكتسبة داخل المستشفيات

الأهداف	المحتوى	طرق التدريس+ الوسائل التعليمية المساعدة
في نهاية هذه الجلسة تستطيع الممرضة أن: 1. تعرف العدوي	- تعرف العدوي بانها تواجد و تكاثر الميكروبات في انسجة او سوائل الكائن الحي مما ينتج عنه اعراض و علامات مرضية واضحة او غير واضحة.	محاضرة,عرض شرائح صور ومناقشة
2. تشرح مكونات سلسلة العدوي	**تتكون سلسلة العدوي من:** **العامل المسبب للعدوي:** هي الميكروبات التي يمكن ان تسبب العدوي مثل البكتيريا و الفيروسات و الفطريات و الطفيليات **مخزن العدوي (المستودع):** هو المكان الذي يمكن ان تعيش و تتكاثر فيه مسببات العدوي **اماكن الخروج:** هو الطريق الذي يمكن لمسبب العدوي ان يخرج منه و يشمل: الجلد المفتوح– الاغشية المخاطية – الجهاز التنفسي– الجهاز الهضمي الجهاز البولي التناسلي **طريق الانتقال:** تطلق علي الطريقة التي تنتقل بها الميكروبات من المستودع الي العائل المعرض للاصابة. و هي تنقسم الي نوعين : ملامسة مباشرة و غير مباشرة **أماكن الدخول:** هو الطريق الذي يمكن للمسبب العدوي ان يدخل به الي العائل المعرض للاصابة **العائل المعرض للاصابة:** هو الشخص الذي يمكن ان يصاب بالعدوي عن طريق الميكروبات المسببه للعدوي و قد يكون العائل المعرض للاصابه هو المريض او مقدمي الرعايه الصحية	محاضرة,عرض شرائح صور ومناقشة
3. تعرف العدوي المكتسبة داخل المستشفيات	- هي اي عدوي موضعية او جهازية تنتج عن الميكروبات او سمومها و تظهر اعراضها و علامتها *علي المريض بعد 48 ساعة من دخوله الي المستشفي*	محاضرة,عرض شرائح صور ومناقشة
4. تعدد العوامل المؤهبة للاصابة بالعدوي المكتسبة داخل المستشفيات	شدة المرض - عدم التحصين- الادوية المثبطة للمناعة – الاقامة الطويلة بالمستشفي – سوء التغذية – العيوب الخلقية – العمليات التمريضية التي تتطلب الدخول الي انسجة المريض – سوء استخام المضادات الحيوية – الاذدحام – قلة الممرضات – عدم توفير عدد كافي من احواض غسل الايدي	محاضرة,عرض شرائح صور ومناقشة

5. تشرح طرق اكتساب الاطفال للعدوي المكتسبة داخل المستشفي	- ايدي مقدمو الرعاية الصحية. - التعرض للرزاز المتطاير من الاشخاص المصابين بالعدوي - استنشاق الهواء المحمل بالجزيئات الدقيقة التي تحتوي علي مسببات المرض - استخدام المحاليل الوريدية الغير معقمة - الحقن الوريدي الغير نظيف - الاجهزة الطبية التي تستخدم في تدبير أمراض الجهاز التنفسي	محاضرة,عرض شرائح صور ومناقشة
6. تتعرف علي انواع العدوي المكتسبة داخل المستشفيات	**انواع العدوي المكتسبة داخل المستشفيات:** - العدوي المرتبطة بالقثطرة الوريدية. - الالتهاب الرئوي. - التهابات المجاري البولية. - عدوي الجهاز الهضمي. - عدوي مجري الدم. - العدوي الجلدية. - الالتهاب الرئوي المترافق مع استخدام جهاز التنفس الاصناعي.	محاضرة,عرض شرائح صور ومناقشة
7. تشرح اسباب الاصابة بعدوي القثطرة الوريدية:	- عدم غسل الايدي عند سحب العينات او تركيب القثطرة الوريدية او اعطاء الادوية - عدم مسح الوريد بالمطهر المناسب عند تركيب القثطرة الوريدية - استخدام ادوات غير نظيفة او غير معقمة عند عند تركيب او التعامل مع القثطرة الوريدية. - عدم العناية بالقثطرة الوريدية	محاضرة,عرض شرائح صور ومناقشة
8. تتعرف علي تشخيص عدوي القثطرة الوريدية:	**التشخيص السريري المبسط** ظهور اثنين او اكثر من الاعراض او العلامات الاتية: - حمي - إحمرار في الوريد - تورم في مكان القثطرة الوريدية - وجود صديد حول القثطرة الوريدية.	محاضرة,عرض شرائح صور ومناقشة
9. تتعرف علي المصادر المحتملة لتلوث القثطرة الوريدية	**المصادر المحتملة لعدوي القثطرة الوريدية:** - تلوث القثطرة اثناء تركيبها - ثقب زجاجة المحاليل الوريدية - تلوث المحاليل الوريدية - الضمادات المتسخة او الغير مثبتة جيدا - عدم تطهير الجلد قبل ادخال القثطرة - ايدي الفريق الطبي - تواجد القثطرة اكثر من 4 ايام - تركيب القثطرة علي وريد سبق تركيب قثطرة فيه	محاضرة,عرض شرائح صور ومناقشة

10.تتعرف علي اسباب الالتهاب الرئوي المكتسب بالمستشفيات	**اسباب الالتهاب الرئوي المكتسب بالمستشفيات:** - عدم اكمال التحصينات اللازمة - الاستخدام الغير آمن لادوات العناية بالجهاز التنفسي - الاستلقاء الظهري لفترات طويلة - اعطاء الطفل التغذية بانبوبة المعدة في وضعية	محاضرة,عرض شرائح صور ومناقشة
11.تتعرف علي تشخيص الالتهاب الرئوي المكتسب داخل المستشفيات	**يشخص الالتهاب الرئوي المكتسب داخل المستشفيات بالاتي:** التشخيص السريري المبسط: ظهور اثنين او اكثر من الاعراض او العلامات الاتية: - حمي - صعوبة في التنفس - السعال - بلغم - اصوات تنفسية غير طبيعية	
12.تشرح اسباب عدوي الجهاز البولي	**يعتبر الاتي من اسباب عدوي الجهاز البولي:** عدم اتباع الاساليب المانعة للتلوث عند تركيب القثطرة البولية - عدم العناية الجيدة بالقثطرة البولية - اخذ عينة البول عن طريق فصل القثطرة عن كيس البول.	
13.. تشرح كيفية العناية بالقثطرة البولية	**تشمل العناية بالقثطرة البولية الاجراءات الاتية:** - العناية بالقثطرة البولية - يجب تفريغ البول دوريا حتي يتجنب تكاثر الميكروبات - يجب عدم وضع كيس البول علي الارض او علي مستوي اعلي من المريض - يجب تغيير القثطرة في الحالات الاتية فقط: - وجود عدوي بالجهاز البولي - وجود انسداد بالقثطرة - او حسب الفترة الموصي بها من قبل الشركة المصنعة.	
14. تشخص عدوي الالتهاب البولي	**يشخص الالتهاب البولي المكتسب داخل المستشفيات بالاتي:** - الحمي اكثر من 38 درجة مئوية - الالحاح البولي - زيادة عدد مرات التبول - الالام اثناء التبول - رائحة كريهة في البول - تغيير في لون البول.	

15.تتعرف علي اسباب عدوي الجهاز الهضمي	- عدم استخدام الاساليب المانعة للتلوث عند تركيب انبوبة المعدة او تحضير او اعطاء التغذية للطفل او عند التخزين - عدم العناية الجيدة بانبوبة المعدة "تمرير ماء مقطر بعد اعطاء التغذية او تغيير انبوبة التغذية" - تواجد مستعمرات البكتيريا في انبوبة المعده	
16.تشخص عدوي الجهاز الهضمي	**يشخص الالتهاب الرئوي المكتسب داخل المستشفيات بالاتي:** - التشخيص السريري المبسط: يعتبر الطفل مصابا بعدوي الجهاز الهضمي عند ظهور اسهال مائي او براز لين مرتين او اكثر خلال 24 ساعة «فوق عدد مرات التبرز العادية» او استفراغ مرتين او اكثر خلال 24 ساعة	
17.تتعرف علي اجراءات تحضير و اعطاء و تخزين الاغذية	**اجراءات تحضير و اعطاء و تخزين الاغذية** - يجب عدم تجميد الغذاء كما انه يجب عدم او تذويب الغذاء بواسطة السخان «تترك لتذوب بحرارة الغرفة العادية او بواسطة ماء دافئ» - يجب التخلص من الغذاء المحضر كل 48 ساعة اذا كان محفوظ بالثلاجة. - الاطفال الرضع يجب التخلص من التغذية التي تخصهم كل 8 ساعات. - يجب مسح انبوب التغذية بمحلول مطهر «الكحول 70%» من الخارج - يجب ان ينحصر تحضير التغذية علي شخص واحد من الاصطاف. - استخدم التغذية المصنعة لانها افضل من التغذية المحضرة يدويا. - يجب عدم اضافة الماء الفاتر «ماء الحنفية» الي التغذية. - حافظ علي نظافة الغذاء و ادوات اعطاءه. - يجب تمرير الغذاء ببطء - يجب ان يكتب علي التغذية تأريخ و زمن تحضيرها	

الجزء الثاني :

- معالجة الالات الطبية
- الاحتياطات القياسية لمكافحة العدوي

الأهداف	المحتوى	طرق التدريس+ الوسائل التعليمية المساعدة
بنهايـــة هـــذا الجـــزء تستطيع الممرضة أن: 1. تصـــنف المعـــدات الطبية	**معدات منخفضة الخطورة**: هي الادوات التي لا تحتك مع الاغشية المخاطية للمريض **معدات متوسطة الخطورة** هي الادوات التي تحتك بالاغشية المخاطية للطفل المريض او الاجزاء المفتوحة من الجلد ولكن لا تخترق الجلد **معدات مرتفعة الخطورة**: هي الادوات التي تخترق الانسجة المعقمة بما في ذلك تجاويف الجسم و الجهاز الدوري	محاضـــرة, عـــرض شرائح صور ومناقشة
2. تعرف التنظيف	هو ازالة كافة المواد الغريبة و الاتربة و المواد العضوية المتواجدة علي سطح الادوات المطلوب معالجتها و يكون بواسطة الدعك ثم الشطف	محاضـــرة, عـــرض شرائح صور ومناقشة
3. تتعـــــرف علـــــي اجراءات التنظيف	- تنظف الادوات يوميا و لا تترك مبللة ابدا - ينبغي ان تغمر الادوات لمدة دقيقة كاملة تحت الماء - يحظر استخدام الصابون العادي في التنظيف - تنظف اسطح كل الادوات بعد غمرها في الماء بواسطة فرشاة صلبة من البلاستيك - يبدأ تنظيف الادوات من الداخل الي الخارج. - يجب التأكد بوضوح من نظافة الاسطح و خلوها من بقع الدم و الانسجة	محاضـــــرة,عرض شرائح صور ومناقشة
4. تعرف التطهير	• يعرف التطهير بأنه عملية التقليل او قتل الميكروبات او تثبيط نموها و يكون اكثر فعالية في الميكروبات التي لا تكون ابواغ	محاضـــرة, عـــرض شرائح صور ومناقشة
5. تشـــرح اجـــراءات التطهير	- يجب تنظيف وصلات جهاز الارزاز و صلات الاوكسجين بالماء الجاري و صابون ثم تجفف ثم توضع في مطهر مناسب مثل الكحول 70% ثم يجفف و ذلك بين المريض و الاخر و بين الاستخدام و الاخر لنفس المريض. - يجب تنظيف برطمان الاكسجين و التشطيف بالماء الجاري و الصابون ثم يوضع في مطهر مناسب مثل الكحول 70% ثم يجفف و ذلك بين المريض و الاخر و بين الاستخدام و الاخر لنفس المريض. - يتم فتح المعدات و الادوات ذات المفصلات او التي تتفكك الي اجزاء و ذلك - يجب استخراج الادوات باستخدام لاقط «جفت مناولة» سبق تعقيمة او تطهيره	محاضـــــرة,عرض شرائح صور ومناقشة
6. تعرف التعقيم	يعرف التعقيم بأنه القضاء علي جميع الميكروبات بما فيها الابواغ الجرثومية .	محاضـــــرة,عرض شرائح صور ومناقشة

	إجراءات التعقيم بواسطة الحرارة الجافة « الفرن الكهربائي»: - يجب تنظيف جميع الادوات و تجفيفها جيدا - وضع المعدات فوق صينية او وعاء معدني مخصص - وضع المعدات داخل الفرن و يجب ان يصل التسخين للوصول الي درجة الحرارة المطلوبة التي تحدد بواسطة الشركة المصنعة. - تترك الالات داخل الفرن لتبرد و يتم استخراجها بواسطة ملقط. - يجب استخدام الادوات المستخدمة مباشرة او حفظها في وعاء معقم لمدة 24 ساعة فقط ساعة فقط.	محاضرة, عرض شرائح صور ومناقشة
7. تعرف غسل الايدي	• غسيل الايدي هو عملية ازالة الاوساخ و المواد العضوية و الجراثيم المؤقتة من اليدين.	محاضرة و مناقشة
8. تعدد اللحظات الخمس لنظافة الايدي	- قبل ملامسة المريض - قبل اجراء عمليات تطلب التنظيف او التطهير - بعد التعرض لخطر سوائل المريض - بعد ملامسة المريض - بعد ملامسه البيئة حول المريض	محاضرة, عرض شرائح صور ومناقشة
9. تعرف غسيل الايدي الروتيني	- غسيل الايدي الروتيني هو عملية ازاله الاوساخ و المواد العضويه و الجراثيم المؤقته بإستخدام الماء الجاري و الصابون	محاضرة و مناقشة
10.تشرح دواعي غسيل الايدي الروتيني	- دواعي غسيل الايدي الروتيني: - قبل بدء العمل و بعد الانتهاء من العمل - قبل و بعد اي انشطة تمريضية لا تتطلب اختراق انسجة الجسم - عند التعامل ما بين كل طفل اخر - بعد الانشطة التمريضية التي تزيد فيها احتمال التعرض لسوائل الطفل المريض. - عند لمس سطح يحتمل تلوثه بالميكروبات - بعد استعمال الحمام - بعد خلع القفازات (الجونتات)	محاضرة, عرض شرائح صور ومناقشة
11.تعدد الادوات المستخدمة في غسيل الايدي الروتيني	الادوات: صنبور مياه – صابون " يفضل صابون سائل" او قطع صابون صغيرة تستبدل علي فترات – مناديل او فوط جافة.	محاضرة, عرض شرائح صور ومناقشة
12.تعرف غسيل الايدي الجراحي	غسيل الايدي الجراحي هو تطهير الايدي الذي يسبق العمليات الجراحية و هو يقضي علي الجراثيم المؤقتة يقلل من الفلورا	محاضرة ومناقشة
13.تعدد الادوات المستخدمة في غسيل الايدي الجراحي	الادوات :حوض غسيل به صنبور مرتفع – صابون طبي سائل – فوطة معقمة – فرشاة – محلول مطهر	
14.توضح معوقات نظافة الايدي	**معوقات نظافة الايدي** - عدم توفر احواض غسيل الايدي او قلة عددها مقارنه بعدد المرضي - عدم توفر الصابون او المطهرات او المناديل و الفوط المستخدمة لاجراءات غسيل الايادي - عدم توفر الزمن الكافي - الانشغال الشديد (كثرة العمل) - قلة عدد مقدمو في مقارنة مع عدد المرضي. - حالة المريض الطارئة - الاعتقاد بعدم خطورة احتماليه انتقال المرض من الطفل الي مقدم الرعلية الصحية	محاضرة, عرض شرائح صور ومناقشة

15.تعرف ادوات الوقاية الشخصية	ادوات الوقاية الشخصية هي الادوات التي تعمل علي وقاية مقدمو الخدمة الصحية من خطورة تعرض الجلد و الاغشية المخاطية و الجهاز التنفسي من الاصابة بالجراثيم المعدية و من المخاطر في مكان العمل	محاضرة و مناقشة
16.تشرح دواعي لبس القفازات	o بعد غسيل الايدي الصحي او الجراحي o تحضير المحاليل الوريدية o قبل التدخلات الطبية او التمريضية العميقة «تركيب القثطرة البولية» o عند تركيب القثطرة الوريدية «الكانيولا» للاطفال ناقصو المناعة o عمليات البذل الصدري و البطني o الغيار علي الجروح. o عند التعامل مع او تنظيف الاجهزة او المعدات الطبية الملوثة او المحتمل تلوثها بسوائل المريض o عند شفط المفرزات من الجهاز التنفسي. o عند جمع العينات	محاضرة, عرض شرائح صور ومناقشة
17.تتعرف علي دواعي تغيير القفازات	تغيير القفازات "الجونتات" في الحالات الاتية: ▪ بعد التعامل مع احد المرضي و الانتقال الي مريض اخر ▪ اذا ظهرت علي القفازات علامات الاتساخ او التلوث او الثقب او التمزق اثناء التعامل مع المريض. ▪ في حالة اكثر من نشاط تمريضي لمريض واحد. ▪ بعد الانتهاء من النشاط التمريضي المعين او ملامسة سطح يحتمل تلوثه بالميكروبات ▪ اذا تعرض للبلل او الرطوبة.	محاضرة, عرض شرائح صور ومناقشة
18.يعدد دواعي ارتداء المريلة	**دواعي ارتداء المريلة:** - الاجراءات التمريضية التي تتطلب التدخل الي انسجة المريض « القثطرة البولية – تركيب القثطرة الوريدية او القثطرة السرية لحديثي الولادة " - عند وجود احتمالية تطاير قطرات سوائل المريض. - عند إعداد و خلط المحاليل الوريدية	محاضرة, عرض شرائح صور ومناقشة
19.تشرح دواعي لبس الكمامة	**دواعي لبس الكمامة:** o العمليات التمريضية التي يحتمل فيها تناثر رزاز سوائل المريض مثل تشفيط مفرزات الجهاز التنفسي o الاجراءات الطبية التي تتطلب التدخل الي انسجة المريض « القثطرة البولية – تركيب القثطرة الوريدية المركزية او القثطرة السرية لحديثي الولادة o إعداد و تحضير المحاليل الوريدية o عند التعامل مع المريض المصاب بعدوي تنفسية o قبل القيام بعمليات تنظيف الادوات و الالات الطبية الملوثة	محاضرة, عرض شرائح صور ومناقشة

الجزء الثالث

- التخلص الآمن من المخلفات
- إجراءات العزل
- الاساليب المانعة للتلوث

الأهداف	المحتوى	طرق التدريس+ الوسائل التعليمية المساعدة
بنهاية هذا الدرس ستكون الممرضة قادره على ان: 1. تصنف المخلفات الطبية	**مخلفات عادية غير معدية**: مثل بقايا الطعام و الاكياس النظيفة و الاوراق المكتبية **مخلفات الرعاية الصحية** و التي تنقسم الي: • مخلفاتت عادية : اغلفة المحاليل و الحقن و الادوات المعقمة و نحوها • مخلفات خطرة: المخلفات الحادة – المعدية الصلبة – مخلفات المعامل – انسجة و سوائل المريض.	محاضرة,عرض شرائح صور ومناقشة
2. تتعرف علي اجراءات التخلص من المخلفات الحادة.	اجراءات التخلص من المخلفات الحادة: - يجب عدم اعادة تغطية الالات الحادة و يجب التخلص معها كوحدة واحدة في صندوق امان مخصص او جمعها في حاوية مخصصة مغلقة و يجب التخلص منها عندما تمتلي حتي ثلاث ارباعها. - يجب عدم كسر او ثني ابرة المحاقن	محاضرة,عرض شرائح صور ومناقشة
3. تتعرف علي اجراءات التخلص من المخلفات المعدية الصلبة	اجراءات التخلص من المخلفات المعدية الصلبة: - يجب تخصيص حاوية بها كيس احمر اللون للتخلص من هذه المخلفات - لا يجوز خلطها مع المخلفات الاخري - يتم التخلص منها عند امتلائها حتي ثلاث ارباعها. - يجب تنظيف الاوعية المخصصة لوضع اكياس البلاستيك الحمراء مرة واحدة في اليوم علي الاقل	محاضرة,عرض شرائح صور ومناقشة
4. تتعرف علي اجراءات التخلص من المخلفات المعدية السائلة	**اجراءات التخلص من المخلفات المعدية السائلة:** - يجب ارتداء جونتات و احذية شديدة التحمل عند التعامل مع المخلفات الطبية السائلة - يتم سكبها في حوض مخصص لذلك. - يجب عدم تصريفها في مكان مفتوح او مكان المرضي او العاملين بالمستشفي. - الحرص علي عدم تناثر الرزاز منها اثناء حملها - يتم دفع الماء مضافا الية الكلور في الحوض المخصص لجمع المخلفات السائلة - يجب نظافة الاوعية التي احتوت علي سوائل طبية بمحلول الكلور و نقعها لمدة 10 دقائق.	محاضرة,عرض شرائح صور ومناقشة
5. تشرح الاجراءات المتبعة عند التعرض لاخطار المهنة	**عند التعرض لسوائل الجسم:** ▪ يجب غسل مكان التعرض بالماء الجاري و الصابون ▪ اخذ جرعة من مصل التهاب الكبد الوباءي البائي. ▪ يجب عمل تحليل فيروسية بعد 3 اشهر من التعرض ▪ في حالة اخذ جرعات سابقة يجب اكمال الجرعات ▪ يتم التبليغ لوحدة مكافحة العدوي	محاضرة, عرض شرائح صور ومناقشة

	عند التعرض للاصابة بالة حادة: o اضغط على موقع الإصابة مباشرة للسيطرة على النزيف o غسل موضع الإصابة بالماء والصابون o تطهير موضع الإصابة بمحلول مطهر o تغطية موضع ا لإصابة بقطعة شاش مع لاصق o تبليغ وحدة مكافحة العدوي	
الـــعـــــزل 6. تتعرف علي الغرض من العزل	الغرض من العزل هو منع انتشار العدوي الي الاطفال الاخرين او العاملين بالمستشفي.	محاضرة و مناقشة
7. تشرح الاجراءات المتبعة للعزل بالنسبة للفريق الصحي	**الاجراءات المتبعة للعزل بالنسبة للفريق الصحي** o يجب ارتداء ادوات الوقاية الشخصية o يجب تطبيق الاحتياطات الخاصة بكل مرض علي حدة o تقليل حركة الدخول و الخروج من والي غرفة العزل	محاضـــرة, عـــرض شرائح صور ومناقشة
8. تتعرف الاجراءات المتبعة للعزل بالنسبة للاطفال المعزولين	▪ يجب وضع فاصل مادي بين كل مريض و اخر ▪ يجب عدم ترك المريض للغرفة الا للضرورة القصوي ▪ يجب التعامل مع الطفل قبل الوفاة وبعد الوفاة بنفس الاجراءات.	محاضـــرة, عـــرض شرائح صور ومناقشة
9. تشرح الاجراءات المتبعة للعزل بالنسبة للالات و الادوات المستخدمة	o يجب تنظيف و تطهير و تعقيم الادوات كما هو موصي به o يجب التخلص من الادوات ذات الاستخدام الواحد و ادوات الوقاية الشخصية مع النفايات الطبية الخطرة o يفضل استخدام انية الاستخدام الواحد لاطعام الطفل او غسل الاواني بالماء و الصابون.	محاضـــرة, عـــرض شرائح صور ومناقشة
10. تتعرف الاجراءات المتبعة للعزل بالنسبة لبيئة غرفة العزل	**بيئة غرفة العزل** ▪ يجب ان تكون دائما نظيفة وجافة ▪ يجب تنظيف الغرفة بالمحلول المطهر كل وردية و بين كل مريض و اخر وكل ما اتسخت ▪ يجب تجميع المفروشات و الملاءات لوحدها و كذلك يجب غسلها في دورة غسيل لوحدها ▪ يجب ان تكون المراتب و الوسائد من مواد بلاستيكية حتي يمكن تنظيفها و تطهيرها ▪ توضع نفايات غرفة العزل مع النفايات المعدية	محاضـــرة, عـــرض شرائح صور ومناقشة
11. تتعرف الاجراءات المتبعة للعزل للامراض المنقولة بواسطة الرزاز/التلامس/ الهواء	- للامراض المنقولة بواسطة الرزاز/التلامس/ الهواء: - يوضع الطفل المريض في غرفة ذات تهوية جيدة و بحمام منفصل ما امكن و يجب وضع صابون و مطهر لغسل الايدي و يجب المحافظة علي اغلاق الباب - يجب تطعيم ضد الحصبة و جميع التطعيمات المتاحة للامراض المنقولة بالهواء - يجب ارتداء الماسك عند التعامل مع المريض. - يجب غسل الايدي الصحي باستمرار - يجب تحضير العلاجات خارج غرفة المريض - اذا كانت الزيارة متاحة يجب تعليم الزائرون سياسة الزيارة	محاضـــرة, عـــرض شرائح صور ومناقشة

الاساليب المانعة للتلوث 12.تعرف الاساليب المانعة للتلوث	الاساليب المانعة للتلوث هي مجموعة من الممارسات التي يجب اتباعها قبل و اثناء و بعد التدخلات التمريضية بغرض التاكد من ان التعامل مع المريض لا يؤدي الي انتقال العدوي اثناء العمليات التمريضية	محاضـــرة, عـــرض شرائح صور ومناقشة
13.يشرح العناصر الاساسية لتطبيق الاساليب المانعة للتلوث	- غسل الايدي بالطريقة المناسبة للاجراء - ارتداء الواقيات الشخصية المناسبة للاجراء - تطهير موضع التدخل العميق"مثل عند تركيب القثاطر الوريدية" - المحافظة علي تعقيم العناصر المستخدمة «الادوية – السوائل – الاجهزة» و ذلك بمنع تعرضها للاسطح غير المعقمة - استخدام اسلوب عدم اللمس عند ادخال العناصر المعقمة داخل جسم المريض. - المحافظة علي البيئة نظيفة.	محاضـــرة, عـــرض شرائح صور ومناقشة
14.تشرح الاساليب المانعة للتلوث اثناء الحقن الامن	**علي الممرضة مراعاة الاتي:** o تجنب ملامسة مكان الحقن باليد o تجنب ترك ابرة الحقن داخل العبوات الدوائية o تجنب اعادة استخدام الابر او الحقن o يجب استخدام حقنة جديدة لكل عملية حقن او اذابة دواء o يجب التخلص من الحقنة في حالة تعرضها للرطوبة او تلف في كيسها او انتهاء صلاحيتها o اي ابرة تمت ملامستها باي ملوث خارجي يجب التخلص منها فورا o يجب ان يتم الاعداد لعملية الحقن في غرفة منفصلة و نظيفة و مطهرة o اي منطقة حقن يجب تطهيرها بالكحول 70% قبل اعطاء الدواء	محاضـــرة, عـــرض شرائح صور ومناقشة
15.يشرح الاساليب المانعة للتلوث بالنسبة لاستخدام زجاجة الادوية ذات الاستخدام المتعدد	• غالبا استخدام الدواء ذو الاستخدام الواحد افضل من استخدام الدواء ذو الاستخدام المتعدد • يفضل استخدام الدواء لمريض واحد مع كتابة بياناته و تاريخ بدء الاستخدام علي الزجاجة • يجب فحص الزجاجة للتاكد من عدم وجود تلوث للحاوية من الداخل او الخارج او تعكير او تسرب و تاريخ انتهاء الصلاحية • يجب مسح مدخل زجاجة الدواء بالكحول قبل سحب الدواء. • يجب الاحتفاظ بزجاجات الدواء ذات الاستخدام المتعدد في منطقة تخزين نظيفة «لا تترك بجانب المريض» • يجب استخدام حقنة معقمة جديدة عند السحب لاي جرعة • اذا تبقت كمية من الدواء يجب كتابة تاريخ بدء الاستخدام علي الزجاجة و تحفظ حسب تعليمات الشركة المصنعه «لا تزيد فترة التخزين عن 24 ساعة عند عدم توفر توصيات بخصوص التخزين.	محاضـــرة, عـــرض شرائح صور ومناقشة

16.تشرح طرق الوقاية من الاصابة و الوخز بالابر	**كيفية الوقاية من الاصابة و الوخز بالابر:** • الاحتراس من الحركة المفاجئة للطفل • عدم اعادة تغطية ابرة الحقنة • عدم ثني الابرة للتخلص منها • في حاة الضرورة يجب اعادة تغطيتها بالطريقة المناسبة. • يجب التخلص من الحقنة و الابرة كوحدة واحدة في مكانها المخصص • عدم ترك الابرة داخل عبوة الدواء المتعدد الاستخدام في حالة الوخز بالابر يجب التبليغ عنها	محاضـــرة, عـــرض شرائح صور ومناقشة
17.تشرح الاساليب المانعة للتلوث اثناء التعامل مع ادوات الكشف علي المريض	**التعامل مع ادوات الفحص:** تشمل ادوات الفحص الثيرمومترات و موازين قياس الطول و الوزن و السماعات الطبية o يجب تطهير هذه الادوات بواسطة المطهرات قبل التعامل بها للحد من انتقال العدوي. **اجراءات تطهير ادوات الفحص:** o يجب مسح ادوات السماعة الطبية بين كل ممرضة و اخري قبل الاستخدام بالكحول بتركيز 90% بشكل دائري من الداخل الي الخارج. o يجب مسح ميزان الوزن بالكحول و وضع قطعة قماش نظيفة عند كل استخدام. o يجب مسح شريط قياس الطول بالكحول قبل و بعد الاستخدام. o يجب ان يمسح ميزان الحرارة بالقطن الجاف ثم مسحه بقطنه مشبعة بالكحول بعد اخذ درجة الحرارة و التخلص من القطن في حاوية النفايات المعدية. يجب ان تحفظ جميع هذه الادوات في مكان نظيف و جاف	محاضـــرة, عـــرض شرائح صور ومناقشة
18.تشرح اجراءات التعامل مع مفروشات المستشفي	**اجراءات التعامل مع مفروشات المستشفي** o تلتزم جميع الممرضات بالتعامل الصحيح مع مفروشات و ملاءات المستشفي اثناء الجمع او الفرش او التداول o يجب علي الممرضات اللاتي يقمن بجمع الملاءات ان يرتدين جونتات نظيفة مع الالتزام بغسل اليدين قبل و بعد التعامل مع الملاءات و المفروشات. o يجب التعامل مع جميع المفروشات والملاءات علي انها ملوثة o ينبغي تغيير الملاءات كل يوم او بين مريض و اخر او اذا اتسخت o عند جمع الملاءات يجب ثنيها للداخل حتي لا يحدث تلوث بيئة o يجب تحريك الملاءات بحذر حتي لا ينتشر الميكروبات بالهواء o توضع الملاءات في اكياس و اوعية قوية و يجب احكام اغلاقها o يجب التاكد من عدم وجود الالات حادة داخل الملاءات o يجب عدم القاء الملاءات و المفروشات علي الارض او علي الكراسي او الاسرة بالعنبر o يجب تسليم الملاءات بواسطة سجل خاص o يجب ان تخزن الملاءات و المفروشات في الدولاب	محاضـــرة, عـــرض شرائح صور ومناقشة

	الخاص بالمفروشات و الملاءات النظيفة	
19.تشرح اجراءات التعامل مع بيئة العمل	**اجراءات التعامل مع بيئة العمل** ▪ يجب ان يوضع جدول لتنظيف بيئة العمل و علي الجميع الالتزام به. ▪ يتم التنظيف بداية كل يوم و بداية كل وردية و بين كل مريض واخر و كلما حدث اتساخ. ▪ يجب ارتداء ادوات الوقاية الشخصية عند القيام بالنظافة ▪ يجب ان يكون التنظيف بالماء و الصابون و يجب ان يبدأ من المكان الاقل الي المكان الاكثر اتساخا ▪ يجب استخدام طريقة الدعك و الفرق للتخلص من الميكروبات ▪ يجب البدء من الاماكن العالية الي الاماكن المنخفضة ▪ يجب تنظيف اسطح العمل و قوائم الاسرة بالماء و الصابون او المطهر المناسب	محاضـــرة, عـــرض شرائح صور ومناقشة
20.تشرح كيفية التخلص من البقع الدموية	**كيفية التخلص من البقع الدموية** o يجب ازاله الدم بقطعة قماش و التخلص منه في حاوية النفايات الخطرة o تنظيف المنطقة بمحلول مطهرو يترك لفترة تلامس مناسبة ثم تجفف المنطقة o اذا كان اثر البقعة موجود يجب تكرار العملية	محاضـــرة, عـــرض شرائح صور ومناقشة

الجزء الرابع :

- مكافحة العدوي داخل وحدة الاطفال
- ترصد العدوي

الأهداف	المحتوى	طرق التدريس+ الوسائل التعليمية المساعدة
بنهاية هذا الجزء تستطيع الممرضة أن: 1. تشرح السياسات العامة لمكافحة العدوي في وحدة الاطفال	السياسات العامة - يجب علي جميع العاملين بقسم الاطفال الالتزام بالاحتياطات القياسية لمكافحة العدوي. - يجب غسل الايدي باستمرار «اللحظات الخمس لنظافة الايدي» - يجب تغيير القفازات بين كل مريض و اخر - يجب اجراء الغسيل الصحي قبل التدخلات العميقة و قبل اعطاء المحاليل و الادوية و قبل استخدام عبوات الدواء متعددة الاستخدام - يجب تقصير الاظافر و عدم استخدام طلاء الاظافر - يجب استخدام ادوات الوقاية الشخصية في مكانها المناسب. - يجب الالتزام بالاساليب المانعة للتلوث عند التعامل مع الطفل - يجب عدم ترك اي منطقة او اداة او اي شئ رطب - يجب تطعيم جميع العاملين بوحدة الاطفال ضد الامراض التي يمكن التطعيم ضده "السل – التتناوس – الحصبة الالمانية- الالتهاب الكبدي الوبائي بي – شلل الاطفال – الدفتيريا " - يجب خلو جميع العاملين بوحدة الاطفال من الامراض المعدية و يجب استبعادهم حتي يتماثلوا للشفاء - يجب الالتزام باللحظات الخمس لغسيل الايدي - يجب عدم التدخين و الاكل و الشرب داخل الوحدة	محاضرة,عرض شرائح صور ومناقشة
2. تشرح اجراءات مكافحة العدوي فيما يتعلق ببيئة وحدة الاطفال	**بالنسبة لبيئة وحدة الاطفال:** - يجب ترك مساحة كافية بين كل سرير و اخر حتي يسهل مرور مقدمو الرعاية الصحية - يجب توفر صندوق امان لكل سرير ع الاقل - يجب ان يكون مكان تحضير الادوية و المحاليل منفصل عن مكان رعاية المرضي - يجب ان يكون هنالك مكان لتخزين الادوات النظيفة منفصل عن مكان رعاية الاطفال - يجب اعتبار جميع سوائل الجسم ملوثة و يجب التعامل معها علي هذا الاساس - يجب اغلاق الشبابيك باحكام ووضع عليها سلك معدني من الخارج - يجب ان يتوفر حوض غسيل لكل اربعه سرير - يجب التخلص من البول و البراز في الحمامات المتوفرة بمنطقة الاطفال المرضي.	محاضرة, عرض شرائح صور ومناقشة

	- يتم فصل النفايات كما هو متعارف عليه	
3. تعرف عملية ترصد العدوي	ترصد العدوي: هو الملاحظة المنهجية النشطة و المستمرة لحدوث انتشار مرض ما في مجتمع معين و كذلك رصد العوامل التي تؤدي الي زيادة او نقصان مخاطر هذا المرض	محاضرة و مناقشة
4. تبين الهدف من ترصد العدوي المكتسبة داخل المستشفيات.	**الهدف من ترصد عدوي المستشفيات:** - خفض حدوث حالات العدوي المكتسبة بالمستشفيات - فهم وادراك تأريخ المرض او الاصابة مما يؤدي الي الاكتشاف المبكر و تقليل تعرض القائمين بالرعاية الصحية بالعدوي. - تحديد اماكن المشكلات و المعرضين لها مما يؤدي الي اكتشاف مصدر العدوي و طريقة انتقالها و اكتشاف مقاومة الميكروبات للمضادات الحيوية - تقييم طرق معالجة المشكلات و ثاثير برنامج مكافحة العدوي	محاضـــرة, عـــرض شرائح صور ومناقشة
5. تعدد طرق ترصد العدوي	**انواع الترصد:** o الترصد السلبي o الترصد النشط o الترصد الاستباقي o ترصد حدوث العدوي	محاضـــرة, عـــرض شرائح صور ومناقشة
6. تتعرف علي ترصد حدوث العدوي	**ترصد حدوث العدوي** تتم عن طريق رصد جميع المرضي خلال فترة زمنية معينة لمعرفة وجود اصابة جديدة بعدوي المستشفيات و تعتبر من افضل الطرق للحصول علي قياسات دقيقة لمعدلات الحدوث العدوي و لكنها تستهلك الكثير من الوقت لذلك يجب ان توجة نحو مناطق محدودة تحت اشراف فريق مكافحة العدوي.	محاضـــرة, عـــرض شرائح صور ومناقشة

الجزء الخامس(الجانب العملي)

يشمل هذا الجزء بعض المهارات التمريضية التي تساعد الممرضات في التحكم و التقليل من العدوي المكتسبة داخل المستشفيات و تشمل :

1. غسيل الايدي الروتيني
2. غسيل الايدي الطبي
3. غسيل الايدي الجراحي
4. ارتداء و خلع القفازات
5. غسل الادوات الطبية قبل التعقيم.
6. تحضير الكزرميل للتعقيم
7. اعطاء الاوكسجين.
8. العلاج بالاستنشاق (النيوبلايزر)
9. اعطاء التغذية عن طريق انبوب التغذية.
10. سحب عينة دم من الوريد.
11. تركيب قثطرة طرفية (كانيولا)
12. اعطاء الدواء عن طريق الوريد.
13. تجميع عينات البول

برنامج التدريب العملي علي المهارات التمريضية ذات الصلة بالتحكم في العدوي

الأهداف	المحتوى	طرق التدريس+ الوسائل التعليمية المساعدة
بنهايـــة البرنـــامج العملـــي ســـوف تكـــون الممرضة قادرة علي : 1. أن تقوم بتجهيز ادوات نظافة الايدي و تطبيق غسيل الايدي بانواعه	توضـيح دواعـي نظافـة الايـدي و قوائم تحقق تحتوى علـي خطـوات (غسيل الايدي الروتيني – الطبي – الجراحي) تجهيـــز الادوات التـــي ســـيتم استخدامها عند القيام بنظافة الايدي	محاضـرة + تـدريب عملي مع عرض الفيديو والصور
2. ان تقوم بغسل الادوات الجراحية و تحضير الكزرميل للتعقيم	تعريـــف بـــالادوات الطبيـــة وقـائمتي تحقـق تحتـوى علـي طريقة خطوات غسل الادوات الجراحية و تحضير الكزرميل للتعقيم	حلقـة نقـاش + تـدريب عملـي لغسـل الادوات الجراحيـة و تحضـير الكزرميل للتعقيم
3. أن تقـوم بلـبس و خلـع القفـازات الجراحية	قائمـــة تحقـــق تحتـــوى علـــي خطـــواتلبس و خلـــع القفـــازات الجراحية	تـدريب نظـري وعملـي لطريقة لبس القفازات و خلعها
4. تقوم باعطاء الاوكسجين باستخدام الكمامة	قائمـة تحقق تحتوى علـي خطـوات اعطـــاء الاوكســـجين باســـتخدام الكمامة	تـدريب نظـري وعملـي بالعنابر لطريقة اعطاء الاكسجين بالكمامة
5. أن تقوم باعطاء الدواء عن طريق جهاز الارزاز	قائمة تحقق تشمل خطوات اعطاء الدواء عن طريق جهاز الارزاز	تدريب نظري وعملي بالعنابر لطريقة اعطاء الدواء عن طريق الارزاز
6. أن تطبق الطريقة الصحيحة لتركيب القثطرة الوريدية (الكانيولا)	قائمة تحقق تحتوي علـي الطريقة الصـــحيحة لتركيـــب القثطـــرة الوريدية (الكانيولا)	تـدريب نظـري وعملـي لتركيـــب القثطـــرة الوريدية
7. تستطيع الممرضة ان تقوم بسحب عينة من الدم الوريدي	قائمة تحقق تحتوي علي طريقة سحب الدم من الوريد.	تدريب نظري وعملي مع عرض الصور والفديو
8. ان تطبق اعطاء الحقن الوريدي بطريقة آمنه .	قائمة تحقق تحتوى علي خطوات طريقة اعطاء الحقن الوريدي	تدريب نظري وعملي مع عرض الشرائح
9. أن تطبق كيفية اخذ عينة نظيفة من البول	قائمة تحقق تشتمل علي خطوات اخذ عينة من البول من خلال القثطرة البولية	تدريب نظري وعملي بالعنابرعلي كيفية سحب عينة من البول
10. أن تقوم باعطاء التغذية عن طريق انبوبة المعدة	قائمة تحقق تشتمل علي خطوات اعطاء التغذية عن طريق انبوبة المعدة	تدريب نظري وعملي بالعنابر

1- Introduction

The child who requires general care in the hospital or clinic setting may be admitted for testing or treatment of an illness or disease. The nurse is responsible for health care activities in addition to the child's safety. ***(Susan L. Ward et al 2009).***

Ensuring good infection control practice in health care facilities is a constant concern, yet evidence shows that the compliance of health care professionals with proper procedures is lacking, despite the existence of guidelines and training programs. An online infection control module was developed to provide ready access to training. ***(Annalee Yassi, et al, 2009)***

Nosocomial infection is an infection that has onset during hospitalization and is not present or incubating at the time of admission to hospital ***(Ward ,2000 and Wathorn,2007)***. It is the most commonly found complication in hospital setting ***(Hedrick and Sawyer,2005).*** Therefore, nosocomial (hospital-acquired) infections are an important and critical issue related to high morbidity and mortality in high risk neonates ***(Malik et al., 2003 and Aziz et al ., 2005).*** Healthcare-associated infection is one of the leading causes of adverse events in the children, increasing the severity of illness , length of hospital stay and health care cost , and negatively affecting the infant's neurodevelopment and growth. ***(Parry et al., 2005 and Callaghan, 2007).***

The consequences of these infections include prolongation of hospitalization, transfer to intensive care units, antibiotic therapy, placement or replacement of invasive devices and surgical procedures.

Paediatric wards and hospitals are particularly suited to the transmission of infection.

Effective infection control programs require specifically trained infection control practitioners, the involvement of physicians, nurses and administrators, and strategies to educate hospital personnel. Programs must be visible and proactive, and must evolve with the changing epidemiology of pediatric nosocomial infections. ***(Dorothy L. Moore 2008)***

The Healthcare Infection Control Practices Advisory Committee (HICPAC, 2008) lists two tiers of isolation precautions. The first tier is "standard precautions" that integrate the features of universal precautions designed to reduce the risk of transmission of blood borne pathogens.

To facilitate the implementation of infection control policies all grades of staff need educational input. This may be in the format of presentations or teaching sessions to particular staff groups, but most often takes the form of giving timely advice regarding a particular situation or problem. . ***(janet Mc Culloch, 2000).*** In 1980, the Study on the Efficacy of Nosocomial Infection Control (SENIC) demonstrated that surveillance for nosocomial infections and infection control practices that included trained professionals could prevent HAIs ***(Emily, et al , 2011).***

1-1 Justification

Nosocomial infection affects hundreds of millions of people worldwide and is a major global issue for patient safety. In developing countries, the risk is two to twenty times higher and the proportion of infected patients frequently exceeds 25% ***(Pittet, et al, 2008),*** this due to environmental conditions of healthcare facilities are poor, nosocomial infections may frequently occur; in actual fact, attention to it is still limited and control measures are not functioning well in many facilities. Furthermore, as implementation of control measures seems to be costly and to consume resources, nosocomial infection control is often given a low priority**.** ***(Hiroshi Ohara, et al, 2013).***

Considerable knowledge exists on the epidemiology of nosocomial infections in pediatric acute care settings. However, information on nosocomial infections is limited in extended care facilities among the pediatric population. ***(Amir Abdolahi, et al, 2012)***.

Effectiveness of staff education on nosocomial infection prevention is controversial but as a part of comprehensive infection control program its value had been seen ***(Yatin Mehta 2014).***

Many studies suggest that approximately one-third of nosocomial infections would be preventable if hospitals had effective infection control protocols ***(Karla Dal-Bó, et al, 2012).***

1-2 Objectives

General objectives:

Evaluation of impact of implementing infection control program for nurses to reduce nosocomial infection in kassala pediatrics hospitals

Specific objectives

1. To assess nurse's knowledge and practice about infection control.
2. Implement training program for nurses about infection control in kassala pediatric hospitals.
3. Evaluate the impact of the implemented program on knowledge and practice of nurses about infection control
4. Determine the incidence of nosocomial infection.

2- Literature Review

2-1 Background:

Nosocomial infections (NIs) are important causes of morbidity and mortality in pediatric hospitals. Multiple factors contribute towards exposing children to the risk of infection when hospitalized, and some of them differ from those in adults. ***(Cavalcante , A et al, 2006)***

Nosocomial infections and their control are a world-wide challenge. Next to the raised morbidity and mortality of patients, nosocomial infections furthermore increase the costs of healthcare due to added antimicrobial treatment and prolonged hospitalization. They are burdensome to patients, complicate treatment, prolong hospital stay, increase costs, and can be life threatening Since the prevalence of nosocomial infections is generally higher in developing countries with limited resources. ***(Raka L, 2009), (World Health Organization, 2010)***

2-2 Previous studies

Numerous studies have shown that educational programs can effectively increase knowledge, positive attitudes and appropriate practice to ensure compliance with international protocols and regulations for the prevention and control of NI ***(Gould D, Chamberlain A.1997)***

In the systemic review carried out in United States of America for a total of varied studies conducted in health institutions to determine the effect of educational infection control program on health care

provider shows that there was a statistically significant decrease in infection rates after intervention in many studies ***(Safdar N and Abad C, 2008)***

Allegranzi B and other emphases that Implementation strategies include the integration of multiple interventions in the areas of blood safety, injection safety, clinical procedure safety, and water, sanitation and waste management, with the promotion of hand hygiene in healthcare as the cornerstone to infection control***. (Allegranzi B, et al, 2007)***

2.3 Infection

Infection is the presence of an organism(s) in body tissue or fluids accompanied by a clinically adverse effect (either locally or systemically) on the host. Infection must be distinguished from colonization, which is the persistence of organisms on skin, in body tissues, or in body fluids but without a clinically adverse effect, and inflammation, which is a condition that results from tissue response to injury or stimulation by noninfectious agents (i.e. chemicals). ***(Garner JS, 1996)***

2.3. 1 Chain of infection:

Transmission of infection during the provision of health care requires three elements: a source of infecting microorganisms, a susceptible host, and a means of transmission for the microorganism. In health care settings, because agent and host factors are more difficult to control, interruption of transfer of microorganisms is directed primarily at transmission.

Source of infection: Human sources of the infecting microorganisms in health care facilities may be clients, health care providers, visitors, care providers or family members and may include persons with acute disease, persons in the incubation period of a disease, persons who are colonized by an infectious agent but have no apparent disease, or persons who are chronic carriers of an infectious agent. The microorganisms include bacteria, viruses, fungi and parasites transmitted through these means and also via vectors such as lice, mosquitoes, flies.

Host*:* Resistance among persons to pathogenic microorganisms varies greatly. Some persons may be immune to infection or may be able to resist colonization by an infectious agent. Other individuals exposed to the same agent may establish a comfortable or residential relationship with the infecting microorganism and become asymptomatic carriers. Others may develop clinical disease. Host factors such as: extremes of age; underlying diseases; certain treatments with antimicrobials, corticosteroids, or other immunosuppressive agents; irradiation; and breaks in the first line of defense mechanisms (e.g. those caused by such factors as surgical operations, anesthesia, invasive procedures and indwelling devices) may make clients more susceptible to infection. ***(Clare Barry et al, 2007)***

Mode of transmissions: In susceptible individuals pathogens are transmitted via a number of routes which are contact, droplet and airborne. *Contact transmission* is the most frequent route of

transmission in hospital, and includes direct contact (direct physical contact between infected and susceptible patients) and indirect contact (via contaminated intermediate surfaces such as the hands of personnel, bedrails, equipment and toys). Appropriate routine patient care practices should prevent most of the transmission by this route. Additional precautions (gloves, gowns and dedicated equipment) may be warranted for organisms of very low infective dose (eg, rotavirus) and for situations in which extensive contamination of the patient's environment is expected (eg, watery diarrhea which cannot be contained within a diaper or a young child with respiratory infection and copious respiratory tract secretions). Respiratory and gastrointestinal viruses may remain viable on surfaces for several hours. ***(Jarvis WR, 1997)***

Droplet transmission occurs when large droplets are expelled from the respiratory tract and deposited onto the respiratory mucous membranes of persons close to the infected child. Some organisms transmitted by this route (eg, Haemophilus influenza type b, Neisseria meningitidis and Bordetella pertussis) are very fragile and do not survive in the environment or on hands. Other organisms, such as RSV, influenza, parainfluenza and rhinovirus, survive long enough on surfaces to be picked up on the hands of patients or personnel. Thus, respiratory viruses may be transmitted by the inhalation of large droplets or by the inoculation of nasal mucosa or conjunctiva by contaminated hands (contact) ***(Hall CB. 2000)*** Respiratory infections

can be spread via ‘contact’ with droplets from expiratory activities such as talking, coughing and sneezing, and also from aerosol-generating clinical procedures. ***(Xiaojian et al. 2007).*** *Airborne transmission*: Human activities are key sources for dispersal of airborne pathogens. These include respiratory activities such as breathing, speaking, coughing, sneezing, ***(Morawska L. 2006)***

The portal of entry: is the path by which an infectious agent invades a susceptible host. Usually, this path is the same as the portal of exit. In addition, each invasive device, e.g. intravenous line, creates an additional portal of entry into a patient’s body thus increasing the chance of developing an infection. In addition, the very young and the very old are at higher risk for infection because in the very young the immune system does not fully develop until about age 6 months, while old age is associated with declining immune system function as well as with chronic diseases that weaken host defenses. ***(N. N. Damani, 2004)***

2-4 Nosocomial infection:

Nosocomial infection means a localized or systemic condition that result from an adverse reaction to an infectious agent or its toxin, which was not present or incubating at the time of hospital admission ***(Garner JS, 1996)***

An infection is considered nosocomial if it becomes evident 48 hours or more after hospital admission or within 30 days of discharge following inpatient care ***(Samuel SO et al, 2009).*** World health organization defined the Healthcare-associated infections (HAIs) as any

occurrence of infection during the process of healthcare, was not present at the time of admission, and include infections which occur among healthcare workers as a result of occupational exposure***. (World Health Organization 2009).***

2.4.1. Mortality of nosocomial infection

Nosocomial infection have been estimated to cause attributable mortality of 7%–9% in adults ***(Sheng WH, et al, 2005)*** In the US, 6% of patients with at least one nosocomial infection in 2002 were reported to have had a cause of death associated with that Nosocomial infection ***(Klevens RM, et al, 2007)***Few reports exist that describe mortality associated with nosocomial infection in pediatric patients. A Brazilian study attributed a case-fatality of 2% with nosocomial infection in general ***(Cavalcante SS, et al, 2006).***

2.4.2 Pathophysiology

Many infections are caused by the patient's own skin flora. Often, however, there is a transformation of the normal flora to a more pathogenic flora following admission to a health care facility. Shortly after admission to a health care facility, patients are exposed to various, more virulent strains of the facility's resident flora. This change begins when microorganisms colonize the patient's skin, respiratory, or genitourinary tract. Colonization is deined as the presence of a microorganism in a host without causing tissue or cell damage. Infection is the presence of microorganism with damage to the host's

tissues and/or cells. Colonization always precedes infection but does not necessarily develop into infection. ***(Kathleen Motacki, et al, 2011)***

2.4.3 Risk factors of nosocomial infection:

Nosocomial infections are a frequent problem in children. They are not necessarily related to invasive procedures but certainly are related to a group of factors that have particular characteristics in the pediatric age group ***(Cavalcante, et al, 2006).*** There is multiple factors associated most significantly with acquired MRSA infections included during hospitalization and bedside invasive procedures, use of total parenteral nutrition, antibiotic usage, and immune deficiency ***(H Saloojee, A Steenhoff, 2001)*** Children with congenital anomalies have a high risk of nosocomial infection because they require prolonged hospitalizations, need multiple operations, and have extended exposure to invasive support and monitoring equipment, rooms crowded with children, and health care workers, also toddlers often share rooms, playrooms, toys, books, and other items and therefore have the potential of spreading pathogens directly to one another ***(Leigh G and Donowitz M, 1990)***

Young children are also susceptible to many infections because they have not yet developed full immunity. The close proximity of large numbers of organism and susceptible hosts favours transmission. Behavioural characteristics of young children, such as incontinence, inadequate hygiene, frequent mouthing of hands and objects, drooling and direct contact between children during play, facilitate the spread of

infection. Basic care requires frequent hands-on contact from health care personnel and parents. Multibed rooms, shared toys and playrooms, and visiting siblings contribute to the risk of transmission ***(Huskins WC and Goldmann DA, 1998)***

2.4.4 Causes of nosocomial infections:

Nosocomial infections are caused by bacterial, viral and fungal pathogens. The most common pathogens are staphylococci, pseudomonas, E-coli, mycobacterium tuberculi, candida, aspergillus, fusarium, trichosporon and malassezia. All are associated with increased morbidity and mortality. ***(O'Grady NP et al, 2002)***

2. 4.5 Nosocomial infection types

(Hospital Infection Society/Infection Control Nurses Association, 2007) stated that the most common types of infection were blood stream infection, urinary tract infections, pneumonia, and the less common type is surgical site infections.

2.4.5.1 Blood stream infection:

Intravenous therapy is an essential part of clinical care used in a wide variety of healthcare settings ***(Parker 2002).*** They have, however, been associated with catheter related blood stream infections (CRBSI) ***(Parker, 2002, Eggimann & Pitet 2002).*** With advancing medical technology and because of procedures the patient has to undergo has increased, often with some penalty of increased risk of infection ***(Maki, 1981).***

Approximately 5% of these nosocomial infections were bacteremias related to intravenous catheters. The incidence is increasing, particularly for certain organisms such as multi-resistant coagulase negative, Staphylococci and Candida species ***(WHO, 2002).***

Diagnosis depends either on positive quantitative catheter culture yielding the same microorganisms recovered from the blood stream or differential quantitative blood cultures with significantly greater colony counts from blood drawn through the vein ***(Salzman and Rubin, 1995).*** Catheter related infections (CRI) include colonisation of the device, skin exit-site infection and device related blood stream infection ***(Eggimann and Pittet, 2002)***

2.4.5.2 Urinary tract infections

The most leading infection in hospitals is UTI, ***(Nicolle LE, et al, 1996)*** although with restrictive clinical definitions, symptomatic urinary infection is less frequent than respiratory infection. ***(Stevenson KB, et al 2005)*** Bacteriuria is very common in residents of these facilities but, by itself, is not associated with adverse outcomes and does not affect survival. ***(Nicolle LE, et al, 2005)***

Urinary tract is the most common source of bacteremia in hospitals. ***(Nicolle LE, et al, 1996), (Smith PW, 1985),*** patients with long-term catheters often present with fever alone. Patients with indwelling urinary catheters in the hospitals are uniformly colonized with bacteria, largely attributable to biofilm on the catheter. These organisms are often more resistant to oral antibiotics. Catheter-related bacteriuria is

dynamic, and antimicrobial treatment only leads to increased antimicrobial resistance. ***(Philip W, et al, 2008)***

2.4.5.2.1 Prevention of nosocomial urinary tract infection

Recommended measures to prevent nosocomial UTI include limiting use of catheters, insertion of catheters aseptically by trained personnel, use of as small diameter a catheter as possible, hand-washing before and after catheter manipulation, maintenance of a closed catheter system, avoiding irrigation unless the catheter is obstructed, keeping the collecting bag below the bladder, and maintaining good hydration in residents ***(Philip W, et al, 2008)***

2.4.2.3 Nosocomial pneumonia

Pneumonia is the leading single cause of mortality in children aged less than 5 years with approximately 1.6 million children dying each year ***(Black RE, et al, 2008).*** The leading risk factors contributing to pneumonia incidence are lack of exclusive breastfeeding, under nutrition, and exposure to indoor air pollution, low birth weight, crowding, and absence of immunization ***(Rudan I, et al, 2008).*** Mechanical ventilation, particularly prolonged coma or reduced conscious level, supine positioning, aspiration, pre-existing disease – e.g.: chronic obstructive pulmonary disease (COPD), admitting diagnosis – trauma, burns, prolonged ICU stay, use of PEEP during mechanical ventilation, use of nasogastric tube, use of paralytic agents, administration of antacids, male gender, enteral feeding and immunosuppression.

2.4.2.3.1 Prevention of nosocomial pneumonia:

Prevention can be achieved thorough hand washing. Noninvasive ventilation has been associated with reduced rates of infection and should be considered in appropriate patients. Nursing patients in the supine position may increase the risks of pulmonary aspiration of gastric contents. Several studies have confirmed reduced rates of NP in patients nursed in semirecumbent rather than supine and this should be encouraged although it is not always practically possible. Simple techniques such as hand washing, placing the patient in semirecumbent position and avoiding excess sedation must become a routine part of ICU care. ***(Girish L. Dandagi, 2010)***

2.4.4 Surgical site infection

Most surgical wound infections result from the contamination of the surgical site with skin flora of the patient or operating room personnel during surgery. The risk of contamination may be reduced by preoperative antiseptic baths, appropriately administered preoperative prophylactic antibiotics, sterile surgical procedures and techniques that minimize tissue damage ***(Huskins WC, 1998).***

2.5 Strategies to control health care associated infection

Strategies to control and prevent nosocomial infection fall into three main categories those are control or elimination of infectious agents, control of transmission and reservoir control.

Control or elimination of the infectious agent: This is achieved by placing patients with suspected or proven infectious diseases under

source isolation and applying barrier precautions. Infectious agents can be controlled or eliminated by effective disinfection and sterilization of items and equipment's and thorough cleaning of the environment. This helps reduce the bio burden of microorganisms in health care facilities. *Control of transmission*: This can be effectively achieved by hand washing, aseptic techniques and control of the health care environment. Basic aseptic technique must be practiced for sterile procedures e.g. insertion of intravenous lines and urinary catheters. Effective decontamination and control of the environment (e.g. mechanical ventilation) is essential to control transmission of microorganisms. *Reservoir control*: Almost any piece of equipment used in health care facilities may harbor microorganisms and therefore act as a reservoir (e.g. respiratory therapy equipment and ventilator circuits, bedpans, urinals, bed linen etc). Interventions directed at controlling or destroying infectious reservoirs in health care facilities include using either disposable equipment or decontaminating equipment as soon as possible after use. In addition, both patients and health care workers may also act as reservoirs of infection. Identifying and treating these individuals will reduce the reservoirs and help prevent cross-infection. ***(N.N Damani, 2007)***

2.6.1.Infection Prevention and Control

the evidence based practices and procedures , when applied consistently in health care settings, can prevent or reduce the risk of transmission of microorganisms to health care providers, other residents and visitors.

2.6.1.1 Standard precautions

Standard Precautions are the minimum infection prevention practices that apply to all patient care, regardless of suspected or confirmed infection status of the patient, in any setting where healthcare is delivered. These practices are designed to both protect health care provider (HCP) and prevent them from spreading infections among patients .Standard Precautions include: hand hygiene, use of personal protective equipment (e., Gloves, gowns, masks), safe injection practices ,safe handling of potentially contaminated equipment or surfaces in the patient environment ,and respiratory hygiene/cough etiquette. Each of these elements of Standard Precautions are described in the sections that follow ***(CDC guide), (Siegel et al. 2007)***

Standard precautions are based on the principle that all bodily fluids (except sweat), non-intact skin and mucous membranes can contain transmissible infectious agents. Hand hygiene is the critical link in infection prevention and is included as a component of standard precautions. Environmental control measures (e.g., private room, negative pressure air flow) also play a role in reducing spread of infection and are included in standard precaution recommendations ***(Cole & Lai 2009)***

2.6.1.2 Hand hygiene

The hands of HCWs are commonly colonized with pathogens like methicillin resistant *S. aureus* (MRSA), vancomycin resistant *Enterococcus* MDR-Gram Negative bacteria Candida spp. and *Clostridium difficile*, which can survive for as long as 150 h and contaminate the gowns, bed linen, bedside furniture, and other objects in the patient's immediate environment. Hand carriage of resistant pathogens has repeatedly been shown to be associated with nosocomial infections. ***(Boyce JM and Pittet D, 2002), (WHO, 2010)***

Hand hygiene prescriptions are the most important measure in the prevention of hospital-acquired infections, because of its proven efficiency (it is estimated that the impact on the reduction of NI is 50%), its effectiveness and its low cost. ***(Teare EL, et al, 1999), (Anita Huis, et al, 2011), (Saloojee H, and Steenhoff A 2001, (Aiello A, et al, 2009)***

However, there is poor compliance with HH regulations by healthcare workers all over the world, and all the studies carried out in hospitals suggest that the frequency of compliance is lower than 50% of the opportunities in which the practice is considered a priority. ***(Pittet D, 1999) (Pittet D, et al, 2001) (Anita Huis, et al, 2011)***

A problem-based and task-orientated education program can improve hand hygiene compliance. Enhancement of minimal handling and clustering of nursing procedures reduced the total patient contact episodes, which could help to overcome the major barrier of time constraints. ***(Barbara C.C et al, 2004)***

2.6.1.3 Alcohol hand rubs

Alcohol hand rubs provide an effective and convenient alternative to hand washing with soap and water, and are used in both health and social care settings to support staff with hand hygiene. While very effective as destroying micro-organisms on 'socially clean hands' alcohol is not a cleaning agent and hands that are visibly dirty (in other words, have organic matter or soiling present on the surface of hands) or potentially contaminated as a result of caring for patients with viruses such as norovirus or diarrheal infections like C. difficile must be washed with soap and water and dried thoroughly to remove dirt, viruses or spores beforehand rubs can be applied. This is because few current hand rub products have been shown to be effective with such infections. ***(linz evans et al, 2012)***

2.6.1.4 Personal protective equipment's

The primary use of protective clothing in health-care settings is to protect the skin and mucous membranes of HCWs from exposure to blood/body fluid and prevent contamination of clothing and reduce the opportunity of spread of organisms from patients or fomites to other patients or environments. The decision to use and select appropriate personal protective equipment must be based upon an assessment of the level of risk associated with contamination of clothing and skin by blood and body fluids from a specific patient care activity or intervention. The HCW must complete a similar exercise for all personnel visiting a patient in isolation. When protective wear is

considered necessary, he or she is responsible for educating visitors and supervising its use. Protective clothing which conforms to appropriate standards should be used.

Gloves: Provided gloves when correctly used, they can provide a protective barrier and prevent gross contamination of the hands when touching blood and body fluids, secretions, excreta, mucous membranes and non-intact skin donning gloves also reduce the likelihood that organisms from the hands of personnel will be transmitted to patients during invasive or other patient care procedures that involve touching mucous membranes and non-intact skin. Gloves protect the skin against hazardous substances, e.g. chemicals. HCWs need to be aware that the inappropriate use of gloves can be a hazard and has been associated with cross-infection. Defects in gloves may be present and hands may be contaminated during their removal. Therefore, it is important that hands must always be decontaminated after using gloves. The use of gloves should never be viewed as a substitute for appropriate hand washing.

Face mask: Masks in conjunction with eyewear should be worn during procedures that are likely to generate aerosols or splashes of blood and body fluids to prevent contamination of mucous membranes of the mouth, nose and eyes. The type of mask best suited to a particular situation depends on the body substances likely to be encountered and the nature of the activity. Wearing of masks during routine ward procedures such as wound dressing or invasive medical procedures is

not necessary. When caring for patients with known or suspected infectious pulmonary or laryngeal tuberculosis, it is recommended that a high efficiency particulate air (HEPA) mask should be used.

The recommendation of wearing face mask include that should be wear as fitted according to the manufacturer's instructions, used only once and changed when moist or grossly contaminated, not be touched by hand while being worn, removed by untying and handled only by the ties and never by the face covering part which may be heavily contaminated with the microorganisms, and not be worn loosely around the neck, but be removed and discarded as soon as practicable after use.

Gowns: Clean, non-sterile gowns should be worn during procedures which are likely to expose HCWs with spraying or splashing of blood, body fluids, secretions, or excretions. Gowns should be impermeable and water repellent. If the gown is expected to become wet during the procedure and if a water repellent gown is not available, a plastic apron should be worn over the gown. Grossly soiled gowns should be promptly removed and placed in a designated leak proof laundry bag. Hands should be washed immediately after removing and bagging of the soiled gown ***(N.N Damani, 2007)***

2.6.1.5 Medical waste disposal

Regulated medical waste should be disposed according to local legislation. Non anatomical medical waste includes. (a) Liquid or semiliquid blood and blood products. (b) Items contaminated with

blood that would release liquid or semiliquid blood if compressed; (c) Body fluids contaminated with blood, excluding urine and feces; (d) Sharp objects including needles, needles attached to syringes and blades; (e) Broken glass of other materials capable of causing punctures or cuts, if these have been in contact with human blood or body fluids; (f) Full sharps containers ***(A.A.P 2007)***

2.6.1.6 Disinfectant and sterilization procedures

Cleansing: Cleansing is the removal of soil or organic material from instruments and equipment used in providing client care. Nurses are involved in cleansing instruments after assisting or performing an invasive procedure. Reusable objects are cleansed prior to sterilization and disinfection to reduce the amount of contamination and loosen the material on the object. Cleansing involves the use of water, mechanical action, and sometimes a detergent. Contaminated objects are cleaned using a soft-bristled brush to scrub the surface.

Disinfection: disinfection is the elimination of pathogens, except spores, from inanimate objects. Disinfectants are chemical solutions used to clean inanimate objects. Bedpans, blood pressure cuffs, linens, stethoscopes, thermometers, and some types of endoscopes are disinfected in the hospital setting. The U.S. Environmental Protection Agency (EPA) licenses (registers) disinfection products and monitors the products to ensure they work as claimed on the label. Common disinfectants are alcohol, sodium hypochlorite, quaternary ammonium, phenolic solutions, and glutaraldehyde. In the home, Lysol and bleach

are common disinfectants that are capable of eliminating several pathogens. A germicide is a chemical that can be applied to both animate and inanimate objects for the purpose of eliminating pathogens. Antiseptic preparations such as alcohol and silver sulfa-diazine are germicides and may be used on skin.

Sterilization: sterilization is the total elimination of all microorganisms including spores. Instruments that are used for invasive procedures must be sterilized. Methods of achieving sterilization are moist heat or steam, radiation, chemicals, and ethylene oxide gas. The method of sterilization depends on the type of contamination, amount of contamination, and object to be sterilized. Autoclaving sterilization, which uses moist heat or steam, is the most common sterilization technique used in the hospital setting. Boiling water is not an effective sterilization measure as some viruses and spores can survive boiling water. Objects that have been boiled in water for 15 to 20 minutes at 121°C (249.8°F) are considered clean but not sterilized. ***(Sue C. and Patricia K, 2002)***

2.6.2 Isolation

Isolation precautions are an important part of strategies to prevent HAIs, reduce the threat of antibiotic resistant infections, and in responding to new and emerging infectious disease threats throughout the world. ***(Timothy Landers et al, 2010).*** Despite evidence that proper isolation and hand hygiene are effective in reducing infection transmission, observational studies demonstrate that adherence to

isolation precautions is low and can vary depending on the practice setting and type of isolation required ***(Gammon et al. 2007)***

Private rooms are generally indicated for child with uncontrolled excretions (diarrhea), secretions, excessive coughing, heavy wound drainage or widespread skin disease. Single-child rooms are preferable while the above conditions are active. However, if no private rooms are available, the child can be placed in a semi-private room, preferably with a child who is at low risk of developing an infection such as one who is well nourished, ambulatory, can perform daily activities independently and has no indwelling catheters/lines or open wounds **.** ***(Elaine Flanagan et al, 2011)***

2.6.3. Surveillance

Surveillance of nosocomial infection is an essential component of infection control. Surveillance permits the identification of problemic infections or patient populations, early detection of clusters and trends, and evaluation of control measures. To be effective, results must be analyzed and distributed promptly and should direct action. The uses of standard definitions, methods of case finding and denominators for rate calculations allow an institution to compare its performance internally over time and externally with published rates. The intensity of surveillance may vary from total hospital surveillance to surveillance of high risk populations (eg, patients in the ICU, immunocompromised children) or specific infections (eg, catheter-associated BSIs or UTIs, ventilator-associated pneumonia, infections related to surgery). On

general paediatric wards, surveillance for viral respiratory and gastrointestinal infections may be performed during seasons of high prevalence in the community. Each institution should set priorities based on local epidemiological data and resources available.

Denominators used for rate calculations must be relevant. Infection rates calculated by admissions are not useful for intra- or interhospital comparisons because the infection risk is related to the duration of hospitalization. Infection rates/1000 patient days are preferable and are useful where patient populations are stable, but do not take into account variations in patient risk factors. Device-associated infection rates reported/1000 device days provide the best risk adjustment at present. For surgical site infections, rates have traditionally been stratified by surgeon and wound infection risk. ***(Emori TG, et al, 1991)***

Surveillance requires objective, valid definitions of infections. Most hospital surveillance definitions are based on the National Nosocomial Infections Surveillance System (NNIS) criteria, but no such standard exists for long-term care. NNIS (now the National Healthcare Safety Network [NHSN]) definitions depend heavily on laboratory data and recorded clinical observations. In the LTCF, radiology and microbiology data are less available, and written physician notes and nursing assessments in the medical record usually are brief. Timely detection of HAI in the LTCF often depends on recognition of clues to infection by nurses' aides and reporting of these findings to the licensed nursing staff.

2.6.2.1 Collecting surveillance data

Published LTCF surveys have been either incidence or prevalence studies. Prevalence studies detect the number of existing (old and new) cases in a population at a given time, whereas incidence studies find new cases during a defined time period. The latter is preferred because more concurrent information can be collected by an incidence study if data are collected with regularity. The surveillance process consists of collecting data on individual cases and determining whether or not a HAI is present by comparing collected data to standard written definitions (criteria) of infections. One recommended data collection method in the LTCF is "walking rounds." This is a means of collecting concurrent and prospective infection data that are necessary to make infection control decisions. Surveillance should be done on a timely basis, probably at least weekly. During rounds, the ICP may use house reports from nursing staff, chart reviews, laboratory or radiology reports, treatment reviews, antibiotic usage data, and clinical observations as sources of information. ***(Philip W. et al, 2008)***

2.7. Role of the nursing staff in infection control

All HCWs play a critical role in preventing and controlling the spread of infection, especially nurses because they provide a significant amount of direct contact care of the patient. It is imperative that good clinical nursing practice, clear understanding of the infection process and evidence-based measures to prevent and control the transmission of microorganisms that cause infection be instilled during the introduction

to nursing care. The practice of standard precautions, body substance isolation, and medical asepsis are practices that help contain infectious organisms. ***(Kathleen Motacki, et al, 2011)***

Nurses should be familiar with practices to prevent the occurrence and spread of infection, and maintain appropriate practices for all patients throughout the duration of their hospital stay.

The nurse in charge of a ward is responsible for *(a)* maintaining hygiene, consistent with hospital policies and good nursing practice on the ward *(b)* monitoring aseptic techniques, including hand washing and use of isolation *(c)* reporting promptly to the attending physician any evidence of infection in patients under the nurse's care *(d)* initiating patient isolation and ordering culture specimens from any patient showing signs of a communicable disease, when the physician is not immediately available, *(e)* limiting patient exposure to infections from visitors, hospital staff, other patients, or equipment used for diagnosis or treatment, *(f)* maintaining a safe and adequate supply of ward equipment, drugs and patient care supplies. ***(WHO 2002)***

2.7.1 Infection control nurse

The nurse in charge of infection control is a member of the infection control team and responsible for *(a)* identifying nosocomial infections *(b)* investigation of the type of infection and infecting organism *(c)* participating in training of personnel *(d)* surveillance of hospital infections, (e) participating in outbreak investigation *(f)* development of infection control policy and review and approval of

patient care policies relevant to infection control *(g)* ensuring compliance with local and national regulations, *(h)* liaison with public health and with other facilities where appropriate *(i)* providing expert consultative advice to staff health and other appropriate hospital programmes in matters relating to transmission of infections ***(WHO 2002), (Ronda G Hughes, 2007)***

3- Methodology

3.1 Study design:

This quasi-experimental hospital-based study conducted to evaluate the effectiveness of infection control training program for nurses to reduce nosocomial infection in pediatric words.

3.2 Study area:

Kassala town (Sudan) lies 620 km southern east to Khartoum and 580 km south to Port Sudan, the capital of Kassala State. Kassala town lies on eastern Sudan with a total area of about 42,282 Km2. The total population of Kassala in 2008 is estimated at about 1527214; of whom 8 live in rural areas and 3 in urban centers, most of them are farmers.

3.3 Setting:

This study was conducted in kassala pediatric hospital and kassala teaching hospital (pediatric ward).

Kassala specialized hospital for pediatric was established in 1988 And funded by Patients Support Fund (Kuwait). The hospital consist of causality for receiving ill children for short stay (24 hours) and four wards which contain 106 beds which is divided to separated wards "general ward which receive children with general medical condition, respiratory disease ward which deal with child have respiratory disorders and nutrition ward which deal with child having nutritional disorder and casualty ward which receive the patients from outside"; there are 26 nurses which provide nursing care for children.

Kassala teaching hospital was established in 1905. It provides most types of medical services (medicine, surgery, and pediatric). Besides these there is tuberculosis center and an HIV center. The pediatric ward is separated area which located in north side of hospital. The pediatric ward is divided into three separate rooms which are (general, casualty and nutrition ward, there are 24 nurses which deliver care to the children occupying 65 beds.

3.4 Sampling and sample size:

- Total coverage sample method was selected.
- All nurses available (50) who are providing nursing care to children in kassala specialized hospital for pediatric (26 nurses) and kassala teaching hospitals (24 nurses).

3.5 Data collection tools:

Four tools were used to collect data during the study, and this includes:

- Structured questionnaire for nurses.
- Observational Checklist for nurse's performance.
- Observational form for hand hygiene:
- Observation Sheet for incidence of nosocomial infection.

3 .5.1 Structured questionnaire:

This tool contains five sections:

Section one concerned with demographic data it include five structural questions related to nurses age, years of experience in pediatric care, training courses in pediatric course ,infection control training, and vaccination against hepatitis B disease.

Section two: It include questions about nurse's knowledge about scope of infection "source of infection, infection and chain of infection.

Section three: It includes structured questions designed to obtain information about nurse's knowledge about hospital acquired infection "definition, types, signs and symptoms, risk factors, mode of transmission, related care and methods of control"

Section four: It includes structured questions designed to obtain nurses knowledge and attitude about universal precautions, save injection practice, save sharp disposal, dealing with work area and visit policies.

Section five: It includes structured questions designed to obtain nurses knowledge about decontamination process and aseptic technique.

These tools were applied three times "before conducting the program (pretest), immediately at the end of the program (post test1) and three months after the program implementations (post test 2)".

3.5.2 Observation checklists for nurse's performance:

These tools were developed by researcher in light of standard checklist in textbook to assess nurse's performance in various nursing procedures regarding infection control before and after their training

3.5.3 Observational form for hand hygiene:

This tool driven from ***WHO*** guide for hand hygiene and modified by the researcher to demonstrate the degree of compliance with hand hygiene among nurses.

3.5.4 Observation Sheet for incidence of nosocomial infection:

This tool was modified from textbook by the researcher to be suitable to observe and record the incidence of nosocomial infection during the period of the study.

Scaling system

Knowledge	***Good***	***Sufficient***	***Poor***
Correct response	More than 4	2 – 3	One
Performance	***Good***	***Fair***	***Poor***
Cleaning surgical instrument	16 – 24	8 – 15	Less than 8
Preparation of drum	14 – 21	7 – 13	Less than 7
Routine hand washing	16 – 24	8 – 15	Less than 8
Alcohol hand rubbing	16 – 24	8 – 15	Less than 8
Hand scrubbing	30 – 45	15 – 29	Less than 15
Donning and removing gloves	34 – 51	17 – 33	Less than 17
Oxygen therapy	24 – 36	12 – 23	Less than 12
Inhalation therapy	22 – 33	11 – 21	Less than 11
Insertion intravenous catheter	30 – 45	15 – 29	Less than 15
Intravenous therapy	22 – 33	11 – 21	Less than 11
Obtaining blood sample	16 – 24	8 – 15	Less than 8
Nasogastric tube feeding	16 – 24	8 – 15	Less than 8
Obtaining urine sample	16 – 24	8 – 15	Less than 8

3.6 Operational Design:

Operational design includes pilot study and data collection technique and ethical consideration.

3.6.1 Validity and reliability:

The tools have been examined by supervisor indicated that some items needed to be modified, and they assured that each tool was achieved the aim of the study.

A pilot study was carried before implementing the tools on semi area (pediatric ward in Shendi teaching hospital). To test applicability of the tools of data collection, and to estimate the time required for filling the required forms.

3.7 Data collection technique:-

In this study the data was collected in three phases. The first phase (pretest) data was run before implementation of education program, in which the questionnaire was distributed to participant and each one of them is allowed sufficient time to fill it. Then the researcher assigned a code for each one of participants to facilitate the observation of them in the clinical area by using observational checklists. This observational process took about two months. Nurses were known that the researcher was observing their practice daily for children. After collection of pretest (First phase) the participants received the infection control training program through five sessions. The training continued for one month. Two weeks for nurses in kassala specialized hospitals for pediatric and two weeks in kassala teaching hospital. After the nurses received this program the researcher told them that their practice

will be evaluated and observed with the same tools. Three months later the same tools used in pretest was used to collect post test data (The second phase) which took about three months. Then after other three months the third phase started (post test 2) to collect the last post intervention data so as to compare the results of these three phase (tests), to make a judgment about the knowledge and practice of nurses regarding this training program.

3.8 Educational program:

A training program was designed based on actual needs for assessment of nurses to improve their knowledge and practice regarding nursing pediatric patient and infection control.

The step of the program includes:

1. Setting objectives.
2. Preparation of the content (infection, chain of infection, nosocomial infection, types of nosocomial infection, decontamination, sterilization, disinfection, medical instrument, universal precautions "hand hygiene – personal protective equipment", medical waste management, isolation, workplace hazards, decontamination methods, infection control in pediatric units and surveillance)
3. Preparation of suitable media for teaching the nurses which include:

Real objects (syringes, vial, cotton bolls, tubes, gauze, nebulizer, oxygen cylinder, antiseptic solutions, gloves, antiseptic soaps, towels, drums, face masks, adhesive plasters, urine samples container and blood container)

The researcher have used different media as charts, animation, colored pictures showing mode of transmission, chain of infection, nursing procedures.

4. Implementation of the program.

3.9 Ethical considerations:

- The aim of the present study was explained to the director of the study setting "kassala teaching hospital and kassala specialized hospital for pediatric" to take his permission to carry out the study.
- An official letters from the faculty of post graduate and scientific research to the directors of hospitals.
- An agreement to participate was taken from nurses involved in the study, after explanation of the purpose of the study. After obtaining their consent for participation in the study they were informed that all collected information will be confidential and will be used only for the purpose of the study.

3.10 Statistical design:

The following statistical measures were used:

1. Descriptive measures including: frequencies, percentages and mean, for quantitative data.

2. Statistical test include: Chi square test, T test was used for quantitative variables for research questions.

3. Correlation between the variable of the study.

4. The level of significance selected for this study was P value equal to or less than **0.05.**

4. Results

The results of the current study were presented as the following sequence:

PART ONE: Demographic characteristics of study group.

PART TWO: Performance of the study group about pediatric care.

PART THRE: Relation between study variables.

PART FOUR: Surveillance of nosocomial infection.

PART ONE

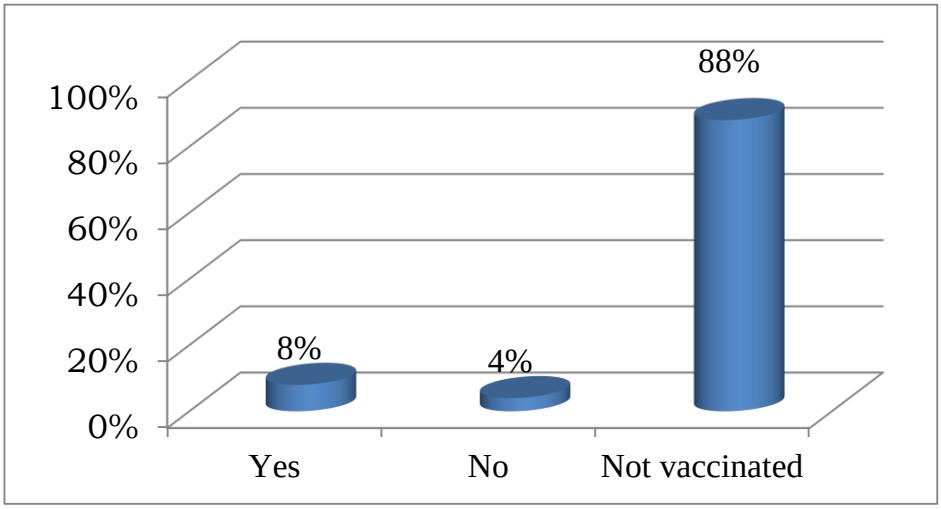
Demographic characteristic of study group

TABLE (1) STUDY GROUP DEMOGRAPHIC DATA

N = 50	Frequency	Percentage
Age		
20-30 years	3	(6%)
31-40 years	30	(60%)
Over 40 years	17	(34%)
Experience in pediatric care area		
less than one year	14	(28%)
1-3 years	13	(26%)
4-6 years	7	(14%)
More than 6 years	16	(32%)
Previous training in pediatric care		
more than 6 month ago	5	(10%)
one years ago	3	(6%)
more than one year ago	5	(10%)
Have no training course	37	(74%)
Pervious training course in infection control		
more than 6 month ago	5	(10%)
one year ago	1	(2%)
more than one year ago	5	(10%)
Have no training before	39	(78%)

This shows demographic characteristics of study group which include age, experience in pediatric care area, and previous training courses in pediatric care and previous training in infection control. It was found that most (60%) of study group were between 31- 40 years old and (32%) of study group had experience more than 6 years in pediatric work. Also it was found most (74%) of the study group had no previous training course in pediatric care and most (78%) have no previous infection control course.

Figure (1): VACCINATION AGAINST HEPATITIS B



N = 50

It shows that (88%) of study group had no vaccination against hepatitis B; (8%) incomplete vaccination and (4%) completed their vaccination.

PART TWO

Knowledge and attitude about infection control

Table (2) KNOWLEDGE OF STUDY GROUP ABUT CONCEPT OF INFECTION

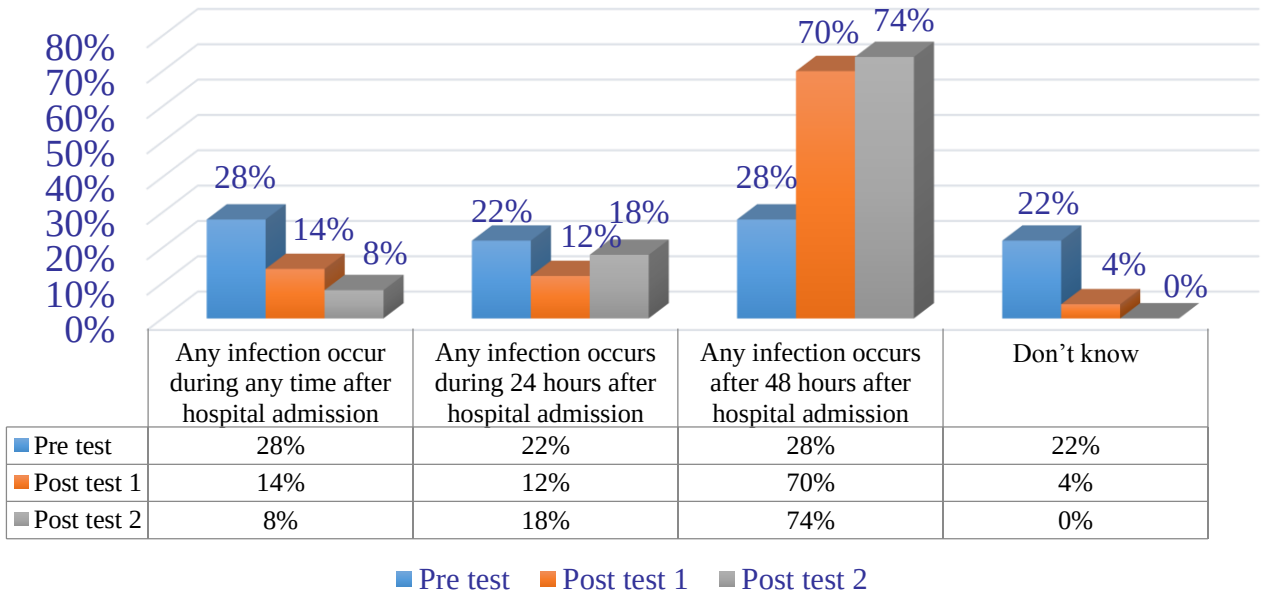
N = 50	**Pre test**				**Post test 1**				**Post test 2**			
Knowledge	***Good***	***Sufficient***	***Poor***	***Don't know***	***Good***	***Sufficient***	***Poor***	***Don't know***	***Good***	***Sufficient***	***Poor***	***Don't know***
Definition of infection	14 (28%)	17 (34%)	6 (12%)	13 (26%)	37 (74%)	8 (16%)	4 (8%)	1 (2%)	39 (78%)	8 (18%)	2 (4%)	0 (0%)
chain of infection	11 (22%)	7 (14%)	19 (38 %)	13 (26%)	31 (62%)	6 (12%)	15 (30%)	0 (0%)	34 (68%)	13 (26%)	3 (6%)	0 (0%)
Source of infection in the hospital	8 (16%)	11 (22%)	27 (54 %)	4 (8%)	35 (70%)	11 (22 %)	4 (8%)	0 (0%)	37 (74%)	11 (22%)	4 (8%)	0 (0%)
Factors increase chance of infection	9 (18%)	10 (20%)	26 (52 %)	5 (10%)	30 (60%)	16 (32 %)	4 (8%)	0 (0%)	37 (74%)	13 (26%)	1 (2%)	0 (0%)
mode of transmission of infection	5 (10%)	17 (34%)	23 (46 %)	5 (10%)	36 (72%)	9 (18 %)	5 (10%)	0 (0%)	38 (76%)	11 (22%)	1 (2%)	0 (0%)
Predisposing factors of nosocomial infection	7 (14%)	8 (16%)	26 (54 %)	8 (16%)	37 (74%)	9 (18 %)	4 (8%)	0 (0%)	40 (80%)	13 (16%)	2 (4%)	0 (0%)
Infection control measures	13 (26%)	5 (10 %)	24 (48 %)	8 (16%)	43 (86%)	5 (10 %)	2 (4%)	0 (0%)	43 (86%)	6 (12%)	1 (2%)	0 (0%)
Mean of knowledge	**19.1 %**				**71.1 %**				**76.5 %**			
P. value	**0.000**											

Table (2) clarified that good knowledge of the study group regarding definition of infection increased from (28%) in pretest to (78%) after intervention. The study group have poor knowledge (38 %) and (26 %) have no knowledge about chain of infection pretest where this percentage was decreased to (6%) after intervention with highly significant variation (P= 0.000) while score of good knowledge raises from (22%) pretest to (68%) after intervention.

Also concerning knowledge about source of infection in the hospital the poor score improved from (54% to 8 %) after intervention. Regarding knowledge about factors increasing the chance of infection in the pediatric ward the good knowledge of study group increased from (18%) pretest to (74%) after intervention with significant (P= 0.000). Regarding mode of transmission of infection there was improvement of good knowledge from (10%) pre test to (76%) after intervention. Concerning knowledge about predisposing factors of nosocomial infection there was decrease of poor knowledge from (54%) pre test to (8%) after intervention and (4%) in post test2 with high significant result (P= 0.000).

The table also show that good knowledge of study group about measures of prevention of infection increased from (26%) pre test to (86%). The table illustrate that over all mean of good knowledge about infection improved from (19.1 %) in pretest to (71.1%) in post test 1and (76.5%) in post test2.

Figure (2) knowledge of study group about nosocomial infection



	Any infection occur during any time after hospital admission	Any infection occurs during 24 hours after hospital admission	Any infection occurs after 48 hours after hospital admission	Don't know
Pre test	28%	22%	28%	22%
Post test 1	14%	12%	70%	4%
Post test 2	8%	18%	74%	0%

N = 50

This figure shows concept of nosocomial infection: where (28%) of study group knows that nosocomial occur after 48 hours of patient admission. This awareness increased to (70%) after intervention and in post test2 increased to (74%). Near quarter (22%) of study group do not know what is nosocomial infection in pretest but this percentage decreased to (0%) in post test2.

TABLE (3) KNOWLEDGE OF STUDY GROUP PRE, POST TEST 1 AND POST TEST 2 REGARDING NOSOCOMIAL PNEUMONIA

N=50	**Pre test**				**Post test 1**				**Post test 2**			
	Good	***Sufficient***	***Poor***	***Don't know***	***Good***	***Sufficient***	***Poor***	***Don't know***	***Good***	***Sufficient***	***Poor***	***Don't know***
Symptoms and signs	14 (28%)	14 (28) %	16 (32%)	5 (10%)	36 (72%)	9 (18%)	5 (10%)	1 (2%)	42 (84%)	6 (12%)	1 (2%)	0 (0 %)
Prevention	8 (16%)	5 (10%)	30 (60%)	7 (14%)	33 (66%)	10 (20%)	5 (10%)	2 (4%)	35 (70%)	11 (22%)	4 (8%)	0 (0 %)
Children behavior	9 (18%)	12 (24%)	16 (32%)	13 (26%)	29 (58%)	11 (22%)	7 (14%)	3 (6%)	34 (68%)	10 (20%)	5 (10%)	1 (2 %)

This table there was improvement of knowledge regarding signs and symptoms of nosocomial pneumonia in post test 1 and post test 2. Whom don't know from (10 %) to (2 % and 0 %) and good score from (28%) to (72 % and 84%) with highly significant variation (P = 0.000). Concerning prevention of nosocomial pneumonia more than half of study group (60%) have poor knowledge but this percentage decreased after intervention to (10%) and (8%) in post test 2. Good knowledge increased from (16%) to (66%) and (70%) after intervention and follow up phase.

Regarding knowledge about behavioral factors leading to nosocomial infection there was marked increase in good knowledge after implementation of program from (18%) to (58%) and finally to (68%) in post test2with highly significant (P = 0.000).

Table (4) KNOWLEDGE OF STUDY GROUP REGARDING DISINFECTING MASK BEFORE INHALATION THERAPY

Disinfection of face mask before use of inhalation therapy			
	Pre test	***Post test1***	***Post test 2***
Always	16 (32 %)	32 (64 %)	40 (80 %)
Often	32 (16 %)	10 (20 %)	9 (18 %)
Sometimes	13 (26 %)	4 (8 %)	1 (2 %)
Never	13 (26 %)	4 (8 %)	0 (0 %)
P value	**0.000**		

This table shows weeping the face mask with alcohol before administration of inhalation therapy near one third (32%) were always doing this action but this increase to (80%) in the post test2. Slightly above quarter (26%) of study never do this action but decreased after intervention to (8%) and no one missed this action (0%) in follow up phase

Table (5) KNOWLEDGE OF STUDY GROUP IN PRE, POST TEST 1 AND POST TEST 2 REGARDING INTRAVENOUS CATHETER INFECTIONS

N = 50	**Pre test**				**Post test 1**				**Post test 2**			
	Good	***Sufficient***	***Poor***	***Don't know***	***Good***	***Sufficient***	***Poor***	***Don't know***	***Good***	***Sufficient***	***Poor***	***Don't know***
Changing cannula	12 (24%)	12 (24%)	10 (20%)	16 (32%)	34 (68%)	9 (18%)	3 (6%)	4 (8%)	38 (76%)	7 (14%)	3 (6%)	0 (0%)
Signs and symptoms	8 (16%)	18 (36%)	19 (38%)	5 (10%)	42 (84%)	5 (10%)	3 (6%)	1 (2%)	43 (86%)	5 (10%)	2(4%)	0 (0%)
Mean of knowledge	**20 %**				**76 %**				**81 %**			
Solution used to clean insertion site of intravenous catheter												
Alcohol	18 (36 %)				28 (56 %)				30 (60 %)			
Dettol	16 (32 %)				5 (10 %)				1 (2 %)			
Iodine	9 (18 %)				15 (30 %)				19 (38 %)			
Normal saline	7 (14 %)				2 (4 %)				0 (0 %)			
Daily assessment of cannulation site												
Always	10 (20 %)				31 (62 %)				42 (84 %)			
often	6 (12 %)				15 (30 %)				6 (12 %)			
Sometimes	5 (10 %)				3 (6 %)				2 (4 %)			
Never	4 (8 %)				1 (2 %)				0 (0 %)			
P value	**0.000**											

This table reflect that near one third (32%) of study group did not know the reasons of changing intravenous catheter before implementation of program but this lack of knowledge decreased after intervention to (8 %) and to (0%) in post test2with significant (p value = 0.000). Regarding signs and symptoms of intravenous catheter associated infection (16%) have good knowledge before conducting the program which increased to (84%) and (86%) after intervention and follow up phase, while poor knowledge decreased from (38%) to (6% and 4%) after intervention and follow up in sequence with significant (p value = 0.000).

Concerning solution used to clean the site before insertion of intravenous catheter slightly more than third (36%) of study group was knowledgeable about use of alcohol and this increase after intervention to (56%) and in post test 2to (60%) while the use of normal saline was found in (14%) of study group pretest but this knowledge is decreased to (4%) and (0%) after intervention and follow up phase. Regarding daily assessment of intravenous catheter site this table illustrate that (20%) of study group was knowledgeable about daily check intravenous site before implementation of program but this increased to (84%) in post test2. There was no one of study group missed checking intravenous catheter site in post test 2 (0%).

Table (6) KNOWLEDGE OF THE STUDY GROUP ABOUT NOSOCOMIAL UTI

N = 50	Pre test				Post test 1				Post test 2			
	Good	***Sufficient***	***Poor***	***Don't know***	***Good***	***Sufficient***	***Poor***	***Don't know***	***Good***	***Sufficient***	***Poor***	***Don't know***
Signs and symptoms	8 (16%)	13 (26%)	26 (52%)	3 (6%)	35 (70%)	9 (18%)	4 (8%)	2 (4%)	37 (74%)	9 (18%)	3 (6%)	1 (2%)
P value	**0.000**											
Solution used to clean genital area												
Iodine	12 (24%)				16 (32%)				25 (50%)			
Alcohol	6 (12%)				29 (58%)				20 (40%)			
Normal saline	27 (54%)				5 (10%)				5 (10%)			
No need	5 (10%)				0 (0 %)				0 (0 %)			
P value	**0.000**											
Barrier used for catheter insertion												
Sterile gloves	19 (38 %)				28 (56 %)				30 (60 %)			
Clean gloves	22 (44 %)				20 (40 %)				19 (38 %)			
Hand washing	9 (18 %)				2 (4 %)				1 (2 %)			
I don't know	0 (0 %)				0 (0 %)				0 (0 %)			
P value	**0.250**											

This table showed that more than half (52%) of study group have poor knowledge about signs and symptoms of urinary tract infection pretest but decreased to (8%) after implementation and to (6%) during phase of follow up. The good knowledge increased from (16%) before conducting the program to (70% and (74%) after conducting the program and post test2with significant (p value = 0.000).

Regarding solution used for cleaning the genital area before catheterization near quarter (24%) of study group was knowledgeable about uses of iodine before intervention, after intervention and follow up this knowledge increased to (32%) and (50%) within the study group, while (10%) of study group indicate that there is no need to use any disinfectant solution but after intervention and follow up this idea was nill. This table illustrate improve in knowledge of study group in barrier used during insertion of urinary catheter as wearing sterile gloves (38%) pretest to (56%) after intervention. Hand washing decreased from (18%) to (2%) after intervention with no significant (p value = 0.250).

Table (7) KNOWLEDGE OF THE STUDY GROUP REGARDING CARE OF URINARY CATHETER

N = 50	Pre test	Post test 1	Post test 2
Knowledge	***Placement of urine bag***		
Hung on bed side	10 (20 %)	12 (24 %)	39 (78 %)
On the floor	7 (14 %)	9 (18 %)	7 (14 %)
Container on floor	30 (60 %)	29 (54 %)	4 (8 %)
On the bed	3 (6 %)	2 (4 %)	0 (0 %)
	Urinary catheter site of taking sample		
Direct aspiration	11 (22%)	36 (72%)	44 (88%)
Disconnect	22 (44%)	9 (18%)	4 (8%)
Evacuation port	17 (34%)	5 (10%)	2 (4%)
P value	**0.000**		

Concerning placement of urine bag: there was improvement about correct placement as hung on side of the bed from (20%) pre test to (24% and 78%) in sequence after intervention and follow up. Less than quarter (22%) of study group was knowledgeable about taking urine sample from catheter as direct aspiration, this increase post intervention and follow up to (72%) and (88%) of the study group.

Table (8) KNOWLEDGE OF THE STUDY GROUP REGARDING NOSOCOMIAL GASTROENTERITIS

N = 50	Pre test				Post test 1				Post test 2			
	Good	***Sufficient***	***Poor***	***Don't know***	***Good***	***Sufficient***	***Poor***	***Don't know***	***Good***	***Sufficient***	***Poor***	***Don't know***
Signs and symptoms	10 (20%)	16 (32%)	19 (38%)	5 (10%)	34 (68%)	8 (16%)	5 (10%)	3 (6%)	38 (76%)	6 (12%)	4 (8%)	2 (4%)
P value	**0.000**											
Interval of changing feeding tube												
Every day	28 (56%)				1 (2%)				11 (22%)			
Every 3 days	21 (42%)				28 (56%)				17 (38%)			
Every week	1 (2%)				21 (42%)				20 (40%)			
Don't know	0 (0%)				0 (0 %)				0 (0%)			
P value	**0.518**											
Flushing of NG tube after feeding												
Always	18 (36%)				35 (70%)				36 (72%)			
Often	6 (12%)				10 (20%)				12 (2 %)			
Sometimes	19 (38%)				4 (8%)				3 (6%)			
Never	7 (14%)				1 (2%)				0 (0%)			
P value	**0.000**											
Position of child during feeding												
Setting	12 (24%)				18 (36%)				10 (20%)			
Supine	10 (20%)				14 (28%)				9 (18%)			
Semi setting	17 (34%)				15 (30%)				29 (58%)			
Lateral	11 (22%)				3 (6%)				2 (4%)			
P value	**0.057**											

This table illustrate that there is improvement in knowledge in good score about signs and symptoms of gastrointestinal infection from (20%) of study group pre test to (76%) in post test2post intervention. Concerning the knowledge about changing of feeding tube there was improvement in knowledge as (2%) of study group knows changing feeding tube every week but this knowledge increased to (40%) in ongoing phase of follow up with statistical significant (p value = 0.083).

Regarding study group knowledge about flushing feeding tube with water after feeding there was marked increase in knowledge (36%) to (70%) after intervention with highly statistical significance (P = 0.000). In this table the knowledge of study group about position of child during tube feeding (34%) have knowledge about semi setting position pre test and this knowledge increase to (58%) after intervention, while knowledge about supine position for feeding the child was (20%) before decreased to (18%) in post test2 after intervention with no significant (p value = 0.057).

Table (9) ATTITUDE OF STUDY GROUP ABOUT FIVE MOMENTS OF HAND HYGIENE

N = 50	Pre test				Post test 1				Post test 2			
Moments	***Always***	***Often***	***Some times***	***Never***	***Always***	***Often***	***Some times***	***Never***	***Always***	***Often***	***Some times***	***Never***
Before touching the patient	2 (4%)	8 (16%)	9 (18%)	31 (62 %)	36 (72 %)	11 (22%)	3 (6%)	0 (0%)	40 (80%)	10 (20%)	0 (0%)	0 (0%)
before clean/aseptic procedure	4 (8%)	9 (18%)	14 (28%)	23 (46%)	33 (66%)	13 (26%)	4 (8%)	0 (0%)	34 (68%)	15 (30%)	1 (2%)	0 (0%)
After risk of body fluid exposure	22 (44%)	3 (6%)	15 (30%)	10 (20%)	41 (82%)	6 (12%)	3 (6%)	0 (0%)	46 (92%)	3 (6%)	1 (2%)	0 (0%)
After touching patient surrounding	18 (36%)	10 (20%)	8 (16%)	14 (28 %)	47 (94%)	3 (6%)	0 (0%)	0 (0%)	48 (96%)	2 (4%)	0 (0%)	0 (0%)
After touching patient	15 (30%)	7 (14%)	6 (12 %)	22 (44%)	46 (92%)	3 (6%)	1 (2%)	0 (0%)	49 (98%)	1 (2%)	0 (0%)	0 (0%)
Mean of knowledge	**24.4%**				**81.2%**				**86.8%**			
P value	**0.000**											

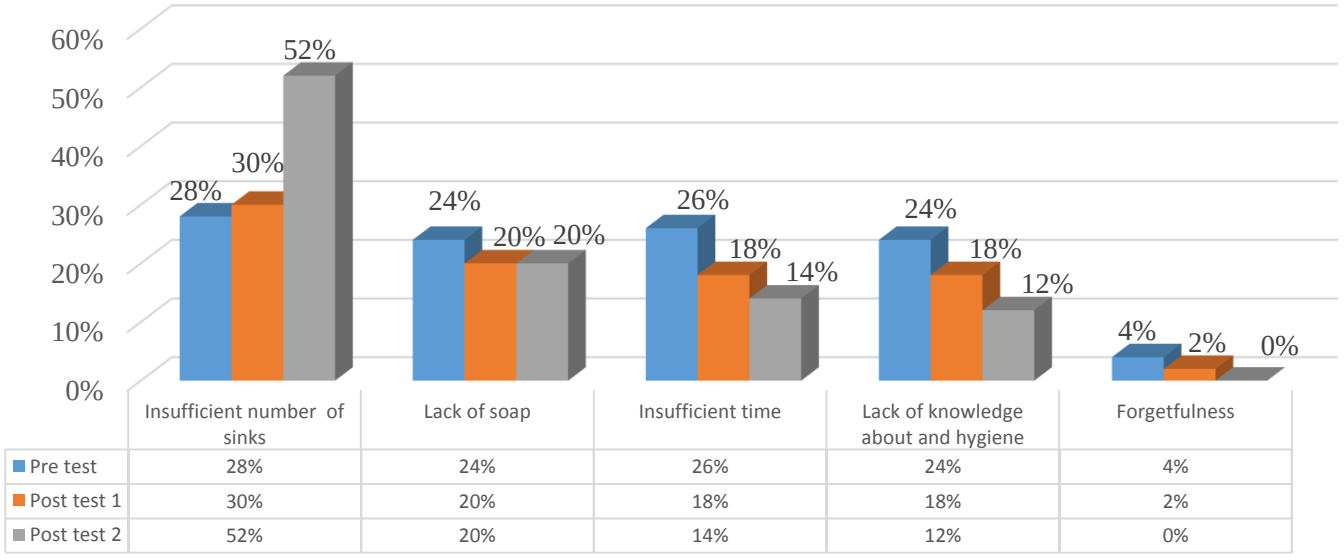
This table explain knowledge about five moments for hand hygiene: There was clear improvement in knowledge of study group those stated that there is never a need to cleaning hand before touching the child decreased from (62%) to nill. before clean/ a septic procedure from (46%), after risk for touching body fluid (20%); after touching child surrounding from (28%) and after touching the child from (44%) pre test to (0%) in all the five moments for hand hygiene. In other hand there was clear in increase of study group knowledge the fact about there is always a need to clean hands, as in pretest “before touching the child (4%), before clean/ a septic procedure (8%), after risk for touching body fluid (44%); after touching child surrounding (36%) and after touching the child (30%) to (80%), (68%), (92%), (96%) and (98%) respectively after intervention. The overall mean of increase of knowledge is (24 %) pre test and (81.2 %) after implementation of program and (86.8 %) in the post test2of the program with highly statistical significance (p value = 0.000).

Table (10) KNOWLEDGE OF THE STUDY GROUP REGARDING MINIMUM TIME OF HAND HYGIENE AND USING GLOVE AS SUBSTITUTE OF HAND WASHING

N = 50	Pre test	Post test 1	Post test 2
Minimum time for routine hand hygiene			
Less than 20 seconds	15 (30%)	8 (16%)	11 (22%)
20-40 seconds	11 (22%)	15 (30%)	10 (20%)
40 - 60 seconds	7 (14%)	19 (38%)	20 (40%)
1-2 minutes	15 (30%)	8 (16%)	9 (18%)
Didn't know	2 (4%)	0 (0%)	0 (0%)
P value	**0.920**		
Uses of gloves as substitute of hand washing			
Yes	30 (60%)	12 (24%)	6 (12%)
No	20 (40%)	38 (76%)	44 (88%)
P value	**0.000**		

This table illustrate that few of study group (14%) aware about the exact time needed for hand washing and this knowledge increased after intervention to (40%). Concerning use of gloves as substitute for hand washing near two third (60%) of study group knows that glove can replace hand washing but this knowledge was decreased to (12%) after intervention. In other hand the knowledge about replacing gloves with hand washing increased from (40%) pretest to (88%) after intervention.

Figure (3): causes of non complaince about hand hygiene among study group



	Insufficient number of sinks	Lack of soap	Insufficient time	Lack of knowledge about and hygiene	Forgetfulness
Pre test	28%	24%	26%	24%	4%
Post test 1	30%	20%	18%	18%	2%
Post test 2	52%	20%	14%	12%	0%

N = 50

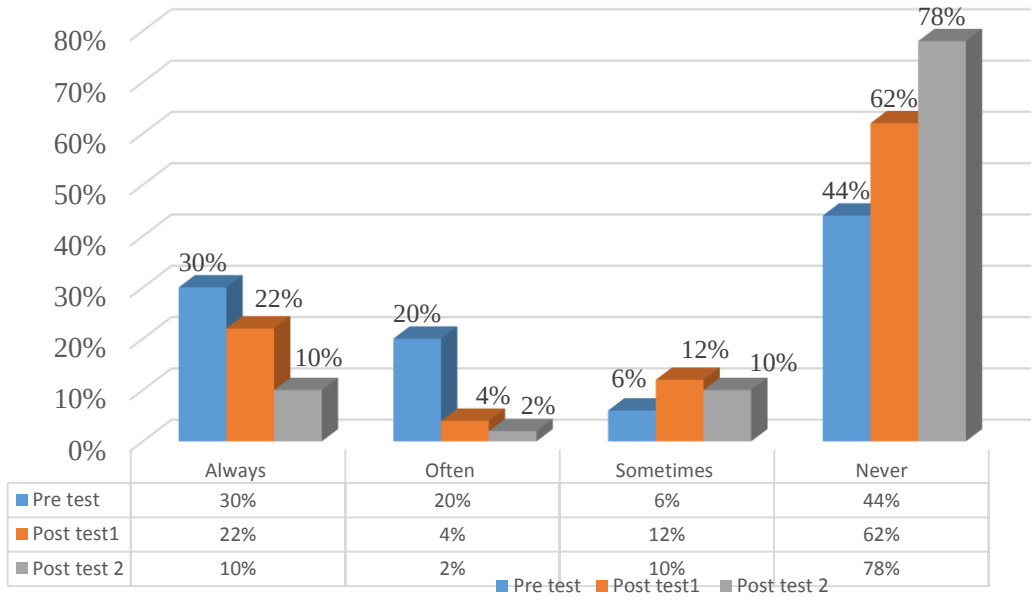
This figure shows that insufficient number of sink is a major causes of non-adherence to hand hygiene where (28%) in pretest (30%) in post test and (52%) in follow up phase; (24%) of study group consider lack of knowledge is a cause of non-adherence in pretest that decreased to (18%) , (12%) in post test and follow up. Forgetfu ness is considered the least cause of non-adherence to hand hygiene, (4%) in pretest and (2%), (0%) in post test and follow up.

Table (11): KNOWLEDGE OF THE STUDY GROUP REGARDING PERSONAL PROTECTIVE EQUIPMENT'S

N = 50	Pre test				Post test 1				Post test 2			
Indication	*Good*	*Sufficient*	*Poor*	*Don't know*	*Good*	*Sufficient*	*Poor*	*Don't know*	*Good*	*Sufficient*	*Poor*	*Don't know*
Gloving	13 (26%)	20 (40 %)	15 (30%)	2 (4%)	14 (28%)	35 (70%)	6 (12 %)	0 (0%)	38 (76%)	11 (22%)	1 (2%)	0 (0%)
Changing gloving	11 (22%)	18 (36%)	21 (42%)	5 (10%)	35 (70%)	7 (14%)	6 (12%)	2 (4%)	44 (88%)	1 (2%)	4 (8%)	1 (2%)
Gowning	10 (20%)	16 (32%)	19 (38 %)	5 (10 %)	34 (68%)	11 (22%)	4 (8%)	1 (2%)	37 (74%)	9 (18%)	4 (8%)	0 (0%)
Wearing face mask	11 (22%)	10 (20%)	22 (44%)	7 (14%)	34 (68%)	11 (22%)	5 (10%)	0 (0%)	40 (80%)	9 (18%)	0 (0%)	0 (0%)
Mean of knowledge	**22.5%**				**58.5 %**				**79.5 %**			
P value	**0.000**											

This table shows that there is an increase in score of good knowledge about indications of wearing gloves (26%), changing gloves (22%), indication of wearing gown (20%), wearing face mask (22%) to (76%), (88%), (74%) and (80%) in the follow up face respectively. Over all mean of good knowledge about universal precautions increased from (22.5%) pre test to (58.5%) after intervention and to (79.5%) in follow up phase.

Figure (4): disterbution of the study group about re use of gloves



	Always	Often	Sometimes	Never
Pre test	30%	20%	6%	44%
Post test1	22%	4%	12%	62%
Post test 2	10%	2%	10%	78%

N = 50

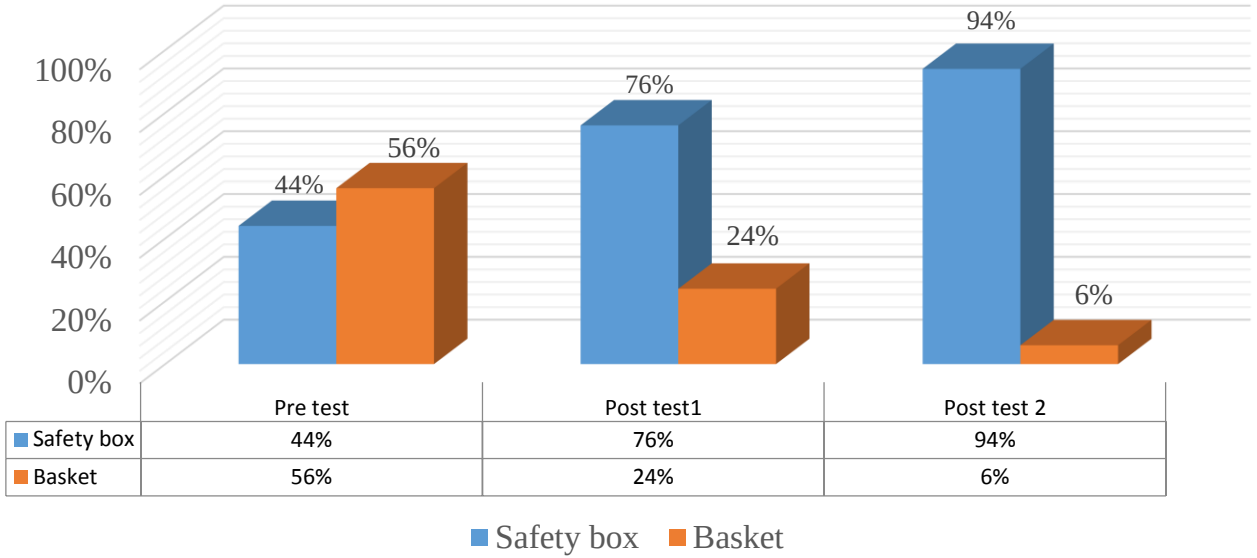
This figure shows that near one third (30%) of study group knows that gloves can always reused before intervention, this knowledge decreased to (10%) after intervention. In other hand there was increase in knowledge of never reuse gloves from (44%) pretest to (78%) in post test2.

Table (12): KNOWLEDGE OF THE STUDY GROUP REGARDING SAVE INJECTION PRACTICE AND SHARP MANAGEMENT

N = 50	Pre test				Post test 1				Post test 2			
	Good	*Sufficient*	*Poor*	*Don't know*	*Good*	*Sufficient*	*Poor*	*Don't know*	*Good*	*Sufficient*	*Poor*	*Don't know*
Multi doses vial	10 (20%)	19 (38%)	18 (36%)	3 (6%)	24 (48%)	20 (40%)	6 (12%)	0 (0%)	33 (66%)	12 (24%)	5 (10%)	0 (0%)
IV therapy	8 (16%)	17 (34%)	22 (44%)	1 (2%)	31 (62%)	16 (32%)	3 (6%)	0 (0%)	38 (76%)	10 (20%)	2 (4%)	0 (0%)
Sharps	7 (14%)	14 (28%)	28 (56%)	1 (2%)	31 (62%)	7 (14%)	5 (10%)	2 (4%)	40 (80%)	5 (10%)	5 (10%)	0 (0%)
Sharps injury	4 (8%)	16 (32%)	26 (52%)	4 (8%)	39 (78%)	8 (16%)	3 (6%)	0 (0%)	41 (82%)	7 (14%)	2 (4%)	0 (0%)
Mean of knowledge	**14.5 %**				**62.5 %**				**76 %**			
P. value	**0.000**											

This table reflect that there was obvious decrease in poor knowledge score regarding save injection practice as; dealing with multi drug vial (36%), dealing with intravenous therapy (44%), dealing with sharp objects (56%) pretest to (10%), (4%) and (10%) after conducting the program. Regarding management of sharp injury the table shows that there is clear increase of study group score of good knowledge from (8%) pretest to (78%) after intervention and (82%) in follow up phase. Over all mean of good knowledge was (14%) pretest and (62.5%) after intervention and (76%) in follow up phase.

Figure (5): disterbution of study group about dispose of sharps



N = 50

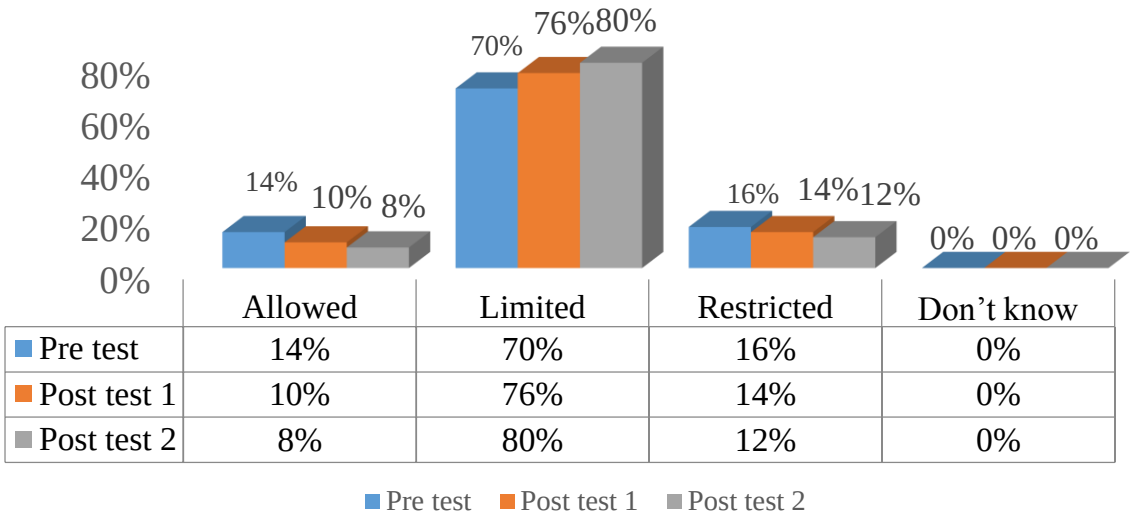
This figure clarified that near half (44%) of study group knows use of safety box to dispose sharps before intervention, this knowledge increased to (94%) in follow up phase.

Table (13) KNOWLEDGE OF THE STUDY GROUP REGARDING DEALING WITH WORK AREA

N = 50	Pre test				Post test 1				Post test 2			
	Good	*Sufficient*	*Poor*	*Don't know*	*Good*	*Sufficient*	*Poor*	*Don't know*	*Good*	*Sufficient*	*Poor*	*Don't know*
Managing blood spots	7 (14%)	17 (34%)	23 (46%)	3 (6%)	24 (48%)	16 (32%)	9 (18%)	1 (2%)	30 (60%)	8 (16%)	2 (4%)	0 (0%)
Changing linens	4 (8%)	21 (42%)	23 (46%)	2 (4%)	37 (74%)	11 (22%)	2 (4%)	0 (0%)	38 (76%)	6 (12%)	4 (8%)	0 (0%)
Cleaning work area	11 (22%)	17 (34%)	21 (42%)	1 (2%)	43 (86%)	4 (8%)	3 (6%)	0 (0%)	44 (88%)	6 (12%)	0 (0%)	0 (0%)
P. value	**0.000**											

This table illustrate that near half (46%) of study group have poor knowledge about dealing with blood spots, this poor knowledge was decreased to (4%) in follow up phase. Concerning changing linens there was clear increase in study group of good knowledge from (8%) pretest to (76%) in post test2after intervention. The table clarified that there was marked decrease of study group poor knowledge regarding dealing with working environment from (42%) pretest to (0%) in post test2of program.

Figure (6) disterbution of the study group knowledge about viting of pediatric ward



	Allowed	Limited	Restricted	Don't know
Pre test	14%	70%	16%	0%
Post test 1	10%	76%	14%	0%
Post test 2	8%	80%	12%	0%

N = 50

This figure shows that most (70%) of study group knows that visits should be limited before intervention, this level of knowledge increased to (80%) after implementation of program. In other hand the knowledge of allowing visit is decreased from (14%) pre test to (8%) in post test2.

Table (14) KNOWLEDGE OF THE STUDY GROUP REGARDING SCOPE OF A SEPTIC METHODS

N = 50	Pre test				Post test 1				Post test 2			
	Good	*Sufficient*	*Poor*	*Don't know*	*Good*	*Sufficient*	*Poor*	*Don't know*	*Good*	*Sufficient*	*Poor*	*Don't know*
Contamination	8 (16%)	14 (28%)	19 (38%)	9 (18%)	36 (72%)	7 (14%)	3 (6%)	4 (8%)	42 (84%)	5 (10%)	1 (2%)	2 (4%)
Cleaning	12 (24%)	15 (30%)	18 (36%)	10 (20%)	36 (72%)	8 (16%)	6 (12%)	0 (0%)	45 (90%)	4 (8%)	1 (2%)	0 (0%)
Methods of disinfection	10 (20%)	27 (54%)	11 (22%)	2 (4%)	37 (74%)	11 (22%)	2 (4%)	0 (0%)	42 (84%)	8 (16%)	0 (0%)	0 (0%)
Efficiency of disinfection	3 (6%)	21 (42%)	16 (32%)	10 (20%)	28 (56%)	10 (20%)	7 (14%)	10 (20%)	33 (66%)	9 (18%)	6 (12%)	2 (4%)
Type of sterilization	5 (10%)	24 (48%)	12 (24%)	9 (18%)	39 (78%)	7 (14%)	4 (8%)	0 (0%)	41 (82%)	7 (14%)	2 (4%)	0 (0%)
Mean of knowledge	**15.2 %**				**70.4 %**				**81.2 %**			
P. value	**0.000**											

This table clarified that slightly more than one third (38%) of study group have poor knowledge score about contamination before intervention, decreased to (2%) in post test2after intervention. Concerning methods of disinfection process there was clear increase in good knowledge score from (20%) before conducting program to (84%) in follow up phase. Regarding knowledge of efficiency of disinfection process there was near one third (32%) have poor knowledge, but this poor knowledge score was decreased to (12%) in post test2of program. Near quarter (24%) of study group have poor knowledge score about type of sterilization and this knowledge was decreased to (4%) in follow up phase. In other hand the overall mean of good knowledge increased from (15%) pretest to (70%) after intervention and to (81%) in follow up phase.

Table (15) knowledge of study group in pre, post test 1 and post test 2 regarding a septic technique for plastic and metal equipment's

N = 50	Pre test	Post test 1	Post test 2
Solutions used for disinfection of plastic equipment			
Dettol	20 (40%)	20 (40%)	5 (10%)
Iodine	9 (18%)	2 (4%)	2 (4%)
Normal saline	8 (16%)	0 (0%)	0 (0%)
Don't know	4 (8%)	0 (0%)	0 (0%)
P. value	0.000		
Methods used for disinfection of metal equipment			
Alcohol	15 (30%)	16 (32%)	16 (32%)
Iodine	14 (28%)	15 (30%)	14 (28%)
Electric oven	17 (34%)	19 (38%)	20 (40%)
Don't know	4 (8%)	0 (0%)	0 (0%)
P value	**0.580**		

This table illustrate that near fifth (18%) of study group aware about uses of alcohol to disinfect plastic equipment, this knowledge was increased to (86%) in post test2after intervention. Concerning knowledge about methods of disinfect metal equipment there was slight increase in study group knowledge about using electrical oven from (34%) to (38%) after intervention and post test2with no statistical significant (P= 0.580)

PART TWO

DISTRIBUTION OF STUDY GROUP PERFORMANCE ABOUT PEDIATRIC CARE

Table (16) DISTRIBUTION OF MEAN PERCENTAGE OF STUDY GROUP PERFORMANCE ABOUT NURSING PROCEDURE WHICH RELATED TO INFECTION CONTROL

Performance	*Mean percentage of pre test*	*Mean percentage of post test 1*	*Mean percentage of post test 2*
Good	15.1 %	54%	**64.3 %**
Fair	33.6 %	23.4 %	14.4 %
Poor	51.3 %	22.6 %	**21.3 %**
Total	100 %	100 %	100 %

This table illustrates that mean performance of nurses increased toward good performance from 15.1 % to 64.3 % in post test 2. Fair performance decreased from 33.6% to 14.4 % in post test 2 and poor performance was decreased from 51.3 % to 21.3 % in post test 2.

Table (17) Study group compliance to hand hygiene pre, post 1 and post 2

	Pre test	Post test 1	Post test 2
Opportunity	1200	1200	1200
Number of hand hygiene action	348	579	757
Compliance	29 %	48.2 %	60.1%

*Compliance = number of hand hygiene opportunity ÷ hand hygiene action ×100%

This table illustrates that there is noticeable increase in study group compliance regarding hand hygiene from pretest (29%) to (48%) after intervention but finally the compliance reach (60%) in follow up phase where reflect significant changes in study group behavior.

PART THREE
RELATION BETWEEN STUDIES VARIABLES
Table (18) RELATION BETWEEN PREVIOUS COURSE IN INFECTION CONTROL AND KNOWLEDGE ABOUT SCOPE OF INFECTION

N = 50	Knowledge	Previous training course in infection control			
Items		***6 month ago***	***Before one year ago***	***More than one year ago***	***Do not have training***
Chance of infection	Good	1 (2%)	0 (0%)	2 (4%)	6 (12%)
	Sufficient	1 (2%)	0 (0%)	2 (4%)	7 (14%)
	Poor	3 (6%)	0 (0%)	1 (2%)	22 (44%)
	Don't know	0 (0%)	1 (2%)	0 (0%)	4 (8%)
Ways of infection transmission in hospital	Good	1 (2 %)	0 (0%)	0 (0%)	4 (8%)
	Sufficient	1 (2 %)	0 (0%)	2 (4%)	14 (28%)
	Poor	3 (6%)	0 (0%)	3 (6%)	17 (34 %)
	Don't know	0 (0%)	1 (2%)	0 (0%)	4 (8%)
Predisposing factors of nosocomial infection	Good	0 (0%)	0 (0%)	0 (0%)	7 (14 %)
	Sufficient	2 (4%)	0 (0%)	3 (6%)	3 (6%)
	Poor	3 (6%)	0 (0%)	2 (4%)	22 (44%)
	Don't know	0 (0%)	1 (2 %)	0 (0%)	7 (14%)
Infection control measures	Good	0 (0%)	0 (0%)	2 (4%)	11 (22%)
	Sufficient	1 (2%)	0 (0%)	1 (2%)	3 (6%)
	Poor	4 (8%)	0 (0%)	2 (4%)	18 (36%)
	Don't know	0 (0%)	1 (2%)	0 (0%)	7 (14%)

This table shows that (44%) of study group those have no training course have poor knowledge about factors increase chance of infection. Also study group have poor knowledge about ways of infection transmission (34%), predisposing factor of infection (44%) and infection control measures (36%) with no statistical significant

Table (19) RELATION BETWEEN YEARS OF EXPERIENCE AND KNOWLEDGE ABOUT SCOPE OF INFECTION

N = 50	Knowledge	Years of experience			
Items		***Less than 1 year***	***2- 3 years***	***4-6 years***	***More than 6 years***
Chance of infection	Good	4 (8%)	2 (4%)	1 (2 %)	2 (4%)
	Sufficient	2 (4%)	5 (10%)	1 (2 %)	2 (4%)
	Poor	(7) 14 %	5 (10%)	4 (8%)	10 (20%)
	Don't know	1 (2 %)	1 (2 %)	1 (2 %)	2 (4%)
P value	**0.788**				
Ways of infection transmission in hospital	Good	2 (4%)	0 (0%)	1 (2 %)	2 (4%)
	Sufficient	5 (10%)	4 (8%)	2 (4%)	6 (12%)
	Poor	6 (12%)	7 (14%)	3 (6%)	7 (14%)
	Don't know	1 (2 %)	2 (4%)	1 (2 %)	1 (2 %)
P value	**0.963**				
Predisposing factors of nosocomial infection	Good	4 (8%)	1 (2 %)	0 (0%)	2 (4%)
	Sufficient	3 (6%)	1 (2 %)	1 (2 %)	3 (6%)
	Poor	5 (10%)	9 (18%)	5 (10%)	8 (16%)
	Don't know	2 (4%)	2 (4%)	1 (2 %)	3 (6%)
P value	**0.700**				
Infection control measures	Good	5 (10%)	1 (2 %)	2 (4%)	5 (10%)
	Sufficient	3 (6%)	0 (0%)	1 (2 %)	1 (2 %)
	Poor	3 (6%)	11 (22%)	4 (8%)	6 (12%)
	Don't know	3 (6%)	1 (2 %)	0 (0%)	4 (8%)
P value	**0.097**				

This table shows that (20%) those that have less than 6 years' experience in pediatric care have poor knowledge about factors increase chance of infection with no statistical significant p = 0.788. Also they have poor knowledge about ways of infection transmission (14%), predisposing factor of infection (16%). Also (22%) of study group who have (2-3 years) old have poor knowledge about infection control measures with no statistical significance p value = 0.097

Table (20) RELATION BETWEEN TAKING PREVIOUS TRAINING COURSE AND SOME NURSING PROCEDURE

N = 50	Performance	Previous training course in infection control			
Procedure s		***6 month ago***	***Before one year ago***	***More than one year ago***	***Do not have training***
Routine hand washing	Good performance	2 (4%)	0 (0%)	1 (2 %)	4 (8%)
	Fair performance	3 (6%)	1 (2 %)	2 (4%)	26 (52%)
	Poor performance	0 (0%)	0 (0%)	2 (4%)	9 (18%)
P value	**0.439**				
Inhalation therapy	Good performance	4 (8%)	0 (0%)	1 (2 %)	5 (10%)
	Fair performance	0 (0%)	0 (0%)	1 (2 %)	11 (22%)
	Poor performance	1 (2 %)	1 (2 %)	3 (6%)	23 (46%)
P value	**0.053**				
Insertion of intravenous catheter	Good performance	2 (4%)	0 (0%)	1 (2 %)	4 (8%)
	Fair performance	3 (6%)	0 (0%)	11 (22%)	1 (2 %)
	Poor performance	0 (0%)	1 (2 %)	3 (6%)	24 (48%)
P value	**0.207**				
Feeding	Good performance	3 (6%)	0 (0%)	2 (4%)	5 (10%)
	Fair performance	2 (4%)	0 (0%)	0 (0%)	16 (32%)
	Poor performance	0 (0%)	1 (2%)	3 (6%)	18 (36 %)
P value	**0.064**				

This table illustrates that (52%) of study group those have no training course in infection control have fair performance regarding hand washing with no statistical significant p value = 0.439. Also the table clarify there is poor performance regarding inhalation therapy (46%), intravenous catheter insertion (48%) and nasogastric tube feeding (36%) in those no training before with no statistical significant.

Table (21) RELATION BETWEEN YEARS OF EXPERIENCE AND SOME NURSING PROCEDURES

N = 50	Performance	Years of experience			
Procedure s		***Less than 1 year***	***2- 3 years***	***4-6 years***	***More than 6 years***
Routine hand washing	Good performance	3 (6%)	0 (0%)	0 (0%)	4 (8%)
	Fair performance	6 (12%)	9 (18%)	6 (12%)	11 (22%)
	Poor performance	5 (10%)	4 (8%)	1 (2%)	1 (2%)
P value	**0.125**				
Inhalation therapy	Good performance	3 (6%)	0 (0%)	1 (2%)	6 (12%)
	Fair performance	2 (4%)	3 (6%)	2 (4%)	5 (10%)
	Poor performance	9 (18 %)	10 (20%)	4 (8%)	5 (10%)
P value	**0.169**				
Insertion of intravenous catheter	Good performance	2 (4%)	0 (0%)	1 (2%)	4 (8%)
	Fair performance	2 (4%)	4 (8%)	2 (4%)	7 (14%)
	Poor performance	10 (20%)	9 (18 %)	4 (8%)	5 (10%)
P value	**0.229**				
N G Tube feeding	Good performance	4 (8%)	0 (0%)	0 (0%)	6 (12%)
	Fair performance	2 (4%)	5 (10%)	6 (12%)	5 (10%)
	Poor performance	8 (16%)	8 (16%)	1 (2%)	5 (10%)
P value	**0.009**				

This table represents that (22%) of study group those have experience in pediatric care more than 6 years have fair performance about hand washing with no statistical significance p value = 0.125. Also those with (2-3 years) of experience perform poorly in inhalation therapy (20%) and (20%) of those have experience less than 1 years perform poorly regarding intravenous catheter insertion. Also the table illustrates that of study group those have experience less than 2 years and (2 – 3 years) (16 %) of them done poorly regarding administering of nasogastric tube feeding with statistical significance p value = 0.009.

PART FOUR

SURVEILLANCE OF NOSOCOMIAL INFECTIONS

Table (22) NUMBER OF CHILDREN ADMISSION PER 6 MONTHS AND RATE OF NOSOCOMIAL INFECTION

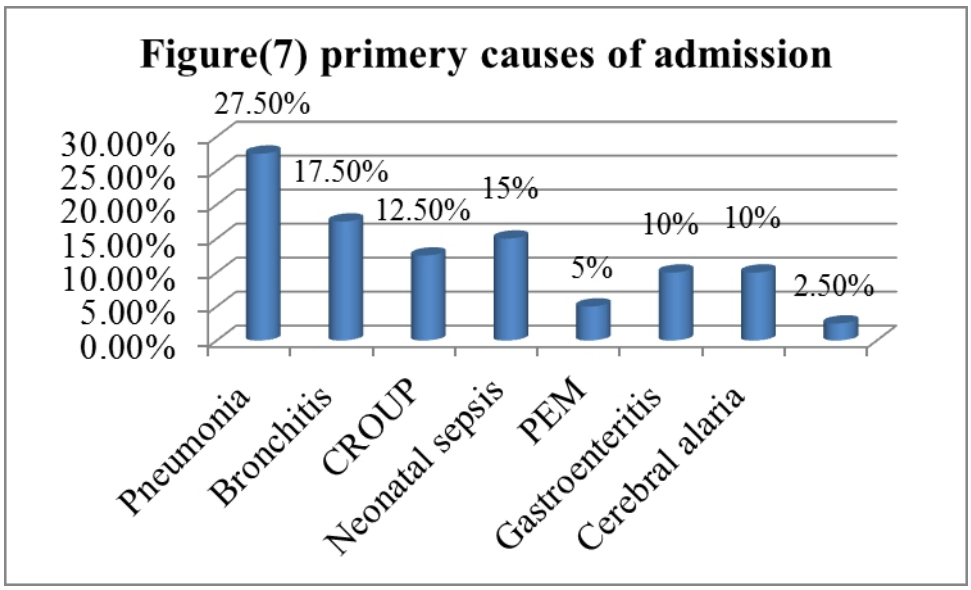
Number of admitted children *per* 6 months	5881
Number of children developed nosocomial infection *per* 6 months	40
Percentage	**0.7 %**

This table shows that (0.7%) of admitted children was develops hospital acquired infection in the period of the study.

Table (23) percentage distribution of children who develops nosocomial infection

N = 40	Frequency	Percentage
Age		
Less than one year	20	50 %
1 `– 5 years	14	35 %
More than 5 years	6	15 %
Sex		
Males	22	55 %
Females	18	45 %

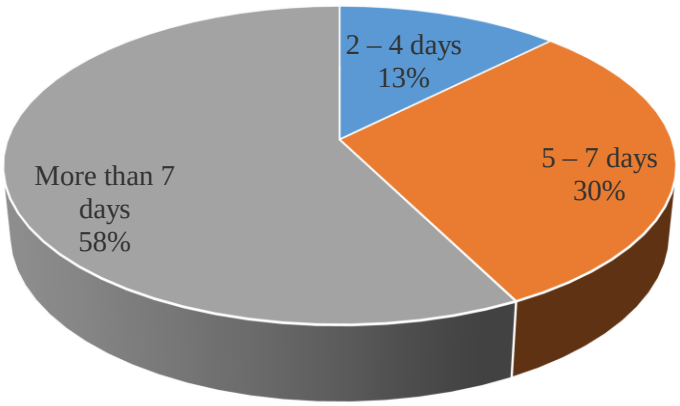
This table Illustrates that half (50 %) of children with nosocomial infection are less than one year age and more than half of them (55%) were males.



N = 40

This figure shows that more than one quarter (27.5 %) of children with nosocomial infection had pneumonia and few of them had urinary tract infection (2.5%).

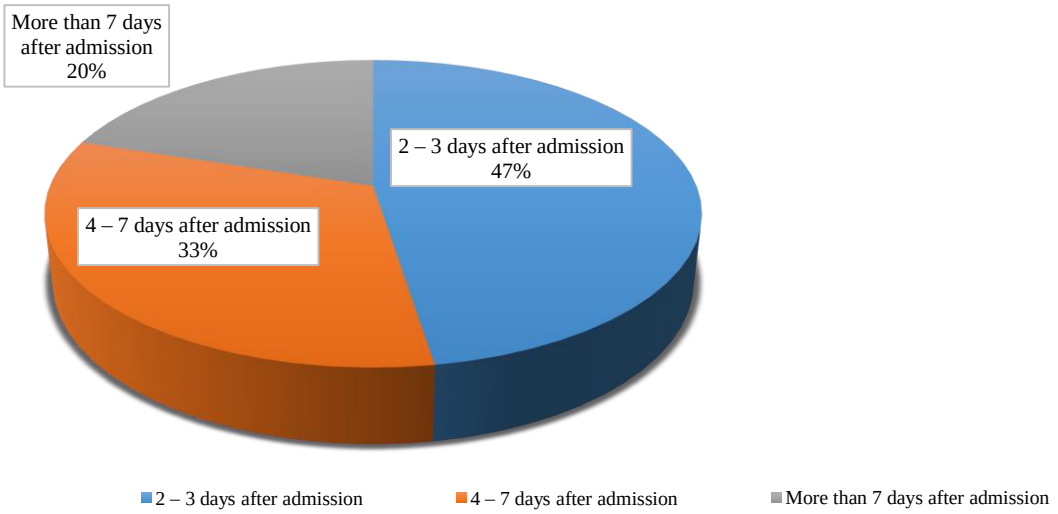
Figure (8) length of hospital stay among children



N = 40

This figure illustrates that more than half (57.5 %) of children with nosocomial infection their length of stay in hospital was more than 7 days.

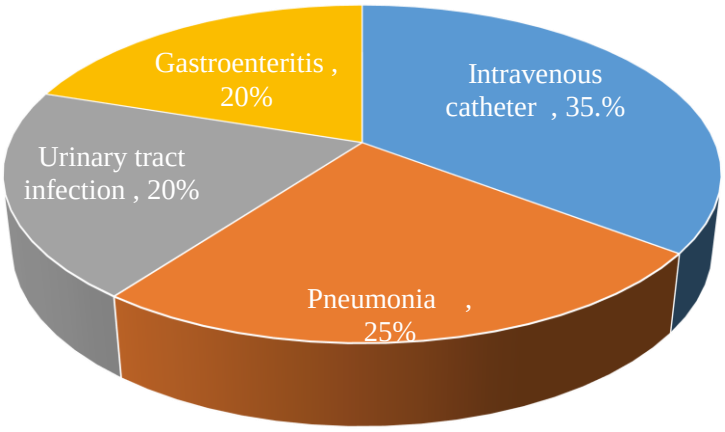
Figure (9) onset of acquiring nosocomial infection



N = 40

This figure illustrate that near half (47.5 %) of children with nosocomial infection acquires infection after two days after admission and fifth (20%) of them acquires infection after more than 7 days.

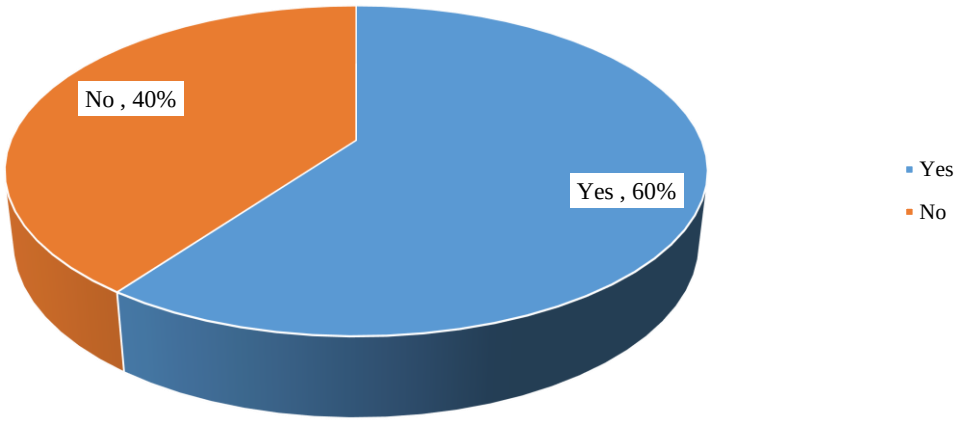
Figure (10) types of nosocomial infection acquired by children



N = 40

This figure shows (35.5 %) of children acquire intravenous catheter infection; (25 %) of them acquire nosocomial pneumonia and (20%) of them acquire urinary tract infection and gastroenteritis.

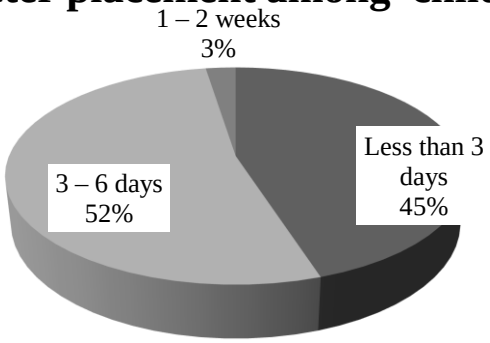
Figure (11) children transfer from ward to another wards



N = 40

This figure shows that (60%) of children transferred from ward to another ward within the hospital; (40%) were not transfer.

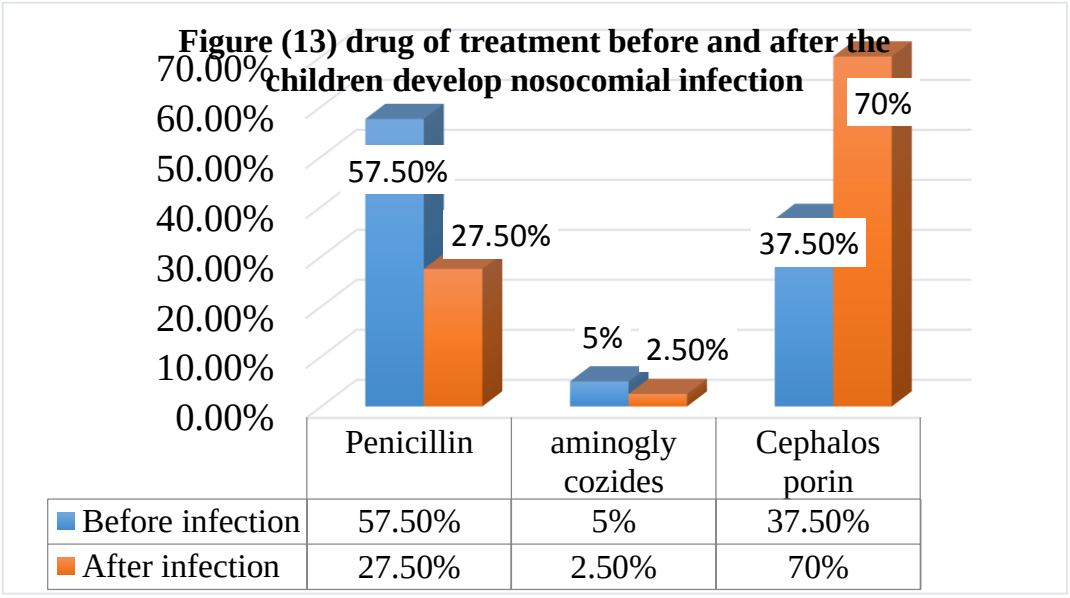
Figure (12) duration of intravenous catheter placement among children



N = 40

This figure shows that (52.5 %) of children their intravenous catheter lasted between (3 – 6 days); (45 %) lasted less than 3 days and (2.5 %) last between 1 – 2 weeks)

Figure (13) drug of treatment before and after the children develop nosocomial infection



	Penicillin	aminoglycozides	Cephalosporin
Before infection	57.50%	5%	37.50%
After infection	27.50%	2.50%	70%

Figure (13) illustrates that (57.5 %) of children treated with penicillin before acquiring infection and (37.5%) treated with cephalosporin; (5%) treated with aminoglycosides. And after infection (70%) of children treated with cephalosporin, (27.5%) treated with penicillin; and (2.5%) of them treated with aminoglycosides

5.1 Discussion

This study was conducted in kassala pediatric hospitals to evaluate impact of implementing infection control program to reduce incidence of hospital acquired infections among admitted children, the educational program was directed mainly to the nurses who provide direct care to children throughout their hospital stay.

This study involved 50 nurses where (32%) of them had experience in pediatrics care field more than 6 years. Most (72%) of them have no previous training course in pediatrics care and most of them (78%) have not attended any infection control course before, despite the fact that providing training courses for medical staff are very useful and effective for the improvement of nosocomial infection control. ***(Hiroshi Ohara. et al 2013)***

There was increase in mean of good knowledge about infection process from (19.1 %) before intervention of program to (71.1%) after implementation of program and (76.5%) on follow up with highly significant result (p value = 0.000). In light of the fact that nurses are not well aware about process of infection they do not support infection control procedures and so optimal knowledge about infection process is necessary to improve infection control measures in hospitals ***(Stein AD, et al 2003)*** and this places a major emphasis on importance of infection control educational program for nurses.

This study clarify that there was improvement of knowledge regarding clinical case identification of nosocomial pneumonia (28% to

84%) and child behavioral factors contributing to development of nosocomial pneumonia (18% to 68%) and prevention of nosocomial infection (16 to 70%) after implementation of the program and follow up phase of program; with regard to ***(Coleman R et al, 2008)*** the fact that the nosocomial pneumonia identification may depend on clinical case definition used and the study population and use of proper infection control practices such cleaning face mask before use and laying children in semirecumbent positioning during feeding are most effective in reduction of nosocomial pneumonia.

(Naomi P. et al 2011) was of the opinion that daily evaluation of catheter insertion site by palpation through the dressing to discern tenderness so dressings should be removed if the patient has clinical signs of, infection, or a malfunctioning catheter and also replace catheter site dressing if the dressing becomes damp, loosened, or visibly soiled and; and also preparation of skin with alcohol before peripheral venous catheter insertion. So all of this useful in preventing intravenous catheter infection. This study shows increase in nurses knowledge about signs and symptoms of intravenous catheter infection and indication of removing of intravenous catheter and use of proper type of antiseptic solution, where (32%) of them did not know the reasons of changing intravenous catheter before implementation of the program but this lack of knowledge was increased after implementation of the program from (8 %) and to (0%) respectively. Concerning knowledge about solution used to clean puncture site before insertion

of intravenous catheter (36%) were knowledgeable about use of alcohol and this knowledge increased after intervention to (56%) and in follow up phase to (60%). The most striking things in this study is that there was insistence from nurses to use iodine (38%) in flow up phase of program. The study shows clearance of negative attitude of nurses about using normal saline as disinfection solution (0%) in follow up phase of program.

There was acceptable change in nurses knowledge about acquired urinary tract infection in which knowledge increased concerning signs and symptoms from (16%) in assessment phase to (74%) after intervention with statistical significant result (p value = 0.000). this increase in knowledge will assist in identification of cases in surveillance process which is part of infection control procedure. There was obvious change in knowledge about un necessary use of antiseptic solution to clean urethra before insertion of urinary catheter from (10%) to (0%) after conduction of the program. Also there was an increase in awareness of nurses about measures of reducing incidence of nosocomial urinary tract infection such as hand hygiene and wear of sterile gloves before insertion of urinary catheter and method of taking urine sample and position of urine bag. Although of increasing knowledge of nurses there was obstacle of hospital policy that not allows nurses to insert urinary catheter to the children. The Centers for Disease Control and Prevention recommended practices for preventing catheter-associated urinary tract infection appropriately emphasizing

the benefits of hand hygiene, aseptic catheter insertion, and proper maintenance using a closed urinary drainage system ***(Sanjay Saint, et al 2009).*** And (***Josef. et al, 2011)*** stated that risk factors for bacteriuria are duration of catheter placement more than14 days, Lack of aseptic techniques during catheter placement and contamination of collecting bag.

Regarding hospital acquired gastroenteritis the study shows adequate improvement in nurse's knowledge about signs and symptoms of gastrointestinal infection and methods of prevention such as flushing feeding tube (P value = 0.000) respectively. Also time of changing feeding tube or syringe used to feed the children and position of children a semi recumbent position during feeding or breastfeeding ***(Coleman Rotstein et al 2008)***. The present study shows that hospital policies may contribute to implementation of nurses infection control practice because we found that role of nurses was administering feeding rather than preparing it which is the preparation is role of nutritionists and this may contribute to increase of nosocomial of infection from external source rather than nurses.

The hands of health care workers may serve as reservoirs for organisms causing health care-associated infections, including infections caused by multidrug-resistant strains; so WHO regards hand hygiene as an essential tool for the prevention of nosocomial infection, but compliance in clinical practice is often low ***(Heather A. Cook et al 2007).*** In our study there was increase in mean knowledge of nurses

regarding hand hygiene from (24.4%) before implementing the program to (81.2%) and (86.8%) after implementation of program and in follow up phase respectively. Also this study show that were mostly concerned about themselves in acquiring infections more than transmit infections to patients so they clean their hands after touching the patient (44%), touching patient surrounding (36%) and after risk of exposure to patient fluids (30%) more frequently before intervention more than cleaning their hands before touching the patient and this behavior still there after implementing the program (98%), (96%) (92%) respectively. this behavior and may lead to spread of infection easily from nurses to children.

Findings of this study shows that nurses had increased knowledge about not using gloves as substitute of hand washing after implementing the program (88%), although gloves may break the chain of infection more effectively than hand-washing or hand disinfection ***(Günter Kampf, et al 2009)***. There is possibility of tearing the gloves during providing nursing care to children and put the nurses and children in hazard of infection so gloves must be intact until the completion of the treatment and child care ***(Aron J. 1997).***

O'Boyle CA and his college's emphasize that actual hand hygiene behavior may be more sensitive to the intensity of work activity in the clinical setting than to internal motivational factors. In this study (54%) of nurses were aware that insufficient sink can be major obstacle for hand hygiene after implementation of the program and (24%) of nurses

consider lack of knowledge about hand hygiene is one cause of non-adherence to hand hygiene and forgetfulness is the least cause of non-adherence. ***Purva M, 2011*** stated that most health care institutions, adherence to recommended hand-washing practices remains unacceptably low, interactive educational programs combined with free availability of hand disinfectants significantly increased the hand hygiene compliance and a single lecture on basic hand hygiene protocols had a significant and sustained effect in enhancing hand hygiene compliance.

Changing current behavior requires knowledge of the factors that influence nurses' compliance with standard precautions. This knowledge will facilitate the implementation of programs and preventive actions that contribute in avoiding hospital acquired infection. Continuous reminders and continuous education on precautionary measures and when they should be used was also considered as an important factor for improving compliance ***(Georgios E, 2011)***. In summary the finding reflect that increase in mean of knowledge of nurses about universal precautions after implementation of program (79.5%) instead of (22.5%) before implementing the program was an effect of intensive program about universal precaution which emphasis on never to practice reusing gloves and indications of wearing gloves, gown and face mask during providing care to ill children; in spite of non-constant availability of some universal

precautions facilities in the hospitals ***(Navid Mohammadi, 2011)***. This may be reflected on their practice and providing saves care to children.

This study reflects acceptable change in nurse's knowledge regarding save injection practice as (14%) before implementing the program to (82%) after program. Education for using protective equipment is needed to reduce hospital acquired infection. Specifically, safety containers for disposal of sharps and needles should be available to and used as recommendation by all nurses. ***Navid Mohammadi, et al*** showed that education, ongoing quality improvement projects and preventive programs play a major role in augmentation of knowledge and safe behavior of health care worker including the nurses.

Regarding save work environment our study reveals marked improvement of nurse's knowledge after receiving the teaching program. Changing children linens and management of blood spots and cleaning of work area is considered key role in prevention of hospital acquired infection as stated by ***Dorothy L Moore.*** She is of the opinion that prevention of the acquisition of infection from the inanimate environment involves appropriate cleaning, disinfection and sterilization of equipment, cleaning of patient care areas, maintenance of ventilation and plumbing, and measures to protect patients from dust.

Visiting of pediatric care area are allowed but visitors; use of appropriate language and education displayed on posters and signs; source control measures such as covering the mouth/nose with a tissue

and prompt disposal of used tissues; hand hygiene after contact with respiratory secretions ***(Elaine Flanagan, et al 2012).*** In this study nurses demonstrate different levels of knowledge even after implementation of the program. Most of nurses (70%) stated that there is strong need of children to have limited visits and after implementation of the program (80%) insist on limited visiting for children with no statistical significant (P= 0.481). Hospitalization is stressful life situation for children and their parents so a visit by the family member is beneficial but should be under nurse's supervision.

Our study reflect that overall mean of knowledge of nurses regarding sterilization and disinfection process increased from (15.2%) before intervention to (70.4%) after implementing the program. this considered as a little change in knowledge because cleaning and disinfection is very important to reduce the risk of transmission of multiple drug resistant organisms. Hospitals need to standardize cleaning procedures, types of chemicals used and establish a monitoring system to assure that the patient care equipment and environment is cleaned, disinfected and stored appropriately so that patient safety is optimized. Staff should be educated on the use of the chemicals. All cleaning, disinfection and sterilization processes should comply with the CDC guidelines and healthcare workers who clean and process patient care equipment should be familiar with the basic principles for sterilization and disinfection ***(Elaine F, et al 2001).***

There are some standard skills, knowledge and attitudes that are expected from the pediatric nurses so as to provide high-quality care to the patients and their families. As a pediatric nurse, there is a wide range of care required to face child demand. Pediatric nurses are now expected to possess skills as well as knowledge in areas related to them. This study highlighted that there were gaps related to psychomotor skills nurses perform before implementing the program in pediatric hospitals including skills which are very crucial for patient; incorrect practices in pretest includes poor performance (51.3%) linked to hand hygiene, wearing gloves, administering inhalation and oxygen therapy, feeding, taking urine and blood samples, intravenous therapy practice and cleaning procedures. There is obvious improvement in performance in posttest (54%) and follow up phase (64.3%). This is in an agreement with enhanced infection control measures in routine patient care practice which should reduce transmission from all patients, including those with asymptomatic or unrecognized infections ***(Dorothy L Moore, 2001).***

The rate of hand hygiene compliance at the start of the program was low (29%), but improved after nurses received optimum knowledge and practice regarding hand hygiene (48%) and with time their compliance increased to (60%). This is due to the efforts made by the infection control program in the period of study aiming to increase awareness of the importance of hand hygiene among nurses. However, hand hygiene compliance rate was high compared to (54.1%) that

found in study conducted in Lebanon by ***(SS Kanj, etal. 2012)*** to determine the rates of healthcare-associated infections in relation with hand hygiene. Hygiene compliance rates rose slightly in constant to results found at Children's Hospital Boston, ***(Alessandra Sessa et al 2011)*** where hand hygiene compliance rose following their intervention, but the effect was transient, declining within months. This emphasizes the variability in responses to behavioral interventions, and the enormous challenges inherent in effecting sustained behavioral change.

Our study showed a significant difference in the level of knowledge and practice according to previous contact with infection control training, because nurses who have no infection control training were more likely to have poor knowledge about concept of infection control and nursing procedure linked to infection control practice compared to those nurses who have a previous training in infection control. This association may be explained by the fact that behavior learned during basic training is put into practice much more effectively than that taught in later training sessions, when established routine behavior has to be changed ***(Günter Kampf et al 2009)***.

Petra G et al recommended that senior members of nurse's staff must recognize that they have to set an example and act accordingly in front of their junior nurses, but this study shows that long years of experience in nursing field have no effect in increasing of nurses knowledge and practice regarding infection control concepts and skills

explained by the fact that more experienced nurses demonstrate poor knowledge and practice with time progress. This is an indication to hospital administrator to establish continuous professional development activities for nurses to improve their knowledge and quality of care.

Surveillance of nosocomial infection is an essential component of infection control. Surveillance permits the identification of problem infections or patient populations. The result of many researches suggest that an active infection surveillance and control program could reduce the rate of hospital acquired infections, but the surveillance is effective if results are analyzed and distributed promptly, and direct action implemented. ***(Yoo S, et al 2001), (Dorothy L Moore, 2001)***

Absence of complete and valid statistics and other supporting evidence of nosocomial infections made it difficult to generate retrospective data about prevalence of nosocomial infection in the kassala pediatric hospitals before conducting the research. This seems national problem in Sudanese hospital where there no system for reporting data on hospital infections. There was 0.7% cases of nosocomial infections detected among children in the six months following implementation of program. In international studies, incidence of nosocomial infection varied from one study to another ***(Karla Dal-Bó 2012).*** These differences can be attributed to different surveillance methods for calculating the incidence of nosocomial infection. However, international rates are slightly higher than what was found in our study and other national studies. The decreased rates

may be partially attributed to the number of hospitals included in this study, differences in work situations, size of hospital and number of beds. Comparing our result with the study done by ***(Raymond J and Aujard Y 2000)*** which indicate incidence of nosocomial infection in the general children as 1% per year, and with Global incidence of , 8.7 % in hospitalized children with nosocomial infections annually.***(Pittet et al 2000)*** in Europe show that a hospital-based series of educational programs directed at prevention of nosocomial infection including posters and performance feedback led to an decrease in hospital acquired infection rates.

During six months of active surveillance of nosocomial infections during hospitalization using a nosocomial infections surveillance tool in pediatric hospitals, the overall incidence of nosocomial infection was 0.7% in our study. The proportion of intravenous catheter infection in pediatric hospitals was (35%) and the major contributing factor was duration of placement of a peripheral catheter were (52%) of children have peripheral catheter for 3 to 6 days without replacement, and level of technical skill for placement of peripheral catheters where half (52%) of nurses had good performance even they attend infection program activities. Proportion of nosocomial pneumonia was (25%) where causes include inadequate practice of feeding with nasogastric tube where (48%) of nurses demonstrate poor performance even after implementation of program. Other contributing factors is non-adherence to hand hygiene by nurses (60%). Twenty percent (20 %) of

nosocomial infections were urinary tract infections and gastrointestinal infections respectively. Most of nosocomial gastroenteritis infection was due to prolonged stay in hospital as in this study (20%) of children stayed more than 7 days ***(Andreas Konstantopoulos, et al 2013)***

We demonstrate patient transition between hospital wards (60%). These transitions have implications for the spread of pathogens and increased the patients' risk for hospital acquired infections. ***(Lona Mody 2011), (Lorena Charrier et al 2014)***

The rate of hospital acquired infections is affected by administrative and financial factor where support is limited and that is inevitably results in limited funds and resource available to deal with infection control program. There are insufficient supplies wards are over-crowded and there is a lower nurse-to-patient ratio compared to international hospitals.

Lindsay E Nicolle suggests that sufficient staffing and their education, together with access to adequate and appropriate supplies play a corner stone in infection control.

5.2 Conclusion

- Nosocomial infection and their control are world-wide challenges.
- The final link in the chain of infection is the susceptible host.
- There was an increase in mean of good knowledge about infection control concept after implementation of the program.
- There was an increase in mean of knowledge of nurses about universal precautions after implementation of program
- Overall mean knowledge of nurses regarding sterilization and disinfection process increased after implementing the program.
- There was improvement in nurse's knowledge regarding clinical case identification and prevention of nosocomial infection.
- Nurses insisted to use iodine for decontamination of skin even after the program was implemented and the study shows clearance of negative attitude of nurses about using normal saline as disinfection solution.
- The nurses hand hygiene practice was motivated in optimum way as there was an increase in mean knowledge and practice of nurses regard handing hygiene after implementation of the program
- Nurses were concerned more about themselves from acquiring infections than transmitting infections to children.
- There was improvement in nurse's psychomotor skills that related to pediatric care.
- Standard precautions are evidence based clinical work practices that prevent transmission organism among health care setting.

- Proper hand washing has been shown to be effective in preventing the spread of infection.
- The use of gloves should never be viewed as substitute appropriate hand washing.
- Previous attendance of infection control courses increased both knowledge and practice of nurses concerning infection control procedures.
- Overall incidence rate of nosocomial infections was low compared to several international studies.
- Intravenous catheter infection was commonest followed by nosocomial pneumonia the urinary tract infections and lastly gastrointestinal tract infections.
- Nosocomial infection was related to length of hospital stay, patient transition between hospital ward and duration of placement of a peripheral catheter.

5.3 Recommendation

- Introducing infection control program to the curriculum of all nursing colleges as well as to other paramedical and technical staff training institutes.
- Updating the current nursing curriculum so as to include infection control guidelines.
- Practice pediatric care with infection control guidelines for prevention of nosocomial infection and periodically assess health care personnel adherence to guidelines.
- Activation of catch up vaccination against hepatitis B and BCG among nurses.
- Establish protocol to describe where and how their nurses should seek medical investigations and treatments after occupational exposure to body fluids, including percutaneous injury.
- Health education to nurses in hospitals and continuous medical education.
- Safety containers for disposal of sharps and needle should be available in all pediatric of wards.

- Sinks and antiseptic soaps should be available in the hospital wards and the nurse’s office with acceptable numbers.
- Implementation of hand hygiene practice as a must and routine in all health care institutions before and after dealing with patient.
- Limiting as much possible duration of hospital stay for pediatrics.
- Further studies should be conducted to overcome the limitations of this study

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Observation form of hand hygiene **Date: .....**

Opp	*Indication*		*Nurse action*		*Opp*	*Indication*		*Nurse action*	
	Before touch the child		Hand washing			Before touch the child		Hand washing	
	Before clean /aseptic procedure		Alcohol rub			Before clean /aseptic procedure		Alcohol rub	
	After touch body fluid		Gloves			After touch body fluid		Gloves	
	After child care		Missing			After child care		Missing	
	After touch child surround					After touch child surround			
Opp	*Indication*		*Nurse action*			*Indication*		*Nurse action*	
	Before touch the child		Hand washing			Before touch the child		Hand washing	
	Before clean /aseptic procedure		Alcohol rub			Before clean /aseptic procedure		Alcohol rub	
	After touch body fluid		Gloves			After touch body fluid		Gloves	
	After child care		Missing			After child care		Missing	
	After touch child surround					After touch child surround			
Opp	*Indication*		*Nurse action*		*Opp*	*Indication*		*Nurse action*	
	Before touch the child		Hand washing			Before touch the child		Hand washing	
	Before clean /aseptic procedure		Alcohol rub			Before clean /aseptic procedure		Alcohol rub	
	After touch body fluid		Gloves			After touch body fluid		Gloves	
	After child care		Missing			After child care		Missing	
	After touch child surround					After touch child surround			

Key: ***Opp***: opportunity

Nosocomial infection surveillance sheet

Pt name ……. Age …….. / Sex ……. / file number …….. / Ward …… Medical diagnosis …….. / Date of admission ……

Date of infection presence …… / date of discharge …….

Type of infection:

1. ***Chest infection:***

Tachypnea	*Fever*	*purulent sputum*	*Wheezing, rales, or rhonchi*	*Cough*

2. ***Urinary tract infection***

Dysuria	*cloudy appearance*	*urine with strong odor*	*Fever*	*Urethral redness*

3. ***Catheter related infection***

Fever	*Redness*	*pus*	*edema*

4. ***Gastrointestinal infection:***

Diarrhea	*Vomiting*	*Abdominal pain*	*abdominal cramps*

Laboratory investigation:

WBC …… other …….

1. History of previous hospital admission

   Yes ( ) no ( )
2. Date of admission …… / chronic disease ……...
3. Uses of immunosuppressive agent (cortisol)

   Yes ( ) no ( )
4. Clinical information during admission: Transfer from ward to another ward:

   Yes ( ) no ( )

- Insertion of urinary catheter:

  No ( ) yes ( ) date …….
- Insertion of intravenous cannula ……. Date ……

  Date of change intravenous cannula site ……. / …….

5. Antibiotic used for treatment …… / prophylaxis antibiotic

جامعة شندي
كلية الدراسات العليا و البحث العلمي
استبيان لتقييم معرفة الممرضات عن التحكم في العدوي المكتسبة داخل المستشفيات
اقرار

انا ..... و اعمل في قسم بكالريوس التمريض بكلية الطب و العلوم الصحية - جامعة كسلا و اقوم باجراء بحث يشمل تطبيق و تقييم برنامج تعليمي للتحكم في العدوي للممرضات لتقليل نسبة العدوي المكتسبة داخل مستشفيات الاطفال بمدينة كسلا. وأقدر كثيرا مشاركتك في هذا البحث. المعلومات التي ساقوم بجمعها منك بواسطة الاستبيانات ستساعد في تصميم سياسات للتحكم في العدوي المكتسبة داخل اقسام الاطفال.و البرنامج الذي سوف تتلقاه سوف يساهم في زيادة معلوماتك مما يتيح لك الفرصة للتعرف علي كيفية وقاية نفسك و الطفل المريض من العدوي المكتسبة داخل المستشفيات . ويأخذ الاستبيان ما يقرب ال 30 دقيقة لاستكماله. ستبقى المعلومات التي ستكتبها سرية و إجاباتك لن تكشف لاي شخص غير الباحث و لن يتم تقاسم أي من إجاباتك مع اي شخص داخل المستشفي او خارجها. وانه بمشاركتك ستكون احد المتطوعين والذين يشملهم البحث وعددهم حوالي ..... مشارك. انت لست مرغما علي أن تشارك في هذا البحث.

هل لديك أي أسئلة حول البحث و البرنامج؟
اسم ورقم الباحث.....
اوافق ( ) لا اوافق ( )

اولا: المعلومات الديموغرافية:

1. **العمر:**
أ. اقل من 20 سنة ( ) ب. 21 – 30 سنة ( ) ج. 31 – 40 سنة ( ) د. اكثر من 40 سنة ( )
2. **سنوات الخبرة في عنبر الاطفال:**
أ. أقل من سنة ( ) ب. 1- 3 سنوات ( ) ج. 4 – 6 سنوات ( ) د. اكثر من 6 سنوات ( )
3. **تأريخ اخر دورة تدريبية تتعلق بعناية الاطفال:**
أ. قبل 6 اشهر ( ) ب. قبل سنة ( ) ج. قبل اكثر من سنة ( ) د. لم أأخذ اي دورة تدريبية ( )
4. **تأريخ اخر دورة تدريبية عن التحكم في العدوي:**
أ. قبل 6 اشهر ( ) ب. قبل سنة ( ) ج. قبل اكثر من سنة ( ) د. لم أأخذ اي دورة تدريبية ( )
5. **إكمال جرعات لقاح التهاب الكبد الوبائي B:**
أ. اكملتها ( ) ب. لم اكملها ( ) ج . لم اتلقي اي جرعة ( )

ثانيا: المعرفة عن العدوي:

6. **تعرف العدوي بأنها:**
أ. تواجد و تكاثر الميكروبات في انسجة العائل مما يتسبب او لا يتسبب في ظهور المرض ( )
ب. تحطم و تخريب الانسجة الحيوية بواسطة الميكروبات ( )
ج. تواجد الميكروبات في الانسجة الميتة للعائل ( )
د. تواجد الميكروبات في الانسجة الحية للعائل ( ) هـ. لا اعرف ( )
7. **تتكون سلسلة العدوي من الاتي:**
أ. العائل المضيف ( ) ب. مصدر العدوي ( ) ج. طريق الانتقال ( ) د. مخرج العدوي ( )
هـ. مدخل العدوي ( ) و. المستودع ( ) ز. لا اعرف ( )

8. **مصادر العدوي تشمل الاتي:**

أ. المريض ( ) ب. مقدمو الرعاية الصحية ( ) ج. الزوار ( )

د. الادوات المستخدمة في رعاية المرضي ( ) ه. لا اعرف ( )

9. **العوامل التي تزيد من فرص العدوي:**

أ. عمر المريض ( ) ب. فترة البقاء في المستشفي ( ) ج. شدة المرض ( )

د. اذدحام المرضي ( ) ه. عدم اخذ التحصينات و اللقاحات ( ) و. لا اعرف ( )

10. **يدخل العامل المسبب للمرض للجسم عن طريق الاتي:**

أ. الجهاز الهضمي ( ) ب. الجهاز التنفسي ( ) ج. الجلد الغير سليم ( )

د. الجهاز البولي ( ) هـ. الدم ( ) و. لا اعرف ( )

11. **يخرج العامل المسبب للمرض من الجسم عن طريق الاتي:**

أ.الجهاز الهضمي ( ) ب. الجهاز التنفسي ( ) ج. الجلد الغير سليم ( )

د. الجهاز البولي ( ) ه. الدم ( ) ه. لا اعرف ( )

12. **تنتقل العدوي عن طريق الاتي:**

أ. الهواء ( ) ب. الرزاز المتطاير( ) ج. ملامسة سوائل الجسم ( ) د. الطعام ( ) ه. لا اعرف ( )

<u>ثالثا: المعرفة عن العدوي المكتسبة بالمستشفيات:</u>

13. **تعرف العدوي المكتسبة بالمستشفيات بأنها:**

أ. أي عدوي تصيب المريض خلال اي زمن اثناء دخول المريض للمستشفي ( )

ب. هي أي عدوي تصيب المريض خلال ال24 ساعة من دخوله المستشفي ( )

ج. هي أي عدوي تصيب المريض بعد 48 ساعة من دخوله المستشفي ( ) د. لا اعرف ( )

14. **ما هو المسبب الاكثر شيوعا في العدوي المكتسبة في المستشفيات؟**

أ. المستديمة النزليه Haemophilus influenza ( )

ب. السبحيات العقدية الرئوية Streptococcus pneumoniae ( )

ج. راينوفايرس Rhinovirus ( ) د. كلوستريديوم دفيسيل Clostridium difficile ( )

هـ. لا اعرف ( )

15. **أي مما يلي يعتبر من طرق الانتقال الشائعة للعدوي بين المرضى في المستشفي ؟**

أ. أيدي العاملين في الرعاية الصحية عندما لا تكون نظيفة ( ) ب.هواء المستشفى ( )

ج. تعرض المرضى لأسطح ملوثة " الأسرة، الكراسي، الطاولات والأرضيات " ( )

د. مشاركة المعدات " مثل ; السماعات، طوق المعصم لجهاز الضغط ..الخ" بين المرضى ( ) هـ. لا اعرف ( )

16. **تتمثل العوامل المؤهبة لحدوث عدوي المستشفيات في الاتي :**

أ.العمليات التمريضية التي تتطلب الدخول الي انسجة المريض ( )

ب. وجود قثطرة وريدية علي المريض "كانيولا" ( )

ج. وجود القثطرة البولية علي المريض ( )

د. توصيل المريض بالاجهزة المساعدة للتنفس ( ) هـ. لا اعرف ( )

17. **التحكم بعدوى المستشفيات يشمل الاجراءات الاتية:**

أ. تطعيم مقدمو الرعاية الصحية ( )

ب. أي شخص يعاني من التهابات جلدية يمنع من التعامل مع الأطفال ( )

ج. أي شخص يعاني من التهابات العينين يجب ان لا يتعامل مع الأطفال ( )

د. أي شخص يعاني من التهابات الجهاز التنفسي يجب ان لا يتعامل مع الاطفال ( ) هـ. لا اعرف ( )

رابعا: المعرفة عن الالتهاب الرئوي المكتسب بالمستشفيات :

18. **الاتي يعتبر من عوامل الخطر للإصابة بالالتهاب الرئوي المكتسب داخل المستشفيات:**

أ. شفط مفرزات الفم ( ) ب. استخدام الامبوباق ( ) ج. الميكروبات الموجودة علي ايدي مقدمي الرعاية الصحية ( ) د. تلوث الأجهزة المستخدمة في العناية بالجهاز التنفسي ( ) هـ. لا اعرف ( )

19. **سلوك الاطفال الذي يجعلهم عرضة للإصابة بالالتهاب الرئوي المكتسب في المستشفيات:**

أ. عدم النظافة ( ) ب. وضع الأيدي في الفم ( ) ج. كثرة اللعاب ( )
د.لعب الاطفال مع بعضهم البعض ( ) هـ. لا اعرف ( )

20. **علامات الالتهاب الرئوي هي:**

أ. السعال ( ) ب. بلغم ( ) ج. حمي ( )
د. سرعة التنفس ( ) هـ. اصوات تنفسية ( ) و. لا اعرف ( )

21. **يمكن الوقاية من الالتهاب الرئوي المكتسب بالمستشفي بالاتي:**

أ. التحصين ( ) ب. وضع الطفل في وضعية شبه الجلوس أثناء الرضاعة ( )
ج. تحضير الطعام بماء مغلي ( ) د. استخدام انبوب معدة ذو مقاس صغير ( ) هـ. لا اعرف ( )

خامسا: المعرفة عن التهابات موضع القسطرة الوريدية (الكانيولا) :

22. **عندما تقوم بتركيب القثطرة الوريدية " الكانيولا " اي من المحاليل الاتية تستخدمها لتطهير الجلد:**

ا. اليود ( ) ب. الكحول "السبيرتو" ( ) ج. محلول ملح الطعام ( ) د. لا استخدم اي محلول ( )

23. **يجب تغيير القثطرة الوريدية (الكانيولا) في الحالات الاتية ؟**

أ. احمرار مكان القثطرة الوريدية ( ) ب. الألم في مكان القثطرة الوريدية ( )
ج. تصلب الوريد ( ) د. توقف القثطرة الوريدية عن العمل ( ) هـ. لا اعرف ( )

24. **هل تقومين بملاحظة موضع القثطرة الوريدية يوميا ؟**

أ. دائما ( ) ب. غالبا ( ) ج. احيانا ( ) د. ابدا ( )

25. **علامات التهاب مكان القثطرة الوريدية (الكانيولا) هي ؟**

أ. الاحمرار في موضع القثطرة الوريدية ( ) ب. الألم حول مكان الكانيولا ( )
ج. التورم مكان القثطرة الوريدية ( ) د. لا أعرف ( )

سادسا: المعرفة عن العدوي البولية المنقولة بالمستشفيات

26. **عند تركيب القثطرة يجب ان يمسح المنطقة التناسلية باستخدام الاتي:**

أ. الكحول ( ) ب. اليود ( ) ج. محلول ملح الطعام ( ) د. لا يحتاج الي الي مسح باي مادة ( )

27. **عند تركيب القثطرة البولية يجب ارتداء الاتي:**

أ. جونتات معقمة ( ) ب. جونتات نظيفة ( ) ج. غسل الايدي فقط ( ) د. لا اعرف ( )

28. **اين يوضع كيس القثطرة البولية؟**

أ. في الارض بجانب السرير ( ) ب. يربط علي طرف السرير ( )
ج. يوضع علي الارض داخل حوض ( ) د. علي السرير ( )

29. **يتم اخذ عينه نظيفة من البول من الطفل الذي لديه قثطرة بولية كالاتي:**

أ. تؤخذ العينة بواسطة حقنة من القثطرة مباشرة ( ) ب. تؤخذ العينة بفصل القثطرة عن كيس البول ( )
ج. تؤخذ العينة عن طريق فتحة تفريغ البول ( ) د. لا اعرف ( )

30. **علامات التهاب المجاري البولية يشمل الاتي:**

أ. حرقة اثناء التبول ( ) ب. تعكير في لون البول ( ) ج. رائحة كريهة في البول ( )
د. التبول الدموي ( ) ه. لا اعرف ( ).

سابعا: المعرفة عن عدوي الجهاز الهضمي المنقولة بالمستشفيات:

31. **الفترة الزمنية التي يجب فيها تغيير أنبوب التغذية :**
أ. كل يوم ( ) ب. كل ثلاثة أيام ( ) ج. كل أسبوع ( ) لا اعرف ( )

32. **هل تمرر ماء بواسطة حقنة قبل اعطاء التغذية ؟**
أ. دائما ( ) ب. غالبا ( ) ج. احيانا ( ) د. ابدا ( )

33. **الحقنة المستخدمة في التغذية يجب تغييرها:**
أ. كل تغذية ( ) ب. كل 8 ساعات ( ) ج. يوميا ( ) د. لا أعرف ( )

34. **الوضعية التي يوضع فيها المريض عند عملية التغذية:**
أ. الجلوس ( ) ب. الاستلقاء الظهري ( ) ج. شبة الجلوس ( ) د. الاضجاع الجانبي ( )

35. **علامات عدوي الجهاز الهضمي :**
أ. الاسهال ( ) ب. الاستفراغ ( ) ج. الآم البطن ( ) د. تقلصات البطن هـ. لا اعرف ( )

ثامنا: المعرفة عن الاحتياطات القياسية لمكافحة العدوي

36. **هل تقوم بتنظيف يديك قبل ملامسة المريض؟**
أ. دائما ( ) ب. غالبا ( ) ج. احيانا ( ) د. ابدا ( )

37. **هل تقوم بتنظيف يديك قبل القيام بإجراء يستدعي التنظيف او التطهير؟**
أ. دائما ( ) ب. غالبا ( ) ج. احيانا ( ) د. ابدا ( )

38. **هل تقوم بتنظيف يديك بعد التعرض لخطر ملامسة سوائل المريض ؟**
أ. دائما ( ) ب. غالبا ( ) ج. احيانا ( ) د. ابدا ( )

39. **هل تقوم بغسل يديك بعد ملامسة المريض؟**
أ. دائما ( ) ب. غالبا ( ) ج. احيانا ( ) د. ابدا ( )

40. **هل تقوم بغسل يديك بعد ملامسة محيط المريض؟**
أ. دائما ( ) ب. غالبا ( ) ج. احيانا ( ) د. ابدا ( )

41. **الحد الأدنى من الوقت اللازم لغسل اليدين حتي يتم قتل معظم الجراثيم على اليد:**
أ. أقل من 20 ثانية ( ) ب. 20 – 40 ثانية ( )
ج. 40 – 60 ثانية ( ) د. 1- 2 دقيقة ( ) ه. لا اعرف ( )

42. **هل يمكن استخدام الجونتات كبديل عن غسل اليدين ؟**
أ. نعم ( ) ب. لا ( )

43. **أسباب عدم الالتزامك بغسل اليدين:**
أ. عدم توفر احواض غسيل كافية ( ) ب. عدم وجود الصابون ( ) ج. عدم توفر الوقت "كثرة العمل" ( )
د. النسيان ( ) هـ. نقص المعرفة بأهمية غسل اليدين ( ) و. لا يوجد خطورة في افرازات الاطفال ( )

44. **ما هي دواعي ارتداء الجونتات :**
أ. العمليات التمريضية التي قد يكون فيها التماس بالدم ( )
ب. ب. عند التعامل مع معدات المرضى التي يمكن أن تكون ملوثة ( )
ج. عند وجود جرح مفتوح بجسم الممرض ( )
د. العمليات التمريضية التي قد يكون فيها التماس بسوائل الجسم ( ) هـ. لا اعرف ( )

45. **ما هي الحالات التي تستدعي تغيير الجونتات :**
أ. بين مريض و مريض لآخر ( ) ب. إذا أصبحت متسخة ( )
ج. إذا ثقبت القفازات ( ) د. في حالة إجراء أكثر من تدخل تمريضي لنفس المريض ( ) هـ. لا اعرف ( )

46. **هل تقوم باعادة استخدام الجونتات؟**

أ. دائما ( ) ب. غالبا ( ) ج. احيانا ( ) د. ابدا ( )

47. **دواعي استعمال مريلة العمليات "الجاون" تشمل الأتي :**

أ. لحماية الجلد المكشوف من رزاز افرازات المريض ( )

ب. لمنع تلوث الثياب أثناء العمليات التمريضية ( )

ج. العمليات التمريضية التي يحتمل أن تولد رذاذ من سوائل الجسم ( )

د. اي عمليه تمريضية تتطلب التدخل الي انسجة المريض ( ) ه. لا اعرف ( )

48. **دواعي ارتداء قناع الوجه "الماسك" تشمل ما يلي :**

أ. الأنشطة الرعاية التمريضية التي يحتمل أن تولد رذاذ من سوائل جسم المريض ( )

ب.عندما يكون هناك احتمال التعرض لإفرازات الجهاز التنفسي من السعال ( )

ج. عند التعامل مع المريض المعزول ( ) د. عند التعامل مع الجروح المفتوحة ( ) ه. لا اعرف ( )

تاسعا :المعرفة عن ممارسة الحقن الآمن

49. **يجب اخذ الاتي بعين الاعتبار عن استخدام العلاج بالحقن:**

أ. استخدم الحقنة لمريض واحد فقط ( )

ب. الادوية المسحوبة مسبقا يجب كتابة الاسم و تاريخ السحب عليها ( )

ج. استخدم الأدوية تعطى عن طريق الحقن متعددة الجرعات لمريض واحد فقط ( )

د. يتم تطهير الجزء المطاطي على الفتيل متعددة الجرعات المستخدم لأكثر من مريض واحد قبل السحب. ( )

50. **يجب اخذ الاتي بعين الاعتبار عند استخدام العلاج بالمحاليل الوريدية:**

أ. استخدم حاوية المحلول الوريدي (الدرب) لمريض واحد فقط ( )

ب. استخدم حاوية محلول ملح الطعام لمريض واحد فقط ( )

ج. وصلات المحاليل الوريدية تستخدم لمريض واحد فقط ( )

د. .لا يتم ثقب حاوية المحلول الوريدي بغرض التسريب ( )

عاشرا: المعرفة عن التخلص الامن للنفايات

51. **يتم التخلص من جميع الابر والأدوات الحادة في:**

أ. في حاوية مخصصة للأدوات الحادة ( ) ب. سلة النفايات ( )

52. **الإجراء الذي تفعله إذا انسكب الدم أو سوائل الجسم على الأرض:**

أ. استخدم جونتات نضيفة للتعامل معها ( ) ب. امسحه بفوطة ورقية أو قماش ( ) ج. انظف مكان البقعة بواسطة محلول مطهر ( ) د. مناداة عامل النظافة لنظافة المكان ( )

53. **هذه العبارات صحيحة فيما يتعلق بكيفية التخلص من الأدوات الحادة :**

أ. عدم إعادة تغطية الإبر المستخدمة باليد ( )

ب. الإبر المستخدمة ينبغي عدم ثنيها باليد ( )

ج. يمكن التخلص من الإبر و الأشياء الحادة المستخدمة في حاويات مخصصة لذلك ( )

د. يجب التعامل مع الأدوات الحادة بواسطة قفازات خاصة ( )

54. **عند التعرض للإصابة بأداة حادة أو وخز الإبر ما الإجراء الذي تتخذه ؟**

أ. اضغط على موقع الإصابة مباشرة للسيطرة على النزيف ( ) ب. غسل موضع الإصابة بالماء والصابون ( )

ج. تطهير موضع الإصابة بمحلول مطهر ( ) د. تغطية موضع ا لإصابة بقطعة شاش مع لاصق ( )

55. **تتم ازالة الملايات من السرير كالاتي :**

أ. ارتداء قفازات قبل التعامل مع الملايات المتسخة ( ) ب. طي الجزء الملوث من الملايات للداخل ( )

ج. تخلص من الملايات بوضعها في أكياس بلاستيكية ( ) د. حفظ الملايات المتسخة بعيدا عن منطقة المرضي ( )

احدي عشر: المعرفة عن التعامل مع بيئة العمل:

56. **يجب علي الممرضة الالتزام بالاتي؟**

أ. تنظيف المكان الذي تجري فيه العمليات التمريضية بعد كل عملية تمريضية ( )

ب. تنظيف غرفة العمليات التمريضية نهاية كل يوم ( )

ج. تنظيف وتطهير المناطق التي يتم لمسها بصورة متكرره "الادراج مثلا ( )

د. تنظيف السطح الذي تجري فيه العمليات التمريضية بين كل مريض و اخر ( )

ثاني عشر: المعرفة عن سياسة الزيارة

57. **الزيارة إلى منطقة تنويم الأطفال يجب أن تكون ؟**

أ.مسموح بها ( ) ب. زيارة محدودة ( ) ج. ممنوعة ( ) د. لا أعرف ( )

ثالث عشر: المعرفة عن التعقيم والتطهير

58. **التلوث يعني :**

أ. وجود الكائنات الدقيقة على الاسطح ( ) ب. وجود الكائنات الدقيقة في السوائل ( )

ج. وجود الكائنات الدقيقة في الادوات ( ) د. تلف الأنسجة الحيوية عن طريق الكائنات الدقيقة ( )

ه. لا اعرف ( )

59. **عملية التنظيف يعني :**

أ. إزالة جميع الموادالغريبة من الادوات قبل التعامل معها ( ) ب. شرط أساسي قبل عملية التطهير ( )

ج. شرط أساسي قبل عملية التعقيم ( ) د. يمكن استخدامها كبديل عن التطهير ( )

60. **التطهير يعني :**

أ. ازاله الجراثيم بدون تعقيم كامل ( ) ب. تقليل عدد الجراثيم ( )

ج. يمكن استخدامه كبديل للتعقيم ( ) د. مناسب للجراثيم التي تكون ابواغ ( ) هـ. لا اعرف ( )

61. **التطهير يمكن أن يكون ب :**

أ. المواد الكيميائية ( ) ب. الغليان ( ) ج. الحرارة الجافة ( ) د. البخار ( ) هـ. لا اعرف ( )

62. **فعالية المطهرات الكيميائية تعتمد على :**

أ. درجة الحرارة ( ) ب. الزمن الذي تقضيه المادة في المطهر ( ) ج. التركيز ( )

د. عدد الكائنات الحية الدقيقة على السطح المعين ( ) ه. لا اعرف ( )

63. **طرق التعقيم هي :**

أ- باستخدام البخار "الاوتوكليف" ( ) ب. الحرارة الجافة "الحفرن الكهربائي" ( )

ج. المواد الكيميائية ( ) د.الغليان ( ) هـ. لا اعرف ( )

64. **هل تطهر قناع الوجه "الماسك" بالكحول قبل وبعد الاستخدام ؟**

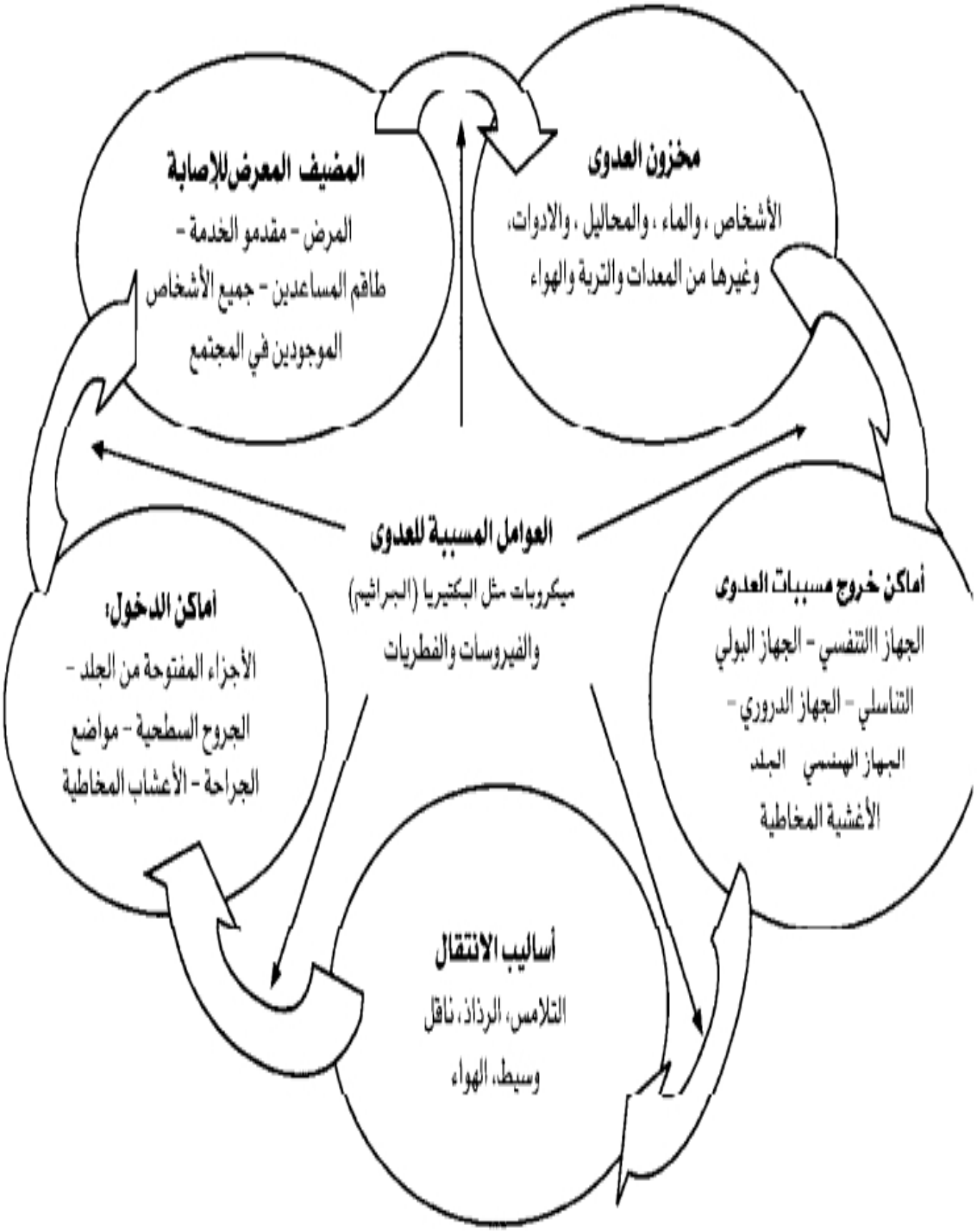
أ. دائما ( ) ب. غالبا ( ) ج. احيانا ( ) د. ابدا ( )

65. **المعدات البلاستيكية تطهر بواسطة :**

أ. الكحول ( ) ب. ديتول ( ) ج. اليود ( ) د. ملح الطعام ( ) هـ. لا أعرف ( )

66. **يجب تعقيم المعدات المعدنية بإستخدام :**

أ. الكحول ( ) ب .الأوتوكلاف ( ) ج. الفرن كهربائي ( ) هـ . لا أعرف ( )


مخزون العدوى
الأشخاص ، والماء ، والمحاليل ، والادوات،
وغيرها من المعدات والتربة والهواء
المضيف المعرض للإصابة
المرض - مقدمو الخدمة -
طاقم المساعدين - جميع الأشخاص
الموجودين في المجتمع
العوامل المسببة للعدوى
ميكروبات مثل البكتيريا (الجراثيم)
والفيروسات والفطريات
أماكن خروج مسببات العدوى
الجهاز االتنفسي - الجهاز البولي
التناسلي - الجهاز الدروري -
الجهاز الهضمي الجلد
الأغشية المخاطية
أماكن الدخول:
الأجزاء المفتوحة من الجلد -
الجروح السطحية - مواضع
الجراحة - الأعشاب المخاطية
أساليب الانتقال
التلامس، الرذاذ، ناقل
وسيط، الهواء

خطوات التنظيف اليدوي للالات

١. يتم ارتداء قفازات مطاطية شديدة التحمل ومريلة بلاستيكية وواقي للعين وقناع واقي وواقي قدم أثناء التنظيف

٢. يتم غمر الأدوات في مياه تحتوى على منظف عادي أومنظف انزيمي لمدة 5-10 دقائق ثم تشطف

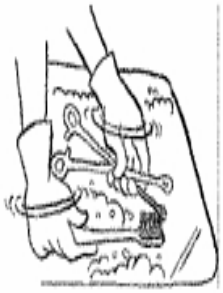
٣. دعك الأدوات بإتقان باستخدام فرشاة ناعمة والماء والمنظف مع الاحتفاظ بالأدوات تحت سطح الماء لتجنب تناثر الرذاذ كما يجب التأكد من تنظيف الثنايا والأسنان والمفصلات من بقايا المادة العضوية ويجب إدخال الماء والمنظف إلى التجاويف الداخلية للآلات ويمكن استخدام أدوات خاصة لهذا الغرض

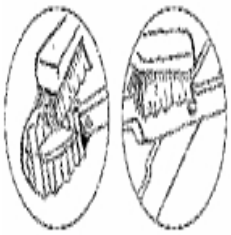
٤. يتم شطف داخل التجاويف باستخدام اندفاع الماء.

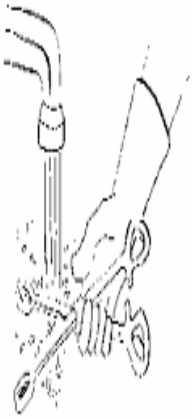
٥. يتم شطف الأدوات جيدًا بمياه دافئة نظيفة لإزالة آثار المنظف، فقد تعوق أي كميات متبقية من المنظفات عمليات التطهير أوالتعقيم، ثم يتم وضع الأدوات على صينية.

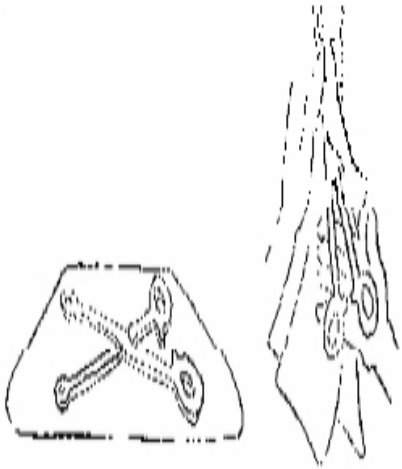
٦. يتم فحص الآلات جيدًا للتأكد من نظافتها.

٧. يتم تجفيف الآلات بمنشفة نظيفة وذلك لتجنب تخفيف محاليل التطهير.

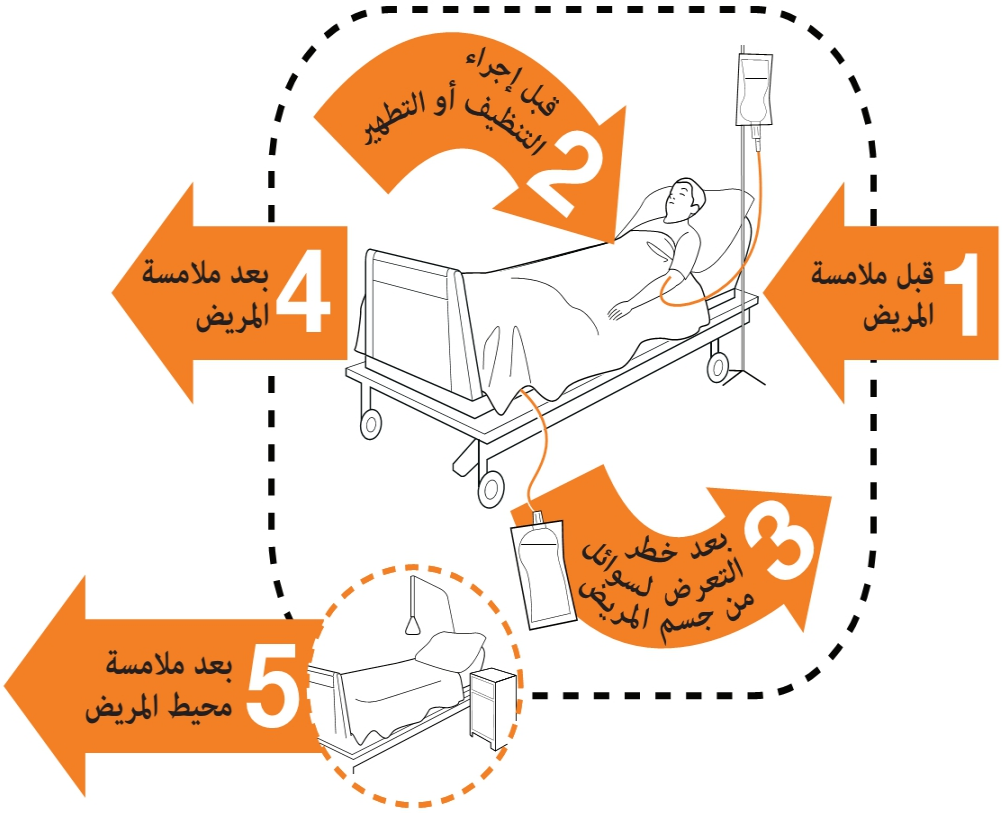








اللحظات الخمس لنظافة اليدين



1 قبل ملامسة المريض	متى؟ لماذا؟	نظف يديك عند اقترابك من المريض قبل ملامسته. لحماية المريض من الجراثيم الضارة الموجودة على يديك.
2 قبل القيام بإجراء يستدعي التنظيف أو التطهير	متى؟ لماذا؟	نظف يديك قبل القيام بإجراء يستدعي التنظيف أو التطهير مباشرة. لحماية المريض من انتقال الجراثيم الضارة إليه، بما فيها جراثيم المريض نفسه.
3 بعد التعرض لخطر ملامسة سوائل من جسم المريض	متى؟ لماذا؟	نظف يديك بعد التعرض لسوائل جسم المريض مباشرة (وبعد خلع القفازات) لحماية نفسك ومحيط تقديم الرعاية الصحية من جراثيم المريض الضارة
4 بعد ملامسة المريض	متى؟ لماذا؟	نظف يديك بعد ملامسة المريض و ما يحيط به مباشرة، عند مغادرتك محيط المريض. لحماية نفسك ومحيط تقديم الرعاية الصحية من جراثيم المريض الضارة
5 بعد ملامسة محيط المريض	متى؟ لماذا؟	نظف يديك بعد لمس أي شيء أو أي أثاث في محيط المريض المباشر، عند مغادرتك – حتى لو لم تلمس المريض. لحماية نفسك ومحيط تقديم الرعاية الصحية من جراثيم المريض الضارة

كيف تغسل يديك؟

اغسل يديك عند اتساخهما بشكل ظاهر للعيان! أو استخدم مستحضرا لفرك اليدين

مدة الإجراء من 40 إلى 60 ثانية

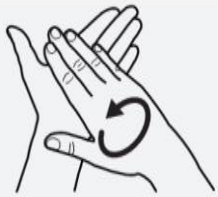
0

بلل اليدين بالماء.

1

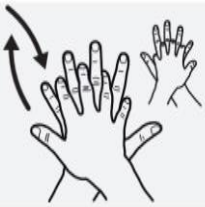
ضع مقداراً من الصابون يكفي لتغطية اليدين معاً.

2



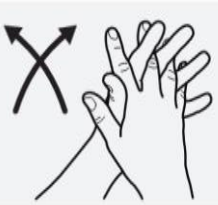
افرك اليدين بدعك الراحتين.

3



افرك ظهر اليد اليسرى براحة اليد اليمنى مع تشبيك الأصابع ثم افعل نفس الشيء باليد اليمنى.

4



خلل الأصابع وشبكهما مع فرك الراحتين.

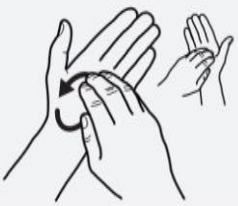
5

افرك بظهر أصابع اليد اليمنى راحة اليد اليسرى ، وظهر أصابع اليد اليسرى براحة اليد اليمنى مع قبض الأصابع.

6

افرك ظهر الكف الأيمن بإبهام اليد اليسرى بشكل دائري ثم افرك ظهر الكف الأيسر بإبهام اليد اليمنى.

7



افرك راحة اليد اليمنى بحركة دائرية إلى الخلف وإلى الأمام بحيث تشتبك أصابع اليد اليمنى براحة اليد اليسرى والعكس بالعكس.

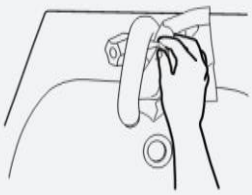
8

اشطف يديك بالماء.

9

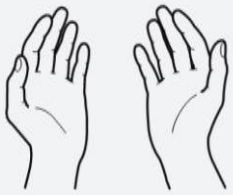
جفف اليدين جيدا بمنشفة تستخدم لمرة واحدة فقط.

10



استخدم المنشفة لغلق الصنبور.

11



ها قد أصبحت يداك آمنتين لتقديم الرعاية.

كيف تفرك يديك؟

افرك يديك لتنظيفهما ! اغسلهما عند اتساخهما بشكل ظاهر للعيان.

مدة الإجراء من 20 إلى 30 ثانية

املأ راحة إحدى يدك بالمستحضر ووزعه على كلتا اليدين.

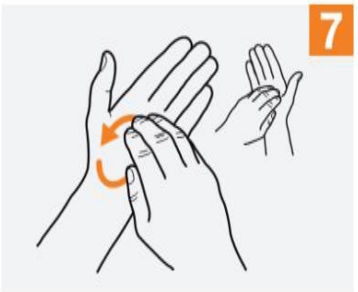
افرك اليدين بدعك الراحتين.

افرك ظهر اليد اليسرى براحة اليد اليمنى مع تشبيك الأصابع ثم افعل الشيء نفسه باليد اليمنى.

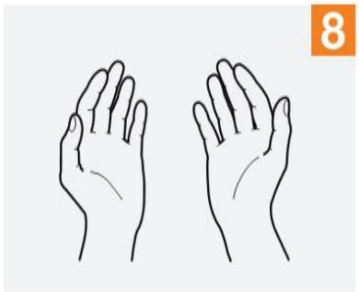
خلل الأصابع وشبكهما مع فرك الراحتين.

افرك ظهر أصابع اليد اليمنى مع راحة اليد اليسرى ، وظهر أصابع اليد اليسرى مع راحة اليد اليمنى مع قبض الأصابع.

افرك إبهام اليد اليسرى بشكل دائري براحة اليد اليمنى وكرر نفس العملية بالنسبة لإبهام اليد اليمنى.



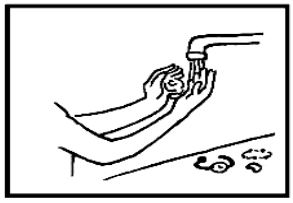
افرك اليد اليمنى بحركة دائرية إلى الخلف وإلى الأمام بحيث تشتبك أصابعها براحة اليد اليسرى والعكس بالعكس.



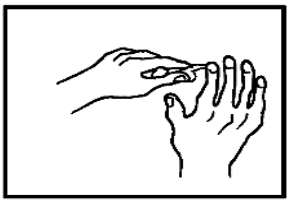
عندما تجف يدك، تصبح آمنة لتقديم الرعاية.

شكل رقم 9 خطوات غسل اليدين الجراحي

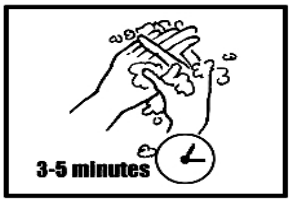
1- اخلع جميع الحلي باليدين أو المعصمين.



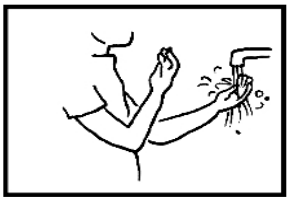
2- اضبط درجة حرارة الماء بحيث يصبح دافئاً وبلل اليدين والساعدين تماماً لمسافة 5سم فوق المرفق كي تتخلص من الأتربة والميكروبات العابرة(العالقة) فوق الجلد.



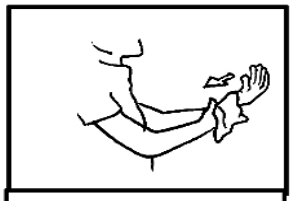
3- نظف أسفل كل ظفر من الأظافر وحول قاعدته (يمكن استخدام فرشة ناعمة عند القيام بأول غسل جراحي لليدين في أول اليوم بشرط أن تستخدم لمرة واحدة ثم يتم تعقيمها). أجعل الأظافر قصيرة ويجب عدم استخدام الأظافر الصناعية أو طلاء الأظافر.



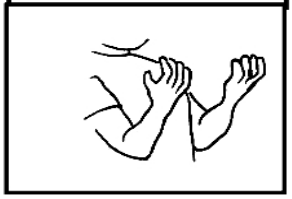
4- ضع مادة مطهرة مما سبق ذكره على اليدين والساعدين إلى المرفق مع رفع اليدين إلى أعلى فوق مستوى المرفق وبحركة دائرية، ابدأ عند أطراف الأصابع في إحدى اليدين ورغّي ثم اغسل بين الأصابع واستمر من أطراف الأصابع إلى مسافة 5 سم فوق المرفق. كرر هذه العملية باليد والذراع الأخريين. واصل الغسل لمدة 3-5 دقائق.



5- اشطف كل ذراع على حدة بدءاً بأطراف الأصابع مع رفع اليدين أعلى مستوى المرفق.

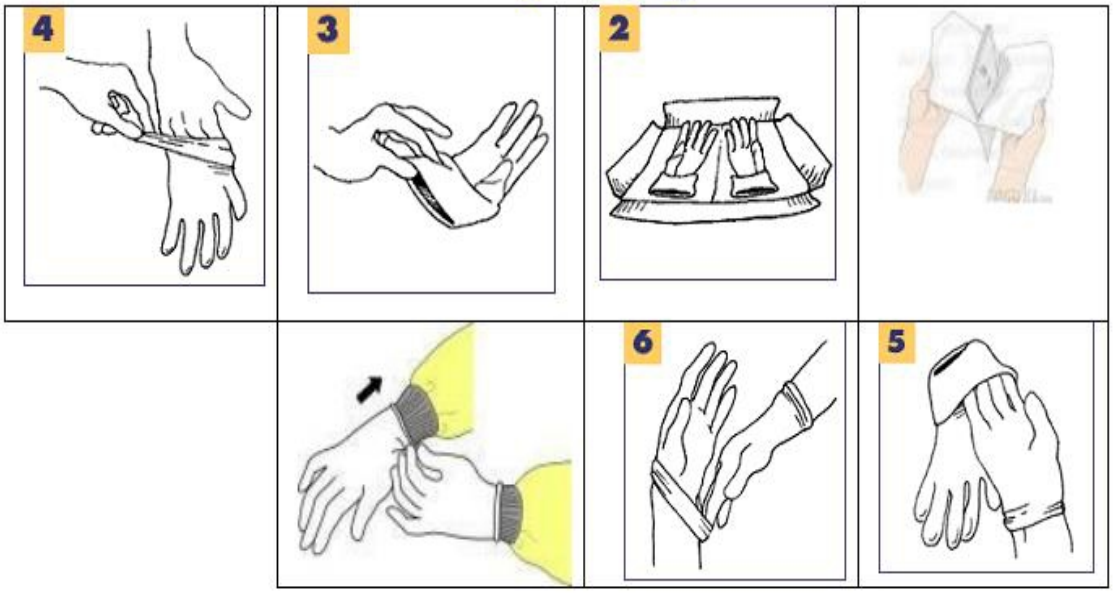


6- استخدم منشفة معقمة للتجفيف. استخدم أحد جانبي المنشفة لتجفيف إحدى اليدين والجانب الآخر من المنشفة لتجفيف اليد الأخرى.

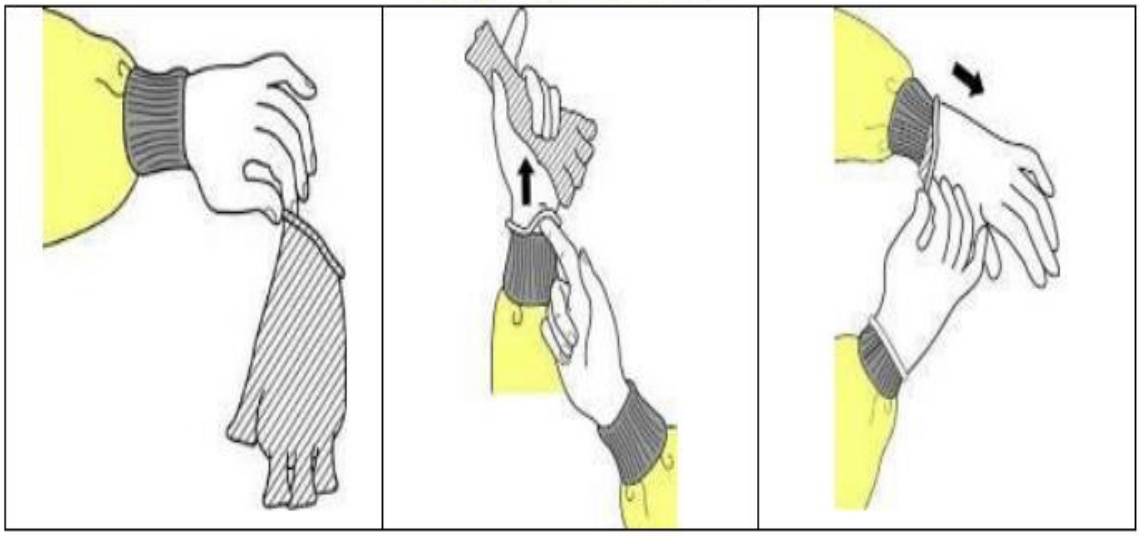


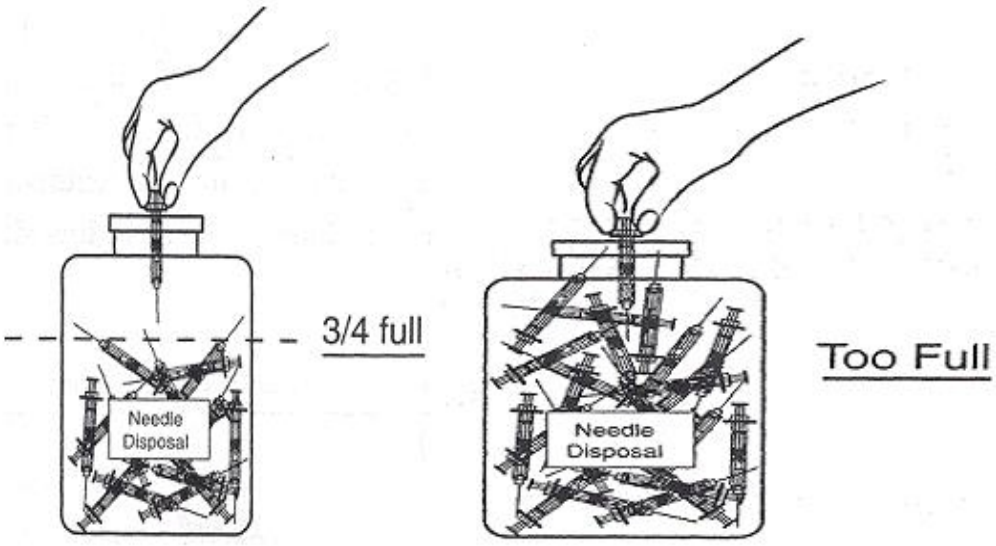
7- اجعل اليدين فوق مستوى الخصر ولا تلمس أي شئ قبل لبس الرداء المعقم والقفازات الخاصة بالجراحة.

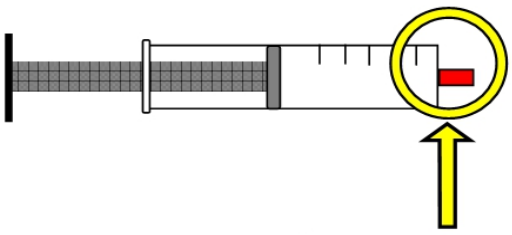
كيفية ارتداء القفازات المعقمة



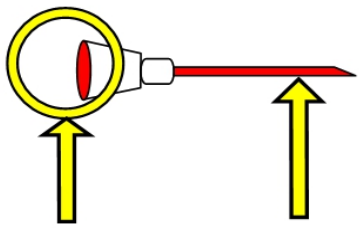
كيفية خلع القفازات الجراحية



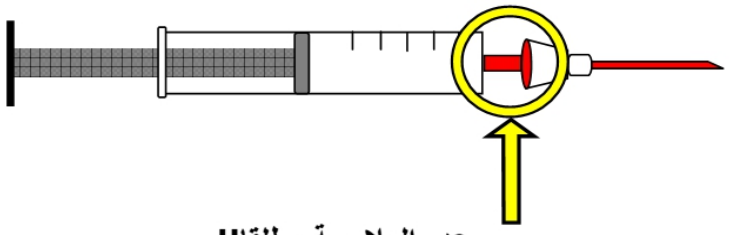




عدم الملامسة مطلقا!!



عدم الملامسة مطلقا!!



عدم الملامسة مطلقا!!

Checklist (1) Cleaning of instruments

Steps of procedure	*Good*	*Fair*	*Poor*	*Not done*
1. Wear personal protective equipment				
2. Immerse the instruments in cold water with soapy foam				
3. Clean the instrument with brush (keep instrument under level of water)				
4. Rinse the groves under running water				
5. Rinse the instrument with warm water				
6. Inspect the instrument for cleanness				
7. Dry the instrument with sterile towel or with air				
8. Remove gloves and wash hands				

Checklist (2) Prepare drum for sterilization

Steps of procedure	*Good*	*Fair*	*Poor*	*Not done*
1. Wash hands.				
2. Check the efficiency of equipment before packing.				
3. Check mechanical accuracy of the drum.				
4. Organizing gauze, sponge and dressing in separate side of the drum by using handling forceps				
5. Cover the equipment with drum liner.				
6. Open the mechanical net using side hinges.				
7. Label the drum department number of packages, date, and signature.				

Checklist (3) Hand washing check list

Steps of procedure	*Good*	*Fair*	*Poor*	*Not done*
1. Prepare needed equipment (soap & towel).				
2. Wet hands first with water.				
3. Apply the soap to hands.				
4. Rub hands together vigorously for at least 15 seconds, covering all surfaces of the hands and fingers.				
5. Rinse hands with water.				
6. Dry thoroughly with a disposable towel.				
7. Use towel to turn off the faucet.				
8. Do not touch any part of the sink.				

Checklist (4) Hand scrubbing

Steps of procedure	*Good*	*Fair*	*Poor*	*Not done*
1. Prepare needed equipment (soap & towel)				
2. Remove rings, watches, and bracelets before beginning the surgical hand scrub.				
3. Don face mask, surgical shoe covers, and other personal protective equipment				
4. Open brush, and place opened package on sink				
5. Do not touches sink with any part of the body				
6. Wet hands and arms				
7. Apply antiseptic soap, thoroughly lather, and wash the hands and arms to 2 inches above the elbows.				
8. Thoroughly rinse hands and arms, keeping hands and wrists higher than the elbows				
9. Treat your fingers, hands, and arms as four-sided objects, and scrub each section separately.				
10. Remove debris from underneath fingernails using a nail cleaner under running water.				
11. Pick up the scrub brush and wet it, and work up a lather.				
12. Scrub hands and forearms for 2–6 minutes				
13. Scrub the first hand (Start at the little finger-side or thumb-side of the hand and scrub the four sides of each digit)				
14. Scrub the palm, sides of the hand, back of the hand, and the web space between the thumb and index finger				
15. Scrub your arm in sections of three or four between the wrist and elbow.				
Switch hands and repeat.				
16. Thoroughly rinse hands and arms, keeping hands and wrists higher than the elbows				
17. Dry hands and arms using a sterile towel starting with fingers and hands and ending with arms and elbows				

Checklist (5): Alcohol hands rub

Steps of procedure	*Good*	*Fair*	*Poor*	*Not done*
1. Remove jewelry				
2. Apply a palmful of alcohol in a cupped hand, covering all surfaces;				
3. Rub hands palm to palm				
4. Rub right palm over left dorsum wit interlaced fingers and vice versa				
5. Rub palm to palm with fingers interlaced				
6. Rub backs of fingers to opposing palms with fingers interlocked				
7. Rotational rubbing of left thumb clasped in right palm and vice versa;				
8. Wait to dry hands.				

Checklist (6) Donning and removing gloves

Steps of procedure	*Good*	*Fair*	*Poor*	*Not done*
1. Remove all jewelry from hands.				
2. Peel apart outer glove wrapping, and carefully remove inner package.				
3. Place inner package on a clean, flat surface.				
4. Open package without touching gloves				
5. Grasp the cuff edge with the thumb and first two fingers of one hand				
6. Line up the thumb side of the glove with the thumb side of the other hand				
7. Touch only the glove's inside surface.				
8. Slip the glove over the fingers and thumb				
9. Ensure that the cuff edge does not fold over.				
10. With the gloved hand, slip the first two fingers underneath second glove's cuff				
11. Slip second glove over the ungloved hand.				
12. Ensure that the gloved hand does not touch any exposed skin				
13. Adjust the gloves to ensure a tight fit over the fingers and thumb.				
Removing gloves				
14. Grasp one glove at the wrist/cuff level without touching exposed skin				
15. Remove glove, turning it inside out, then discard.				
16. Take first two fingers of bare hand and tuck inside the remaining glove without touching outside of glove.				
17. Remove glove, turning it inside out, then discard.				

Checklist (7) Administer Oxygen therapy- mask

Steps of the procedure	*Good*	*Fair*	*Poor*	*Not done*
1. Gather equipment.				
2. Hand washing.				
3. Explain procedure to the child or his parent				
4. Check respiratory rate and character.				
5. Position the child should be in a sitting or semi-fowlers position.				
6. Connect tubing.				
7. Clean the face mask with antiseptic solution.				
8. Adjust the follow rate according to the order.				
9. Put the mask on child face.				
10. Ensure mask is positioned properly without leakage				
11. Instruct the child to breathe through mouth if possible				
12. Reassure the child				
13. Wash hands.				
14. Document procedure				

Checklist (8): Inhaled Drug Administration- NEUBLIZER

Steps of the procedure	*Good*	*Fair*	*Poor*	*Not done*
1. Wash hands				
2. Prepare the drug.				
3. Clean the face mask and container with alcohol swab.				
4. Put the drug into container.				
5. Assist to the child to a make comfortable position in sitting or semi-Fowler position				
6. Press ON key in nebulizer device.				
7. Put the face mask closely in way to child nose and mouth.				
8. Reassure the child				
9. Instruct the child to breath normally				
10. Wait until the whole drug is complete.				
11. Wash hands and clean container and mask.				

Checklist (9) Insertion of intravenous catheter

Steps of procedure	*Good*	*Fair*	*Poor*	*Not done*
1. Put the child in comfortable position to reduce his stress.				
2. Gather the equipment				
3. Choose the appropriate size of intravenous catheter.				
4. Put the hand/foot of child on clean towel.				
5. Hand washing.				
6. Put on non-sterile gloves.				
7. Use tourniquet on child hand (choose non dominant) / foot				
8. Clean insertion site with alcohol swab.				
9. Insert the catheter – if failed change the catheter				
10. If blood return in catheter chamber pulls out the needle and advance the catheter.				
11. Remove the tourniquet.				
12. Put sterile gauze on the insertion site.				
13. Fix the catheter with adhesive tape.				
14. Dispose the needle safely				
15. Remove gloves and wash hands				

Checklist (10): Withdrawal intravenous sample

Steps of procedure	*Good*	*Fair*	*Poor*	*Not done*
1. Wash hands.				
2. Wear clean gloves.				
3. Use tourniquet on child selected site.				
4. Clean the skin on the selected site and wait to dry.				
5. With your non dominant hand pull the skin down to stabilize the vein.				
6. Insert the needle with bevel up in 20° angle.				
7. Remove the tourniquet.				
8. Withdraw the needed amount of blood.				
9. Pull the needle out and put the dry swab on insertion site and apply pressure.				
10. Put the sample in the container				
11. Remove gloves and wash hands				

Checklist (11): Intravenous injection

Steps of procedure	*Good*	*Fair*	*Poor*	*Not done*
1. Prepare the equipment.				
2. Prepare the child in comfortable position.				
3. Hand washing				
4. Wear non sterile gloves				
5. Put on tourniquet.				
6. Choose appropriate vein.				
7. Clean the injection site with alcohol swab.				
8. Insert the needle				
9. Remove tourniquet				
10. Inject the medication slowly				
11. Slowly remove needle and put dry cotton swab on injection site				
12. Dispose the needle safely (never recap)				
13. Remove gloves and wash hand				

Checklist (12): Urine sample collection

Steps of procedure	*Good*	*Fair*	*Poor*	*Not done*
1. Wash hand				
2. Wear sterile gloves				
3. Use alcohol swab to clean the connection site of catheter with urine bag				
4. Carefully disconnect the catheter				
5. Collect the urine in sterile urine container				
6. Clean the connection area with alcohol swab.				
7. Reconnect the catheter with urine bag				
8. Remove gloves and wash hand.				

Checklist (13): Feeding with NG Tube:

Steps of procedure	*Good*	*Fair*	*Poor*	*Not done*
1. Wash hand				
2. Prepare the equipment.				
3. Prepare the patient for the feeding				
4. Don nonsterile gloves.				
5. Elevate the head of the bed to a Fowler's position in bed				
6. Check tube placement of NG Tube				
7. Aspirate and measure gastric contents to determine residual volume.				
8. Return aspirated contents to stomach				
9. Connect administration tubing to formula bag.				
10. connect the feeding tube to the NG Tube				
11. Start feeding at a slow, constant infusion rate (25 to 50 mL/hr).				
12. Keep the head of the bed elevated for 2 hours.				
13. Remove gloves and wash hands.				