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Nurses competence regarding infection control program in surgical ward in Omdurman teaching hospital, Khartoum state

*A thesis submitted in partial fulfillment for the requirement of the degree of M.Sc
in Medical Surgical nursing*

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الاية

(وَعَلَّمَ آدَمَ الْأَسْمَاءَ كُلَّهَا ثُمَّ عَرَضَهُمْ عَلَى الْمَلَائِكَةِ فَقَالَ أَنْبِئُونِي بِأَسْمَاءِ هَؤُلَاءِ إِنْ كُنْتُمْ صَادِقِينَ ﴿31﴾ قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا إِلَّا مَا عَلَّمْتَنَا إِنَّكَ أَنْتَ الْعَلِيمُ الْحَكِيمُ ﴿32﴾)

□ صرق الله العظيم

سورة البقره (31 - 32)

Dedication

This thesis is dedicated to

My great teacher and messenger, Dr. Higazi Mohammed
Ahmed

My university The Shandi University

To all members of my family specially my father, my Mather,
my husband, to all my brothers and my sisters

To all my teachers and friends

All the people in my life who touch my heart, I dedicate this
research

Acknowledgment

I acknowledge with sincerity wave words of Gratefulness and thank fullness to my supervisor, ProfessorHigazi Mohamed Ahmed and Dr.MohamedJuberEldarust. Sania Mohamed Ahmed ,ust.Amna Omer AbdElrahman

Professor Higazi for his nonstop support, helping and assisting me throughout this work, correcting advising me and direct me towards an ideal perfect work.

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Also extend my thankfulness to Shandi University

Abstract

Nurses competence regarding infection control program in surgical ward in Omdurman teaching hospital, Khartoum state

Infection Prevention and Control is a core part of an effective risk management programmer, aiming to improve the quality of patient care and the occupational health of staff. In addition to the clinical need to prevent the spread of health care associated infection, there are legal requirements to protect patients, staff and visitors from harm. Four types of infection account for more than 80 percent of all nosocomial infections: urinary tract infection (usually catheter-associated), surgical-site infection, bloodstream infection (usually associated with the use of an intravascular device), and pneumonia (Usually ventilator-associated) One fourth of nosocomial infections involve patients in intensive care units, and nearly 70 percent are due to microorganisms that are resistant to one or more antibiotics — an emerging public health crisis that is due in large part to indiscriminate use of antibiotics.

The study showed that more than half of study group in adult age ,less than tow third female ,majority of them employed and more than one third holding Nursing certificate and BSc in addition of that near the half more than 10 years' experience

Majority of them knowledgeable and good performance about hand washing and non-infectious waste managements

Less than one third satisfy knowledge to eradicating sources of infection and to responsibility of infection prevention and control, less than one third satisfy performance to wearing and removing gown, less than half satisfy performance to hand washing and done sterile gloves, less than

half poor performance to hand washing and done sterile gloves, but less than half satisfy performance to sharp waste management, more than half poor performance to wearing and removing gown.

The study recommends the following

Give practice training in hand washing

Give practice training in done sterile gloves

Apply the ward by chart and poster of how to wash hand and done gloves

Gives training in how to managements infectious waste

Apply the ward by different waste containers

Gives practice training in wearing and removing gown

Apply the wards by work facilities

ملخص الدراسة

نسبة لاهميه برنامج السيطرة على العدوى فى المستشفيات والدور الكبير الذى يلعبه التمريض فى السيطرة على العدوى تم اعداد هذا البحث لمعرفة مدى معرفة الممرض بطرق ووسائل السيطرة على العدوى ومدى تمسكه بالعمل بها . وما هى الاشياء المعيقه على التعامل على السيطرة على العدوى فى المستشفيات

السيطرة على العدوى تساعد فى حمايه المرضى بمنع او تقليل انتشار العدوى من المريض الي مريض اخر ،العاملين في المستشفى ، او الزوار . كما يمكن منع نقل العدوى من الفئات المذكورة الي المريض

هذه الدراسة اثبتت اكثر من النصف من مجموعة الدراسة من فئة الشباب – اقل من ثلثين المجموعة من فئة النساء – الاغلبية من المجموعة موظفين اكثر من الثلث منهم حملة شهادة التمريض الثانوية الفنية-واكثر من الثلث حملة بكالوريوس التمريض – اكثر من النص من المجموعه لديهم خبرة عمل عشر سنوات

اثبتت الدراسة الاغلبيه من المجموعه لديهم معرفة تامة واداء جيد في كيفية واهمية غسل الايدي – وكيفية التعامل مع النفايات الغير طبيه

اقل من الثلث متوسطي المعرفة في كيفية السيطرة على العدوى . اقل من الثلث متوسطي المعرفة في كيفية لبس والتخلص من الجونتيات – وكيفية لبس والتخلص من المريلة

اقل من النص متوسطي المعرفة والاداء في كيفية التخلص ومعالجه النفايات الطبية الحاده

الدراسة توصي بالاتي

على الجهات المختصة العمل على دورات مستمرة في كيفية واهمية غسل الايدي ، كيفية لبسالجونتيات المعقمه والتخلص منها ، كيفية التعامل مع النفايات الطبية والتخلص منها

تزويد العنابر بالبوسترات (الوسائل التوضيحية) في غسل الايدي ، لبس الجونتيات – كم يجب تزويد العنابر بسلات النفايات المختلفة (نفايات غير طبيه –نفايات معدية – نفايات طبيه حادة)

كما يجب تزويد العنابر بوسائل تسهيل العمل .

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List of Abbreviation

CDC- Center for Disease Control

DH- Department of Health

Eg – example

FFM-Face Filter Mask

GPD – General Purpose Defragent

NNIS – National Nosocomial Infection Surveillance

PPE - Personal Protective Equipment

PHE- Protective Health Equipment

SSD- Sterile Supplies Department

TB -Tuberculosis

VCJD – Variant Creutzfeldt –JacobDisease

CHAPTER ONE

- **Introduction**
- **Justification**
- **Objectives**

INTRODUCTION

Infection Prevention and Control is a core part of an effective risk management programme, aiming to improve the quality of patient care and the occupational health of staff. In addition to the clinical need to prevent the spread of health care associated infection, there are legal requirements to protect patients, staff and visitors from harm(2).

Previous arrangements outlined in a series of national guidance documents and reports (Department of Health (DH)/ Public Health laboratory Service (PHLS), 1995; DH, 2002; DH, 2003; DH, 2004a; DH, 2005; DH, 2006) have formed the basis for 'the Code' and are also reflected in this policy document. Nurses specializing in infection control are responsible for agency wide Policy development and program direction. Infection risk significantly increased as patient care equipment becomes more Complex and as more devices that disrupt naturally protective anatomic barriers are used. Staff nurses play an important role in risk reduction by paying careful attention to hand hygiene, by ensuring careful administration of prescribed antibiotics, and by following Procedures to reduce the risks associated with patient care devices each year, an estimated 2 million patients in the United States Acquire nosocomial infections while hospitalized. Approximately, 240000 additional residents of long-term care facilities become infected each year. With the anticipated growth of the elderly population, this number may increase to approximately 750,000 by 2005(2).

The nature of nosocomial infections:-

Four types of infection account for more than 80 percent of all nosocomial infections: urinary tract infection (usually catheter-associated), surgical-site infection, bloodstream infection (usually associated with the use of an intravascular device), and pneumonia

(Usually ventilator-associated) One fourth of nosocomial infections involve patients in intensive care units, and nearly 70 percent are due to microorganisms that are resistant to one or more antibiotics — an emerging public health crisis that is due in large part to indiscriminate use of antibiotics.(1)

Nosocomial infections can also be ranked according to their frequencies, associated mortality rates, costs, and relative changes in frequency in recent years.^{4,7} Catheter-associated urinary tract infections are the most frequent (accounting for about 35 percent of nosocomial infections) but carry the lowest mortality and lowest cost. Surgical-site infections are second in frequency (about 20 percent) and third in cost. Bloodstream infections and pneumonia are less common (about 15 percent each) but are associated with much higher mortality and costs. Bloodstream infections and methicillin-resistant *Staphylococcus aureus* infections share notoriety for being both the highest-cost infections and the most rapidly increasing in frequency; the current incidence of bloodstream infections is nearly three times the incidence in 1975.^{4,11} The rates of both urinary tract.(1)

PREVENTING INFECTION IN THE HOSPITAL:-

Nurses specializing in infection control are responsible for agency wide policy development and program direction. Infection risk is significantly increased as patient care equipment becomes more complex and as more devices that disrupt naturally protective anatomic barriers are used. Staff nurses play an important role in risk reduction by paying careful attention to hand hygiene, by ensuring Careful administration of prescribed antibiotics and by following procedures to reduce the risks associated with patient care devices. Each year, an estimated 2 million patients in the United States acquire nosocomial infections while hospitalized. Approximately 240, 000 additional residents of long-term care facilities become infected each year with the anticipated growth of the elderly population, this number may increase to approximately 750,000 by 2005 . The CDC estimates that

approximately one third of all nosocomial infections could be prevented with effective infection control programs. An effective program includes the following components: a program of surveillance for nosocomial infections and vigorous control efforts, at least one infection control practitioner for every 250 hospital beds, a trained hospital epidemiologist, and feedback to surgeons about individual surgical site infections. Unfortunately, many hospitals have not introduced all four required aspects, and only an estimated 9% of expected infections are prevented(1).

Justification

Infection Control — a Problem for Patient Safety:-

Nosocomial, or hospital-acquired, infections (more appropriately called health care-associated infections) are today by far the most common complications affecting hospitalized patients. Indeed, the Harvard Medical Practice Study II found that a single type of nosocomial infection — surgical-wound infection — constituted the second-largest category of adverse events.¹ Long considered the greatest risk that the hospital environment poses to patients,² nosocomial infections abruptly became the province of public health officers at the time of a nationwide epidemic of hospital-based staphylococcal infections, in 1957 and 1958.³ Since then, the study and control of nosocomial infections have been profoundly shaped by the discipline of public health, with its emphasis on surveillance and epidemiologic methods. These infections are not only the most common types of adverse events in health care; they may also be the most studied. Currently, between 5 and 10 percent of patients admitted to acute care hospitals acquire one or more infections, and the risks have steadily increased during recent decades.^{4,5} These adverse events affect approximately 2 million patients each year in the United States, result in some 90,000 deaths, and add an estimated \$4.5 to \$5.7 billion per year to the costs of patient care.^{6, 7} Infection control is therefore a critical component of patient safety. In this article I describe the common ground shared by these two disciplines. I also discuss the major problems in infection control, approaches to their solutions, the role of the National Nosocomial Infections Surveillance (NNIS) System of the Centers for Disease Control and Prevention (CDC) as a model, and the need for renewed commitment to and innovations in infection control to help ensure patient safety(2).

Objectives

General objective:--

Nurses competence regarding infection control program in surgical ward in Omdurman teaching hospital, Khartoum state

Specific objectives

- 1-To identify nurse's knowledge regarding infection control
- 2-To assess nurses practice regarding infection control
- 3-To determine nurses attitude regarding infection control

CHAPTER TWO

Literature review

Definition:-

Infection

Infection indicates a host interaction with an organism. A patient Colonized with *S. aureus* may have staphylococci on the skin without any skin interruption or irritation. If the patient had an incision, *S. aureus* could enter the wound, with an immune system reaction of local inflammation and routing of white cells to the site. Clinical evidence of redness, heat, and pain and laboratory evidence of white cells on the wound specimen smear suggest infection. In this example, the host identifies the staphylococci as foreign. Infection is recognized by the host reaction and by organism identification(6)

An infectious disease is any disease caused by the growth of pathogenic microbes in the body. It may or may not be communicable (i.e., contagious). Modern science has controlled, eradicated or decreased the incidence of many infectious diseases. However, increases in other infections, such as those caused by antibiotic-resistant organisms and emerging infectious diseases are of great concern. Examples of these types of infectious diseases are highlighted in this chapter. Other infectious diseases such as the information on tuberculosis (TB) found in It is important to understand infectious causes and treatment for contagious, serious, and common infections. Presents an overview of many infectious diseases, their causative organisms, mode of transmission, and usual incubation periods between contact and development of the first signs and symptoms (6)

The nurse has an important role in infection control and prevention activities. Educating patients may decrease their risk of becoming infected or may decrease the spread of infection. Using appropriate barrier precautions, observing prudent hand hygiene, and ensuring aseptic care of intravenous catheters and other interventional equipment also assist in reducing infections(6)

EXPLANATIONS OF TERMS USED:-

Infection -the invasion and multiplication of microorganisms in body tissues

Control -system of measures to manage an activity

Transmission (of infection) – is the transfer of infectious microorganism from one person to another (6)

INFECTION, ITS CAUSES AND SPREAD

The causes of infection:-

Microorganisms that cause infections are known as pathogens. They may be classified as follows:

Bacteria are minute organisms about one-thousandth to five thousandth of a millimeter in diameter. They are susceptible to a greater or lesser extent to antibiotics.

Viruses are much smaller than bacteria and although they may survive outside the body for a time they can only grow inside cells of the body. Viruses are not susceptible to antibiotics, but there are a few anti-viral drugs available which are active against a limited number of viruses. Pathogenic

Fungi can be either moulds or yeasts. For example, a mould which causes infections in humans is *Trichophyton rubrum* which is one cause of ringworm and which can also infect nails. A common yeast infection is thrush caused by *Candida albicans*. Protozoa are microscopic organisms, but larger than bacteria. Free-living and non-pathogenic protozoa include amoebae and paramecium. Examples of medical importance include: *Giardia lamblia*, which causes enteritis (symptoms of diarrhea).(4)

Worms are not always microscopic in size but pathogenic worms do cause infection and some can spread from person to person. Examples include: threadworm and tapeworm. Prions are infectious protein particles. All known prion

diseases affect the structure of the brain or other neural tissue and all are currently untreatable and universally fatal. Example: A prion is responsible for Creutzfeldt-Jakob disease. (4)

The spread of infection:-

A feature that distinguishes infection from all other disease is that it can be spread from one person to another. It is convenient to classify the modes of spread of infection as follows,

Direct contact: Direct spread of infection occurs when one person infects the next by direct person to person contact (e.g. chicken pox, tuberculosis, sexually transmitted infections etc.). Indirect: Indirect spread of infection is said to occur when an intermediate carrier is involved in the spread of pathogens e.g. fomite or vector. A fomite is defined as an object, which becomes contaminated with infected organisms and which subsequently transmits those organisms to another person. (4)

Examples of potential fomites are bedpans, urinals, thermometers, oxygen masks or practically any inanimate article. Crawling and flying insects are obvious examples of vectors and need to be controlled. Insect bites may cause infections such as malaria.

Hands: The hands of health and social care workers are probably the most important vehicles of cross-infection. The hands of patients can also carry microbes to other body sites, equipment and staff.

Inhalation: Inhalation spread occurs when pathogens exhaled or discharged into the
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Atmosphere by an infected person atmosphere are inhaled by and infect another person. The common cold and influenza are often cited as examples, but it is likely that hands and fomites (inanimate objects) are also important in the spread of respiratory viruses.

Ingestion: Infection can occur when organisms capable of infecting the gastrointestinal tract are ingested. When these organisms are excreted faecally by an infected person, fecal-oral spread is said to occur. Organisms may be carried on fomites, hands or in food and drink e.g. Hepatitis A, Salmonella, Campylobacter.

Inoculation: Inoculation infection can occur following a “sharps” injury when blood contaminated with, for example, Hepatitis B virus, is directly inoculated into the blood stream of the victim, thereby causing an infection. Bites from humans can also spread infection by the inoculation mode.

Splash Injury: Infection may occur through splashing of blood, body fluids, secretions or excretions into the face and eyes. **(3)**

Breaking the chain of infection-:

Breaking the chain of infection by targeting one or more links can prevent the spread of infection. This usually involves:

- eradicating the source of infection through appropriate antimicrobial therapy
- preventing the method of spread through infection prevention and control measures:

- Hand and personal hygiene;
- Use of Personal Protective Equipment;
- Environmental cleaning;
- Decontamination of equipment;
- Disposal of waste.
- Protecting the individual at risk by immunization;
- Preventing microorganisms from entering the body by:
 - using an aseptic technique when handling invasive devices or dressing wounds;
 - covering wounds and insertion sites with sterile dressing set **(3)**

Practice Staff/Care workers:-

Infection prevention and control is the responsibility of everyone working within the practice although the management of this will be shared by the management team and the designated IPC lead. All staff/care workers have a responsibility to ensure that they:

- Are aware of the location, how to access and be able to demonstrate an understanding of the practice policies on the prevention and control of infection.
- Follow the infection prevention and control policies of the practice and to work in such a way that the infection risk to service users, themselves and others is minimized.
- Receive infection prevention and control training appropriate to their role.
- Report any recurrent skin, soft tissue and other infections that may be transmittable to service users

HAND HYGIENE AND SKIN CARE:-

Hand hygiene is recognized as the single most effective method of controlling infection. The ability of transient microorganisms to transfer to and from hands with ease results in hands being extremely efficient vectors of infection. Thorough hand washing will reduce the risk of cross infection immediately.

Transient organisms are those that are not usually part of the normal flora. They are picked up during contact with individuals and the immediate environment, and are located on the surface of the skin. A social hand wash will usually remove most of these transient bacteria.

Resident flora is commonly termed commensals. They are bacteria usually found deep in the epidermis, in skin crevices, hair follicles, sweat glands and beneath fingernails. The numbers of these organisms are reduced during a surgical hand wash.

- Before and after each work shift or work break. Remove jewelry (only plain band rings **are** exempt and it must be possible to move and clean under them).
- Before and after physical contact with each client.
- after handling contaminated items such as dressings, bedpans, urinals and urine drainage bags.
- Before putting on, and after removing, PPE
- after using the toilet, blowing your nose or covering a sneeze.
- whenever hands become visibly soiled.
- Before preparing or serving food.
- before eating, drinking or handling food and before and after smoking.

The World Health Organization has implemented a process detailed as the Moments for Hand Hygiene at the point of care (WHO 2009) (5)

This approach recommends health-care workers to clean their hands

- before touching a patient
- before clean/aseptic procedures
- after body fluid exposure/risk
- after touching a patient
- after touching patient surroundings

‘Bare below the elbow’

A “Bare below the elbow” initiative has been recommended and endorsed by the Department of Health and has been widely adopted across the NHS. This requires all care workers that have direct contact with service users, their equipment and environment:

- To have short sleeves
- not to wear wrist watches, jewelers on the hands or arms other than a plain band
- To keep nails short and clean
- Not to wear artificial nails, nail polish or nail jewelers

□ Jewelry and wrist watches may become contaminated with and harbor micro-organisms, consequently care workers providing care should ensure that prior to commencing a shift all wrist and hand jewelry apart from a plain band is removed. Hand hygiene is an important part of respiratory hygiene and cough etiquette. The following measures will assist good practice –

□ When coughing, sneezing, wiping or blowing the nose, cover the nose and mouth with disposable single use tissues. Dispose of used tissues immediately into the appropriate waste stream.

□ Wash hands after coughing, sneezing wiping or blowing the nose, or after contact with respiratory secretions. (6)

Which hand wash solution?

□ Liquid soap is the preferred option for most care settings and will remove most transient organisms. Emollients are now standard in the majority of hand wash agents to reduce skin dryness.

□ Alcohol gels/ foams: Alcohol is an effective decontamination agent but should only be used on visibly clean hands. It will destroy transient bacteria and is suitable for use when other facilities are inadequate or when minimal patient contact has occurred. Alcohol gels do not destroy nor virus or Clostridium diffusiblespores and should not be used in these circumstances.

□ Antiseptic solutions are soap solutions with an antiseptic added (egchlorhexidine, povidone-iodine). They will remove the resident micro-organisms as well as the transient. They are harsh on the skin and should be reserved for surgical hand washing.

When and how to wash your hands?

Hands that are visibly soiled, or potentially grossly contaminated with dirt or organic material, must be washed with liquid soap and water, hands must be dried thoroughly following washing. Within a patient's own home/ Care Home the same

principles should apply however if facilities are not readily available then Alcohol gel can be used on a risk assessment basis.

Preparation:-

The efficacy of hand decontamination is improved if the following principles are adhered to:

- Keep nails short and pay attention to them when washing hands – most microbes on the hands come from beneath the fingernails
- Rings with ridges or stones, and wrist jewelry should not be worn, (one plain metal band is acceptable). Total bacterial counts, particularly of Gram negative bacteria, are higher when rings are worn
- Do not wear artificial nails or nail polish as they discourage vigorous hand washing. Nail polish can flake and itself become a source of contamination
- Wrist watches and bracelets should not be worn and staff must adhere to “bare below the elbow” in clinical practice.
- Cuts or abrasions must be covered with occlusive waterproof dressings.
- Cuts can provide a breeding environment for micro-organisms and also provides an entry site for infective organisms

Hand decontamination technique:-

Using soap and water (see figure 1)

- Use liquid soap
- Use warm running water Avoid splashing
- Wet the hands under running water
- Apply the soap and rub hands together vigorously to produce a visible lather over all areas of the hands including fingertips, webs of fingers, thumbs, palms and Backs of hands **(3)**
- Wash for at least 20-30 seconds Rinse under running water
- Dry thoroughly with paper towels using a “blotting” action

- do not re contaminate hands on taps or bin lids

Using alcohol gel

- Apply alcohol to clean dry hands, rub over all surfaces of hands and wrists Rub hands together covering all surfaces until hands are dry. Pay particular attention to fingertips and palms of hands.
- Use enough gel to continue this process for 20-30 seconds, gel must be dry before your hands are safe.

Surgical hand washing

Surgical hand washing destroys transient organisms and reduces resident flora before surgical or invasive procedures. An aqueous antiseptic solution is applied for two minutes. Preparations currently available are 4% chlorhexidine-detergent and 0.75% povidone/iodine solution-detergent.

This is required before minor surgery and invasive procedures.

Alternative hand preparation for minor surgery and invasive investigations using alcohol hand rub.

For areas where minor surgery or invasive procedures are performed and scrub sinks are not available, the following hand disinfection technique may be used:

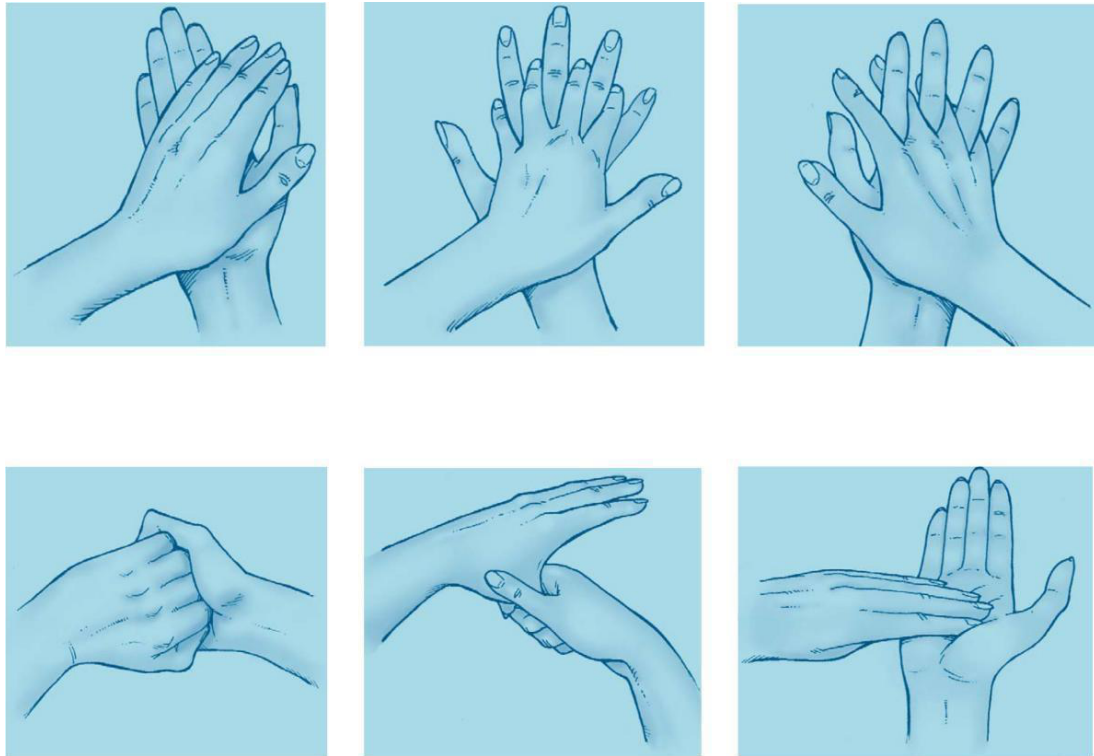
I. Ensure nails are clean. Wash hands and wrists with non-medicated liquid soap from the dispenser, rinse under running water and dry thoroughly using paper towels **(6)**

II. Apply one application of alcohol gel (see figure 1) and rub over all surfaces of hands and wrists paying particular attention to fingertips and palms of hands until the solution evaporates to dryness. This should take at least 20 seconds but it is more important that there is enough gel initially to cover all skin surfaces **(6)**

III. Repeat Step 2

For subsequent procedures in the same session it is only necessary to perform step 2 unless hands become physically contaminated. The rationale for this process is

that whilst alcohol gel is an excellent bactericidal agent, it only works on socially clean hands. Washing with soap and water first removes dirt and transient bacteria.



Use of hand creams – Communal pots of hand cream should not be used as these can become contaminated and a source of cross infection. Hand cream should be available in a wall mounted dispenser in at least one area of the Practice e.g. Staff toilets, staff rest room. These dispensers should be of the cartridge type and not refilled. Skin lesions – If staff members have lesions or skin problems on their hands the occupational health department should be consulted for advice, or their own GP. **(6)**

Use of nail brushes – Nail brushes should not be used for routine handwashing as they may abrade the skin and can become reservoirs for bacteria. Sterile or disposable nail brushes should be used where a surgical scrub may be necessary.

Hand washing facilities

Within clinical rooms, facilities should be adequate and conveniently located. Hand washing sinks must be placed in areas where needed and where patient consultations take place. All new build and refurbishments should have elbow-operated or sensor-operated mixer taps. A separate sink should be available for other cleaning purposes. (6)

- Use wall-mounted liquid soap dispensers with disposable soap cartridges - keep them clean and replenished.

- Hand wash basins should be free from plugs, with the flow of water offset from the drain.

- Disposable paper towels should be sited in wall mounted dispensers next to the basins - soft paper towels will help to avoid skin abrasions.

- Bins should be easily accessible, positioned near the hand wash basin, and of the non-touch type.

- Paper towels may be disposed of as household waste.

If undertaking refurbishments or new builds in line with Health Building Note 11-01 Project managers must ensure that the Infection Control Nurse is consulted about the requirements and relevant regulations with regard to the proposed siting and design of hand washing facilities within all healthcare premises(6)

PERSONAL PROTECTIVE EQUIPMENT (PPE):-

Selection of protective equipment must be based on an assessment of the risk of transmission of microorganisms to the patient, and the risk of contamination of the healthcare practitioners' clothing and skin by patients' blood, body fluids, secretions or excretions.

Assessment of risk (3)

High Risk	Medium Risk	Low Risk
Exposure to blood/body fluids or substances listed under COSHH regulations anticipated high risk of splashing to face	Exposure to blood/body fluids or substances listed under COSHH regulations anticipated but low risk of splashing	No exposure to blood/bodily fluids or substances listed under COSHH regulations anticipated
Wear gloves, plastic apron and eye/mouth/nose protection	Wear Gloves	No protective clothing

Types of protective clothing:-

Gloves: Worn to reduce the transmission of microorganisms between patients and staff and prevent the risks associated with blood and bodily fluids. These must be available in all clinical areas and during domiciliary visits. A risk assessment should be carried out to identify the correct glove selection.

Gloves will not prevent inoculation injuries:

Rationale	Action
For maximum effectiveness	Gloves must be worn as single use items (compliant with EU standards). They should be clean of good quality and of a good fit. They must not be reused and should be changed if you notice any defects.
They are more likely to induce an allergic reaction. In addition microorganisms may be transmitted via the powder	Powdered gloves must never be used
To prevent cross contamination and ensure effective hand hygiene	The must be put on at the point of patient care / immediately before the activity and

	removed as soon as this is complete
In the event of a needle stick injury the amount of blood inoculated will be minimized.	Gloves must be worn for invasive procedures, contact with sterile sites and non- intact skin or mucous membranes, and all activities that have been assessed as carrying a risk of exposure to blood, body fluids, secretions or excretions, or to sharp or contaminated instruments
To reduce the risk of skin contamination with microorganisms/chemicals.	Non sterile gloves: Should be used when hands are likely to come into contact with <input type="checkbox"/> body fluids or equipment contaminated with body fluids

Disposable plastic aprons: Must be worn as single use items and should be worn when there is a risk that clothing may be exposed to blood, body fluids, secretions or excretion or when caring for service users with certain infections to prevent contamination to clothing and reduce the risk of transmission of infection, this includes**(3)**

- undertaking personal care
- Carrying out or assisting with ANT, including management of wounds
- as a barrier precaution if patient identified as having an infection

They should also be worn for giving close physical care and for bed making. Plastic aprons should be worn as single-use items, for one procedure or episode of patient care, and then discarded and disposed of as clinical waste.

A separate apron should be worn for each care episode as they are designated single use items. They should be stored in a clean area (dispenser) to prevent contamination. Once the procedure has been completed the aprons must be disposed of into the appropriate waste stream. Hands must then be decontaminated. **(3)**

Removal of aprons:-

Remove the apron promptly after use by turning the outer contaminated side inward and rolling into a ball. Dispose of immediately into a pedal operated bin and wash hands.(3)

Color coding:-

It is a good idea to use different colored aprons for different types of tasks. For example, use white ones when required for clinical procedures, and another color can be worn for non-clinical procedures e.g. cleaning activities. For more information on color coding refer to section 17.5. This is especially important when the same care worker is undertaking different types of tasks.(3)

Eye protection:-

To prevent exposure to the conjunctivae to potentially infectious or harmful substances as a risk of splashing from blood, body fluids, secretions or excretions splashing into the face and eyes.

- Eye protection must be shatter resistant, a comfortable fit. They must fully cover the eyes including side shields. They must be decontaminated between uses or be identified as a single use item.
- this must be used if there is a risk of aerosol production during a procedure or there is a risk of splashing from potentially harmful substances. (3)

Face masks:

There are very few occasions when the wearing of masks is required in the community. Indication for masks include if there is a risk to staff or patients. Masks are single use and should be discarded at the end of the procedure.

- During aerosol generating procedures where there is a risk of splashing
- Specific Micro-organisms for example whilst undertaking chest physic for patients known or suspected to have active TB.
- As advised by PHE for the management of specific organisms for example the management of Pandemic Influenza.

The use of FFP3 masks (filtered masks) may in some circumstances be required practitioner must ensure these are fitted appropriately and they have undertaken the recommended training to use this product. (3)

EQUIPMENT CLEANING GUIDANCE:-

The aim of decontaminating equipment is to prevent potentially pathogenic organisms reaching a susceptible host in sufficient numbers to cause infection.(3)

SINGLE USE EQUIPMENT:-

Single use means that the manufacturer:

- intends the item to be used once and then thrown away
- Considers the item unsuitable for use on more than one occasion
- Has insufficient evidence to confirm that re-use would be safe

The Medicines and Healthcare Regulations Authority guidance advises that reprocessing and re-using such items may pose hazards for patients and staff, if the reprocessing method has not been validated.

The Consumer Protection Act 1987 will hold a person liable if a single use item is reused against the manufacturer's recommendations. Liability under this legislation continues for 10 years.

The re-use of single use products is not acceptable.

Single patient use means that the item can be reused if re-processed using an appropriate method and is used on the same patient only. The manufacturer will provide details of the appropriate method of decontamination of the device in this instance.

The duration of use is dependent upon undertaking a risk assessment of individual factors.

The Medical and Healthcare products Regulations Agency (MHRA) defines the following terms:-

Cleaning is an essential prerequisite of equipment decontamination to ensure effective disinfection or sterilization can subsequently be carried out.

Cleaning is a process which physically removes contamination but does not necessarily destroy micro-organisms. The reduction of microbial contamination cannot be defined and will depend upon many factors including the efficiency of the cleaning process and the initial bio-burden. (3)

Disinfection is a process used to reduce the number of viable micro-organisms, which may not necessarily inactivate some viruses and bacteria spores. Disinfection will not achieve the same reduction in microbial contamination levels as sterilization.

□ Sterilization is a process used to render the object free from viable micro- organisms, including spores and viruses (3)

RISK ASSESSMENT:

Re-usable equipment should be appropriately decontaminated between each patient using a risk assessment model. Use only the method advised by the manufacturer - using any other process may invalidate warranties and transfer liability from the manufacturer to the person using or authorizing the process. If you have any doubts about the manufacturer's recommendations, seek further advice.

Medical equipment is categorized according to the risk that particular procedures pose to patients. For example, items that come into contact with intact mucous membranes are classified as intermediate risk and require disinfection between each use as a minimum standard. Items that enter normally sterile body areas, or come into contact with broken mucous membranes, are classified as high risk and must be sterile before use.

Some high-risk devices cannot tolerate high temperatures, and must either be single use or disinfected between each use - for example items used in the vagina or cervix must be single use or sterilized between each use(3)

Risk assessment for decontamination of equipment:-

Suitable method	Application of item	Risk
Cleaning and drying	in contact with healthy skin e.g. stethoscopes not in contact with patient e.g. furniture	Low
Cleaning followed by disinfection or single use	in contact with intact mucous membranes contaminated with virulent or readily transmissible organisms (body fluids) prior to use on immune-compromised patients	Intermediate
Sterile at point of use, or single use	<input type="checkbox"/> in contact with a break in the skin or mucous membrane <input type="checkbox"/> or introduction into sterile body areas for example uterine sounds, instruments used for surgical/ operative procedures	High

Cleaning methods:

Cleaning is the first step in the decontamination process. It must be carried out before disinfection and sterilization to make these processes effective. Thorough cleaning is extremely important in reducing the possible transmission of all micro-organisms, including the abnormal prion protein that causes variant Creutzfeldt- Jacob disease (vCJD).

Staff must wear the appropriate personal protective clothing whilst handling and cleaning used medical devices or equipment. **(3)**

Thorough cleaning with general purpose detergent (GPD) (i.e. Hospice™) and warm water - maximum temperature 35°C - will remove many micro-organisms. Hot water should not be used as it will coagulate protein making it more difficult to remove from the equipment.

The concentration of the detergent solution must be as advised by the manufacturer. This requires that a measured amount of detergent is added to a known volume of waste **(3)**

All equipment must be thoroughly rinsed in clean water and dried using a non-shedding disposable cloth prior to use or further processing. **(3)**

Mechanical cleaning using a washer/disinfector or ultrasonic bath is recommended for cleaning surgical instruments as these processes can be validated. **(3)**

Manual cleaning of small items and surgical instruments must be undertaken in a designated sink, which is deep enough to completely immerse the items to be cleaned.

Scrubbing can generate aerosols, which may convey infective agents. Therefore if scrubbing is necessary it must be carried out with the brush and item beneath the surface of the water.

Personal protective equipment, including aprons, gloves and goggles or visors, must be readily available for staff undertaking the manual cleaning of equipment.

Cleaning equipment - such as brushes must be stored clean and dry between uses. Brushes must not be stored in disinfectant solutions. **(3)**

Disinfection methods:

Disinfection methods apply to hand washing, pre-operative skin preparation and the disinfection of medical devices or equipment. Disinfection of equipment should be limited and, where possible, disposable or autoclave able equipment used instead. If disinfection is required, use the method recommended by the manufacturer. **(3)**

Some high-risk or intermediate-risk medical devices are not able to be heat sterilized and require high level disinfection between patients uses i.e. fiber-optic endoscopes.

Any practitioner who is responsible for the decontamination of endoscopes must have separate guidelines for the local reprocessing of endoscopes. (3)

Sterilizations methods:

Sterile instruments may be obtained by:-

- purchasing pre-sterilized single use items: These avoid the need for re-sterilization and are a practical and safe method. You must store items using a stock rotation system according to Manufacturer's instructions.
- using a sterile supplies department (SSD)
- SSDs may provide a cost effective and efficient service. There should be a contract specifying the responsibilities of both parties. Since June 1998 SSDs have been bound by the Medical Devices Directive 93/42/EEC, which requires the department to have a quality system of audit and to have been assessed and validated as CE compliant.
- Local sterilization of re-usable equipment using a bench top steam sterilizer or a vacuum steam sterilizer: The National Decontamination Programme required all organizations that undertake local decontamination and sterilizations of equipment used within the NHS to achieve full compliance with a wide range of quality assurance standards by 31st March 2007 (<http://www.decontamination.nhsestates.gov.uk>).
- Any practitioner who uses a bench-top autoclave must have a policy for the local reprocessing and sterilization of re-usable medical devices. These must comply with HTM 2010, 2030 and 2031(3)

Use single-use. Use single-use	Vaginal specula Trial size caps and IUCD instruments
Clean with detergent wipes.	Keyboards
Single use only	Nail brushes
Clinic cuffs - clean with detergent wipe between patients. 24 hour monitoring cuffs – between each patient use a neutral detergent to ensure cuff is dried thoroughly	BP Cuffs
Use disposable where possible. Clients should have their own nebuliser masks, which are ‘single patient use’ these can be washed with warm water and GPD between use, store dry and change mask and tubing weekly, ‘Single use’ masks are for one use only and should not be re-used. Nebulisers which are used in the surgery or loaned to clients must be thoroughly decontaminated between patient uses. All tubing, mask, and filters should be disposed of after use, and replaced with new, disposable components before the item is used by another client. Staff must maintain a record of use (giving patient details and date of use) for each nebuliser including a record of the decontamination process detailing the date, time, cleaning method used, items replaced, and the signature and name of the member of staff responsible.	Nebulizers
For medical procedures and dressings, single use scissors must be used. Scissors used for other purposes where there is no contact with the patients’ skin or clean/sterile equipment can be cleaned with a detergent wipe	Scissors

<p>Examination couches should have a head tilt thus negating the need for pillows. If pillows are used these should be covered with a washable cover, which must be in good repair, clean with GPD solution or detergent wipes at start and finish of each session or if becomes soiled.</p>		<p>Pillows</p>
<p>Use disposable or patients own. Do not allow sharing</p>		<p>Razors – safety or electric</p>
<p>If your spirometer permits inspiration through it or through any of its parts, then the portions of the inspired pathway that are exposed to expired air, must be sterilized between tests on different patients. If the machine itself is not conducive to sterilization then you must use an exchangeable filter assembly between the mouthpiece and the equipment. Mouth pieces should be single use where possible. If re-useable mouth pieces are used, there must be an established protocol for cleaning that will prevent the transmission of disease.</p>		<p>Spirometer Cleaning</p>
<p>Single use mouthpieces Clean handpiece with disinfectant wipes between each patient</p>		<p>Peak flow meters</p>

Clean with detergent wipes between patients.	Stethoscopes
Disposable curtains must be changed every 6 months, or if visibly soiled Washable curtains must be changed every 6 months, or if visibly soiled. These must be laundered by an approved laundry supplier who is compliant with national standards	Curtains
Must be covered with a disposable cover and cleaned with neutral detergent/disinfectant wipe after each patient	Examination couches

WASTE MANAGEMENT:-

Guidelines for the safe handling and management of clinical waste General Practices have a legal responsibility to ensure that waste generated by staff employed by the organization is disposed of safely. It is essential that persons handling waste exercise care to prevent injury or transmission of infection to themselves or others. The procedures must ensure that both hazardous and non-hazardous waste is dealt with properly from the production site through to disposal in compliance with current legislation. This must be reflective of Health and Safety and COSHH policy containing information specific to the site such as where waste containers are stored, disposal routes, etc. In England and Wales, the Hazardous Waste Regulations require that most premises producing hazardous waste be notified to the Environment Agency. A few types of premises are exempt from the requirements to notify if they produce less than 500kg of hazardous waste in any period of 12 months (hazardous waste also includes televisions, computer equipment and monitors, fluorescent tubes, batteries and refrigerators. The following information is only an outline of waste management; Practices should measure their compliance against HTM 07-01 in conjunction with their agreed waste contractor.

9.1 Clinical waste is defined as any waste which consists wholly or partly of:

- Human or animal tissue
- Blood or other body fluids
- Excretions
- Drugs or other pharmaceutical products
- Swabs or dressings

- Syringes, needles or other sharp instruments; which unless rendered safe may prove hazardous or infectious to any persons coming into contact with it
- Any other waste arising from medical, nursing, dental, veterinary, pharmaceutical or similar practice, investigation, treatment, care, teaching or research, or the collection of blood for transfusion, being waste which may cause infection to any person coming into contact with it.

9.2 Hazardous/non-hazardous waste

The new national guidelines HTM07-01 further classify waste as “hazardous” and “non-hazardous” waste. (3)

Types of hazardous and non-hazardous waste:

Examples of non-hazardous waste	Examples of hazardous waste
Offensive/hygiene waste	Infectious waste
Domestic waste	Medicines
Food waste	Amalgam
Packaging	Chemicals
Recirculates (paper, glass, aluminum)	Batteries

Infectious waste has two categories for the purposes of transport legislation

- **Category A:** An infectious substance which is transported in a form that, when exposure to it occurs, is capable of causing permanent disability, life threatening or fatal disease in humans or animals. Highly infectious waste includes waste arising from exotic infectious diseases and laboratory cultures;
- **Category B:** An infectious substance which does not meet the criteria for inclusion in Category A.

Offensive waste /non-infectious waste (dressings, incontinence pads)

This is non-infectious waste arising from healthcare, which does not require specialist treatment but may cause offence to those coming into contact with it; i.e. human hygiene waste, incontinence products, sanitary waste, nappies, plaster casts etc. Where the waste products of healthcare are assessed as non-infectious; i.e. non-infectious wound dressings, incontinence pads etc. the waste should be discarded as “offensive/hygiene waste” in a yellow bag with black stripe. Some contractors may use orange bags for disposal of offensive waste. Clarity for this must be received from your waste provider. (3)

Medicinal waste has:-

Medicinal waste has two categories Cytotoxic and Medicines other than cytotoxic and cytostatic Cytotoxic waste arising from care must be placed into an appropriate yellow container with purple stripe or purple lid. Community healthcare workers involved in the administration of cytotoxic drugs should use the waste disposal

arrangements of their Trust/ Practice. If service users self-administer the cytotoxic drugs the container should be returned to the hospital or GP surgery as agreed locally.

Care workers must assess waste as it is produced to identify its infectious, chemical and medicinal properties and segregate appropriately for disposal as per national guidance.(3)

Household/domestic waste:-

- Pedal-operated bins with lids are recommended.
- Any waste that is not covered under the clinical waste groupings is classed as household domestic waste, e.g. wastepaper, cans, bottles.
- This waste must be disposed of through the normal household waste stream i.e. black bin liners or dustbins collected by the Local Authority. Where possible, recycling options should be considered.
- Household waste and clinical waste must be kept separate at all times. (3)

Reducing waste can save money and help to improve the environment:-

Disposal	Containers	Examples	Types of Waste
Hazardous waste for incineration	Yellow rigid lidded bin or bag	Anatomical waste: placenta, tissues, organs etc, and laboratory waste. Waste from highly infectious diseases, e.g. Ebola virus	Infectious waste (Category A)
Licensed or permitted treatment facility or incineration	Orange lidded bin or bag	Assess for infection Infectious dressings, swabs, bandages, pads, suction liners, stoma bags, catheter bags, plastic disposable instruments (not sharps).	Infectious waste (Category B)
Orange lidded sharps container		Not contaminated with medicinal products OR Fully discharged sharps contaminated with medicinal products (NOT cytotoxic or cytostatic medicines)	Clinical sharps

Orange lidded sharps container		Not contaminated with medicinal products OR Fully discharged sharps contaminated with medicinal products (NOT cytotoxic or cytostatic medicines)	Clinical sharps
Yellow lidded, liquid-proof sharps container.		Partially or un-discharged sharps (NOT cytotoxic or cytostatic medicines)	Clinical Sharps
Yellow bag or lidded bin with purple stripe. Yellow sharps bin with purple lid		All contaminated waste. Soft waste: including gloves, swabs, packaging etc Sharps waste: needles, syringes, ampoules etc,	Cytotoxic and cytostatic waste and sharps
Yellow bag with black stripe		Non-infectious dressings, swabs, drains, incontinence pads, suction liners, stoma bags, catheter bags, plastic disposable instruments (not sharps).	Offensive/ hygiene waste

Yellow rigid lidded box for liquids or solids		Unused drugs and other pharmaceutical products. Never discard them into the drainage system. Controlled drugs: comply with local procedures.	Medicines (Not cytotoxics or cytostatic)
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CHAPTER THREE

Methodology

Chapter Three

Methodology

Study design descriptive crosssectional study and observational study .don during the period of four weeks from march _ September

Study area:-

Omdurman is the second largest city in Sudan and Khartoum state, lying on the western banks of the river Nile opposite the capital Khartoum. Omdurman has a population of 2.395-159 (2008) and is the national center of commerce with Khartoum and Khartoum north or bahri, it from the culture and industrial heart of nation

Study setting:-

Omdurman Teaching Hospital is biggest public hospital in Omdurman city consist of different departments clinical emergency department , medicine department, surgical department , pediatric surgery , ENT , Operating Room , ICU , Endoscope department , X-Ray department , Blood Bank , Laboratory , Dental clinic , Pharmacy , Private department lectures Howl ,

Surgical department divided into five wards of males consist of 116 beds. And five wards of females consist of 120 beds. The method of work divided into two shift morning and afternoon night

Population: -

All nurses worker in Omdurman Teaching Hospital have involve study exclusion National service and student under trainee

Sampling and sample size:-

A-sampling technique: simple random sample technique the followed formula used

$$N = \frac{PQ}{E} \left(Z \right)^2$$

N=sample size

P=population percentage

Q=completed percentage

Z=deviation degree =1.96

E=missing =0.05

Sample size

(70) Nurses were selected by toes

Data collection tools

a-The first tool used questionnaire:-

The tool was used questionnaire Closed end questions was developed by the recherché based on the available literature composed of twenty five divided into three part, part one consists of four demographic question ,part two and three consists of level of knowledge and performance

b-The second tool used check list observations:

-b-Observation was modified by the researcher rated by don and not do composed of (20) or (8) steps

Scoring system:-

Knowledge squaring system:-

According to the anther percentage

1-Knowledge 70% and more

2- Satisfy 50% and more

3- Poor knowledge less than 50%

If the participate answer more than 75 is knowledgeable, if answer 60-74 very good knowledge or satisfy, if answer 50-59 good knowledge, less than 50 power knowledge

And good performance or poor through the check list

Data collection technique:-

Data collected in four weeks during the post of the shift and after noon shift during the rest time with verbal consent was taken .Every participant was allow to simple fill and allow chance for refused. And nurses in holly days are excluded

The second part of collecting data by observational check list

Data management:

Data was coded .Then analysis manually by simple statistical technique then by computer soft program and exile program Then SPSS deferent statistical majors example mean, stander deviation, frequency and chi test used. Then presented in tables and figures. P value conceder significant (0.05)

Ethical consideration:-

The proposal was approved by the ethical scientific committee permeation was taken from the director of the hospital and head nurse.

Verbal permeation was taken from the nurses and there was a chance if wish refused or stop

CHAPTER FOUR

Data analysis

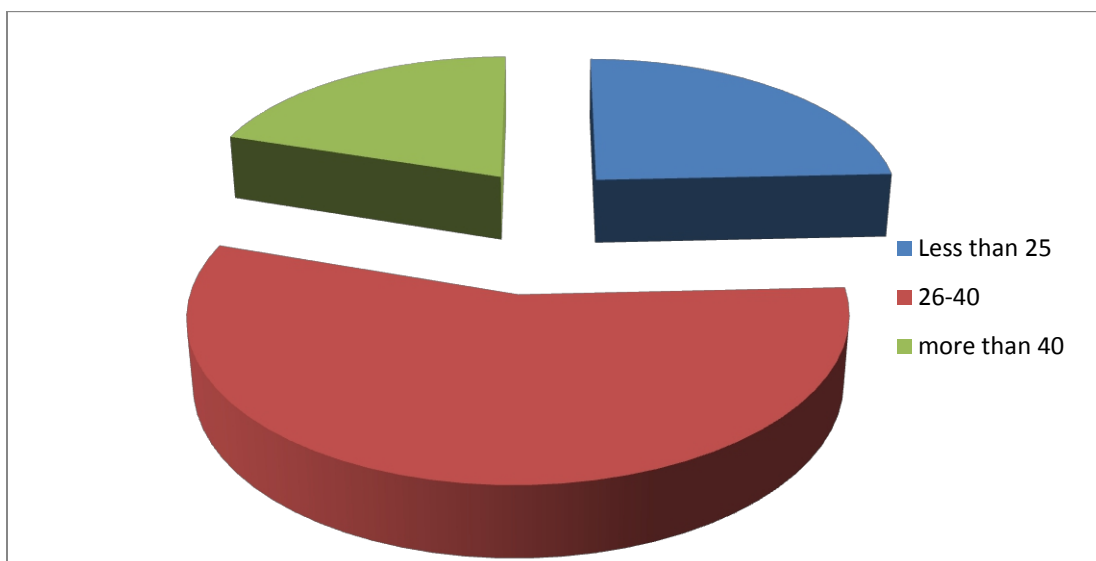


Figure (1) Age of study group

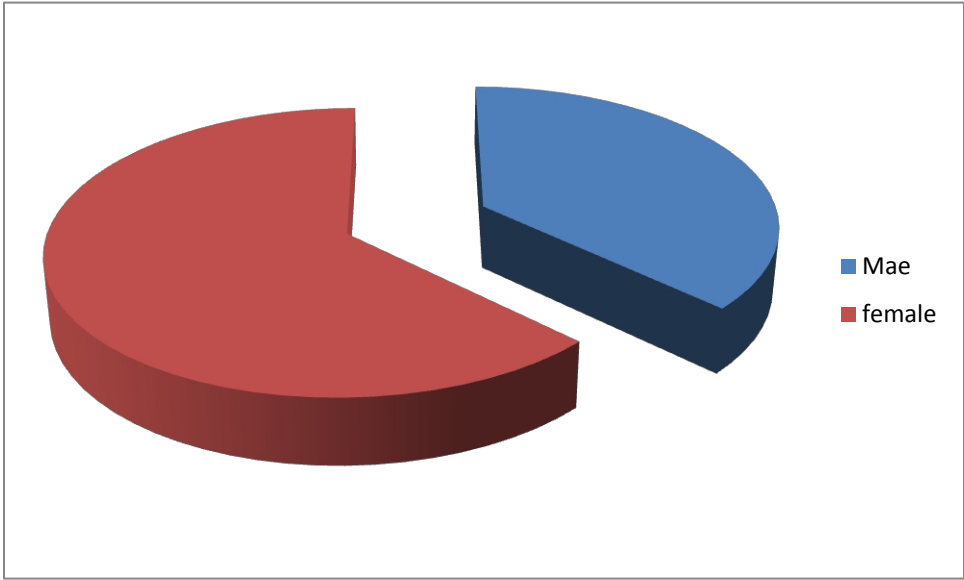


Figure (2) gender of study group

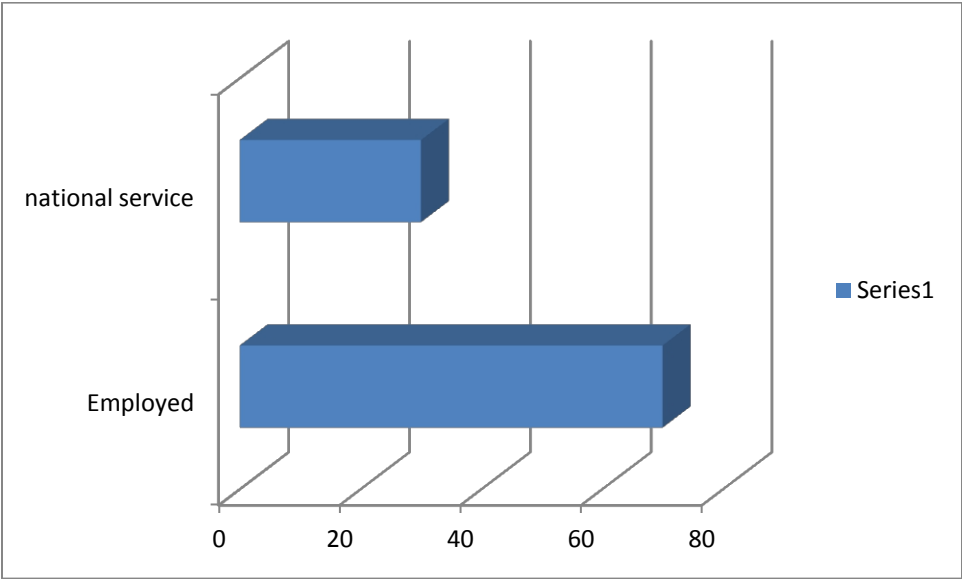


Figure (3) occupation of study group

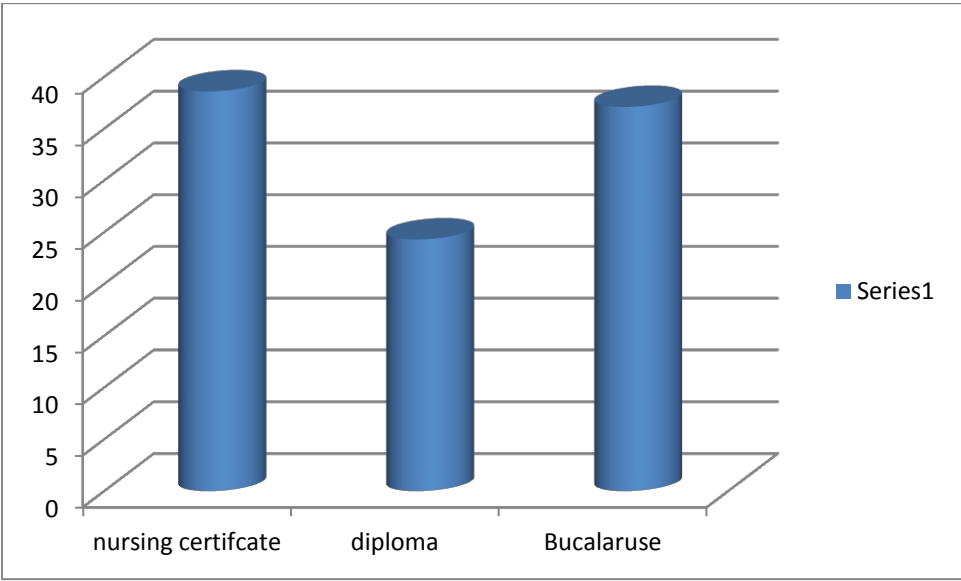


Figure (4) level of education of study group

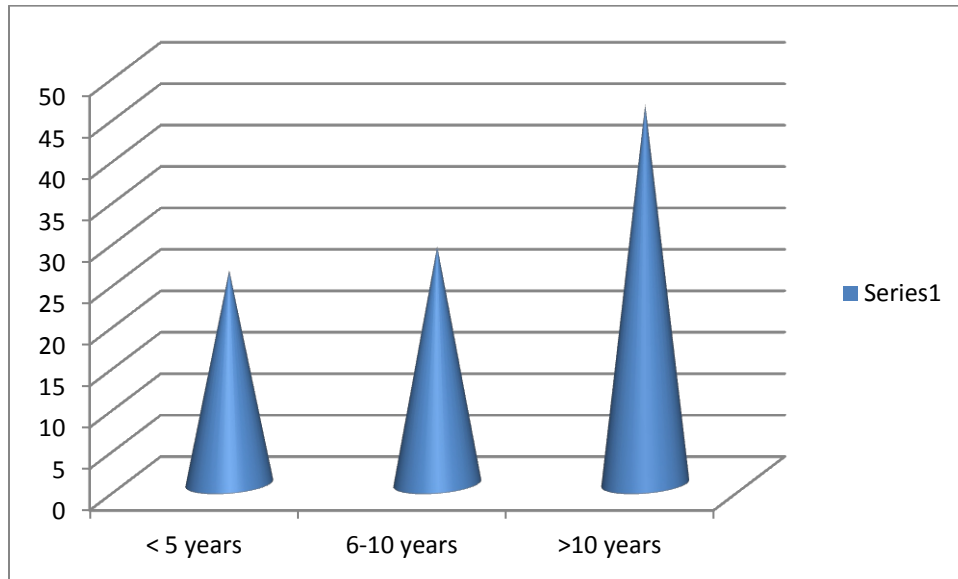


Figure (5) years of experience of study group

Table (1) level of nurse's knowledge about definition of terms

Definition of terms	Level of knowledge					
	Good		Satisfied		Poor	
	F	p	F	P	F	P
Infection prevention & control	58	82.9			12	17.1
Infection & control	58	82.9	0	0	12	17.1

Table (2) level of nurse's knowledge about definition of terms

Definition of terms	Level of knowledge					
	Good		Satisfied		Poor	
	F	P	F	P	f	P
Microorganism caused infection	54	77.1	0	0	17	22.9
Spread of infection	41	58.6	20	28.6	9	21.9
Potential fomites	32	45.7	21	30.0	17	24.3
Hand of patients can carry microbe to	52	74.3	0	0	18	25.7

Table (3) level of nurse's knowledge about eradicating sources of infection through

eradicating sources	Level of knowledge					
	Good		Satisfied		Poor	
	F	p	F	P	F	P
Eradicating sources of infection	46	65.7	17	24.3	7	10.0
Health care worker clean their hand	45	64.3	17	24.3	8	11.4
Alcohol is effective decontaminated	39	55.7	22	31.4	9	12.9
Hand decontaminate technique	39	55.7	21	30.0	10	14.3
Surgical had washing	44	62.9	17	24.3	9	12.9
Infection prevention responsibility of	37	52.9	23	32.9	10	14.3

Table (4) level of nurse's knowledge about PPE

Definition of terms	Level of knowledge					
	Good		Satisfied		Poor	
	F	p	F	P	F	P
Selection of PPE must be used on	50	71.4	0	0	19	27.1
Assessment of high risk	57	81.4	0	0	13	18.6
Single used means	50	71.4	0	0	20	28.6
In contact with contact mucous membrane must be used	57	81.4	0	0	13	18.6

Table (5) Level of nurse's knowledge about definition terms

Definition of terms	Level of knowledge					
	Good		Satisfied		Poor	
	F	P	F	P	F	P
Cleaning	59	84.3	0	0	11	15.7
Disinfection	55	78.6	0	0	15	21.4
sterilization	56	80.0	0	0	14	20.0

Table (6): Level of nurse's knowledge about waste management

Definition of terms	Level of knowledge					
	Good		Satisfied		Poor	
	F	p	F	P	F	P
Management of clinical waste	54	77.1	0	0	16	22.9
Clinical waste defined as	43	61.4	20	28.6	7	10.0

Table (7) Nurse's performance about wearing and removing gown

practice	Level of performance					
	Good		Satisfied		Poor	
	F	P	F	P	F	P
Wearing gown	1	4.0	9	36.0	15	60.0
Removing gown	1	4.0	9	36.0	15	60.0

Table (8) level of nurse's performance about hand washing and done sterile gloves

practice	Level of performance					
	Good		Satisfied		Poor	
	F	P	F	P	F	P
Hand washing	13	52.0	9	36.0	3	12.0
Done sterile gloves	5	20.0	10	40.0	10	40.0

Table (9) level of nurse's performance about waste management

Waste management practice	Level of performance					
	Good		Satisfied		Poor	
	F	P	F	P	f	P
Infectious waste	0	0	0	0	0	0
Noninfectious waste	25	59.5	0	0	0	0
Sharp waste	0	0	17	40.5	0	0

CHAPTER FIVE

- Discussion.
- Conclusion.
- Recommendation.

Discussion

Abstract

Surgical site infections are the second most common cause of hospital acquired infections. The objectives of this study were to quantify the rate of wound infection and to identify risk factors associated for its prevalence among patients admitted for elective surgery in Khartoum Teaching Hospital in Sudan. A prospective study was conducted. All patients, aged >18 years admitted during March 1st 2010 to 31th October 2010 were recruited Baseline data was collected before the patient was operated. Patients were followed up to one month for detection of wound infection using bedside and post-discharge surveillance. A total of 1387 patients were included with a mean age of 35 ± 14 years and 1138(82%) were females. More than three quarters were healthy (79.3%) and 1367 (98.6%) patients were operated on conventionally. The total number of the performed surgical procedures was 1426. The rate of wound infection was found to be 9%. The majority of the infected wounds 120 (96%) were superficial and only 5 (4%) were deep incisional. Univariate analysis revealed that five variables were significantly associated with the prevalence of wound infection; namely patient's body mass index ($P=0.041$), comorbidity($P=0.006$), presence of diabetes ($P=0.010$), ASA score ($P<0.0001$) and laparoscopic surgical technique ($P=0.007$). Multivariate logistic analysis showed that ASA score 2 and ASA score > 3, [adjusted OR 1.9 (1.2-3.0), $P=0.006$ and adjusted OR 3.6 (2.0-6.7); $P<0.001$ respectively], laparoscopic surgical technique [adjusted OR 5.5 (2-14.8); $P=0.001$] were mostly significantly associated with the prevalence of wound infection. The rate of wound infection was high with patient's physical status being strong predictor of infection.

Infection prevention and control is a core part of an effective risk management program. Nurses specializing in infection control are responsible for agency wide policy development and program direction.

The study represented that more than half (60%) in study group stay in age between 26-40 years, less than one third (<33%) in age 25 years and less than one third (<33%) in age more than 40 years. This is evidence this occupation need adult person, less than two third (61-66%) female but the male more than one third (34-39%), majority (70-85%) of them employed, more than one third (34-39%) National nursing certificate level of education and more than one third (34-39%) BSc in nursing. This is evidence of increased nursing school in Sudan but less than one third (<33%) level of education Diploma, in addition to near the half (46-49%) experience years more than 10 years but less than one third (<33%) less than 5 years and less than one third (<33%) between 6-10 years.

The study showed that in level of nurses knowledge majority (70-85%) of them good knowledge in definitions terms infection prevention and control, majority (70-85%) of them good of defined caused and spread of infection, less than two third (61-66%) identify of eradicating sources of infection and hand of HealthCare workers, decontaminated hand and surgical hand washing, majority (70-85%) of them defined selection of PPE, assessment of high risk, majority (70-85%) of them knowledgeable about cleaning, disinfection and sterilization, majority (70-85%) of them define waste management, clinical waste define, more than half (60%) good performance about hand washing, all most (90-100%) good performance about noninfectious waste.

The last result evidence the major (70-85%) of study group knowledgeable and more than half (60%) good performance.

The study showed that less than one third (, 33%) satisfy knowledge in

Spread of infection, less than one third(<33%) satisfy knowledge in eradicating sources of infection , less than one third (<33%)satisfy knowledge in hand decontaminated technique , less than one third(<33%) satisfy knowledge in responsibility of infection prevention ,in addition less than one third(<33%) satisfy performance in wearing and removing gown , less than one third (<33%) satisfy performance of hand washing ,less than half (40-49%)satisfy in done sterile gloves and less than half(40-49%) satisfy performance managements of sharp waste

In addition to the resultshow that less than one third satisfy knowledge

In addition to the study revealed less than one third(<33%) poor knowledge in definition terms infection prevention and control ,less than third(<33%) poor knowledge in causes and spread of infection ,less than third(<33%) poor knowledge in eradication sources of infection , less than one third(<33%) poor knowledge in selection of PPE and assessment of high risk , less than one third(<33%) poor knowledge to define cleaning ,disinfection and sterilization , less than one third(<33%) poor knowledge to waste managements and define of clinical waste .In addition to more than half(60%) poor performance in wearing and removing gown, less than one third(<33%) poor performance to hand washing and done sterile gloves .

Conclusion

The study showed that more than half of study group in adult age ,less than tow third female ,majority of them employed and more than one third holding Nursing certificate and BSc in addition of that near the half more than 10 years' experience

Majority of them knowledgeable and good performance about hand washing and non-infectious waste managements

Less than one third satisfy knowledge to eradicating sources of infection and to responsibility of infection prevention and control, less than one third satisfy performance to wearing and removing gown, less than half satisfy performance to hand washing and done sterile gloves, less than half poor performance to hand washing and done sterile gloves, but less than half satisfy performance to sharp waste management, more than half poor performance to wearing and removing gown.

Recommendation

The study recommends the following

The study recommended the Directors to give chance of practice training to the nurses in hand washing

The study recommended the Directors to apply the ward by chart and poster of how to wash hand and use gloves

The study recommended the Directors to give chance of practice training to the nurses in how to manage infectious waste

The study recommended the Directors to apply the ward by different waste containers

The study recommended the Directors to give chance of practice training to the

Wearing and removing gown

The study recommended the Directors to apply the ward by work facilities

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4- Karen Anderson.Dr Mike Smith Consultant MicrobiologistAndrew Sinclair.

INFECTION PREVENTION AND CONTROL POLICY - May 2015

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Budget

In Sudanese bound

1-Transportation 350 Sudanese bound

2-Typing and photocopying 750 Sudanese bound

Questionnaire

shandi University

Graduate College
for MSC Nursing Program

Infection control program

Serial Number

Date

-1 Age Sex Male Female

Occupation 2-

Employed N rvice student

Level of education3-

Nursingcertificate loria

4-Experience years

1-5 years -10years increase of10 years

5- Infection Prevention and Control is

Aiming to improve the quality of patient care

Aiming to improve the occupational health of staff

6-Explanations of terms used infection control

Infection - the invasion and multiplication of microorganisms in body tissues

Control - system of measures to manage an activity

Transmission (of infection) – is the transfer of infectious microorganism from one person to another

7- The causes of infection Microorganisms that cause

Infections are known as pathogens.

Bacteria

Viruses

Fungi

8- The spread of infection through

Direct contact

Indirect spread

Splash Injury

Hands and fomites

9- Indirect spread of infection? Examples of potential fomites

Bedpans

Urinals

Thermometers

Practically any inanimate article

10- Hands of patients can carry microbes to

Other body sites Equipment Staff

11- Eradicating the source of infection through

Hand and personal hygiene
Use of Personal Protective Equipment
Decontamination of equipment
Using an aseptic technique when handling invasive devices or dressing wounds

12- Infection prevention and control is the responsibility of

Nurses
Doctors
Lab technicals
Directors

13- Health-care workers to clean their hands?

Before touching a patient
Before clean/aseptic procedures
After body fluid exposure/risk
After touching a patient
After touching patient surroundings

14- Wash hands after?

Coughing

Sneezing

After contact with respiratory secretions

15- Alcohol is an effective decontamination agent but should only be used on

Visibly clean hands.

It will destroy transient bacteria

Is suitable for use when other facilities are inadequate

When minimal patient contact has occurred

16- Hand decontamination technique? Using soap and water

- Use liquid soap

- Use warm running water Avoid splashing

- Wet the hands under running water

- Wash for at least 20-30 seconds Rinse under running water

17- Surgical hand washing

- Destroys transient organisms
- Reduces resident flora before surgical
- Invasive procedures
- An aqueous antiseptic solution is applied for two minutes

18- Selection of protective equipment must be based on

- An assessment of the risk of transmission of microorganisms to the patient
- The risk of contamination of the healthcare practitioners
- Clothing and skin by patients' blood, body fluids secretions

19- Assessment of risk.

High Risk Exposure to blood/body fluids or substances high risk of splashing to face

- Wear gloves
- Plastic apron
- Eye/mouth/nose protection

20- Single use means that the manufacturer:

- Intends the item to be used once and then thrown away
- Considers the item unsuitable for use on more than one occasion
- Has insufficient evidence to confirm that re-use would be safe

21-Cleaning is a process

This physically removes contamination

Does not necessarily destroy micro-organisms

The reduction of microbial contamination

22- Disinfection is a process

To reduce the number of viable micro- organisms

May not necessarily inactivate some viruses and bacteria spores?

Disinfection will not achieve the same reduction in microbial contamination levels as sterilization.

23- Sterilization is a process used

To render the object free from viable micro- organisms, including spores and viruses

Re-usable equipment should be appropriately decontaminated between each patient using Sterilization

Items that enter normally sterile body areas, are classified as high risk and must be sterile before use.

24- In contact with intact mucous membranes contaminated with virulent must be used.

Cleaning

Followed by disinfection

Or single use

Check List:

Wearing and removing gown

STEPS
1. Wearing gown
1. Wash your hands.
2. Opens wrapped gown package.
3. Pick up the gown.
4. Unfolds the gown while holding the inner neck area.
5. Insert each arm in the gown.
6. Make sure the gown completely covers the front of your uniform.
7. Tie the strings at the back of the neck.
2. Removing gown:
a- Gown that is not visibly soiled requires no particular technique for removal.
<i>For gown that is visibly soiled:</i> b-Untie neck strings of gown. Remove gown without touching outside of gown by keeping one hand up and under the gown cuff and using this protected hand to pull the opposite sleeve down and off.
c- Use ungowned arm and hand to grasp the gown from the inside and remove from the remaining arm. Remove gown and turn inside out and drop in appropriate container.
9- Wash hands thoroughly.

Checklist: Assessment of done sterile glove

STEPS
1. Wash your hand and dry thoroughly.
2. Chose the correct size.
3. Remove outer glove package by carefully separating and peeling apart side.
4. Grasp inner package and lay it a clean, flat surface just above waist level. Keeping gloves on inside surface
5. If gloves are not prepowdered tack packet of powder and apply lightly to hands over sink or wastebasket.
6. With thumb and first two fingers of non-dominant hand, grasp edge of cuff of glove for dominant touch only gloves inside surface.
7. With thumb and first two fingers of non-dominant hand
8. Carefully pull second glove over nondominant hand. Do not allow fingers and thumb o gloved dominant hand touch any part of exposed nondominant hand.
9. After second glove is on interlock hands, the cuffs usually fall down after application, be sure to touch only sterile sides.

Hand washing check list

<i>Steps of procedure</i>
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.

Waste management

Statement	Don	Not do
Infectious Infectious: dressings, swabs, bandages pads suction liners stoma bags catheter bags plastic disposable instruments Containers orange lidded binorbag		
2- Clinical sharps medicines orange lidded sharps container		
3- Non-infectious dressings, swabs, drains, incontinence pads, suction liners, stoma bags, catheter bags, plastic disposable instruments Yellow bag with black stripe		