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Nurses' role in the prevention of nosocomial infections

A systematic literature review

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Abstract

Infectious diseases are disorders caused by organisms such as bacteria, viruses, fungi or parasites. Many organisms live in and on our bodies. They are normally harmless or even helpful. But under certain conditions, some organisms may cause disease. Some infectious diseases can be passed from person to person. Some are transmitted by insects or other animals, and you may get others by consuming contaminated food or water or being exposed to organisms in the environment.

Signs and symptoms vary depending on the organisms causing the infection, but often include fever and fatigue. Mild infections may respond to rest and home remedies, while some life-threatening infections may need hospitalization. Many infectious diseases such as measles and chickenpox, can be prevented by vaccines. Frequent and thorough handwashing also helps protect you from most infectious diseases.

This study was conducted using content analysis approach and qualitative research method. The data was collected from search engines with information about prevention of nosocomial infections. Analysis of data was done to find the source of the problem. From the six data analysed, it was noted that nurses and healthcare workers in general have a big role in the prevention of nosocomial infections. Also, there should be continued training for nurse in the importance of aseptic techniques use. The aim of this study was to identify nurses' role in the prevention of nosocomial infections. The research method is systematic literature review.

Language: English Key words: Nosocomial Infections, Prention of Infections, Nurses' role

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1 Introduction

Nurses fulfill many roles in a patient's care but are most importantly the patient's primary advocate. Nurses do so by speaking up for the patient on their behalf and caring for them in a manner directed at achieving the best patient outcomes. A vital component of patient advocacy is to help prevent the spread of healthcare acquired infections (HAIs) that may complicate the treatment and recovery trajectory. Nurses use a variety of methods to protect patients from new or worsening infection in common practice, broadly known as infection control. Infection control includes handwashing, respiratory hygiene, environmental sanitization, waste management, and isolation precautions, and is part of the daily responsibilities of all healthcare professionals. Healthcare facilities routinely maintain strict policies and procedures related to infection control, based on the Centers for Disease Control and Prevention (CDC) guidelines (Centers for Disease Control, 2020).

The literature suggests that comprehensive infection control does not take place in healthcare facilities to the specifications of these CDC guidelines. Hermann (2018) notes that roughly 1.7 million HAIs are occurring in the United States (U.S.) annually, resulting in nearly 100,000 deaths and $20 billion in healthcare costs. Nurses, in particular, have low rates of infection control guideline compliance. A 2016 report found that fewer than 1 in 5 nurses comply with all nine standard precautions for infection prevention (Powers, Armellino, Dolansky, & Fitzpatrick, 2016).

Aside from detrimental patient outcomes, healthcare facilities are at risk for lack of reimbursement for follow-up care when infections are found to be hospital-acquired (Peasah, Mckay, Harman, A- McKay, Harman, Al-Amin, & Cook, 2013). An evaluation of the routine use of standard infection control practices on multiple active hospital units will help to determine the degree of compliance with CDC guidelines and the need for updated education of nursing staff to meet best infection control practices and decrease the spread of infection transmission. (Francis, 2019).

2 Aim of Study and General Research Question

Most diseases are infectious. Therefore, the aim of this study is to describe the ways/ roles of nurses in nosocomial infections prevention and to create knowledge on how nurses can help in nosocomial infections prevention. This study has been motivated by the need to educate and create knowledge to nurses on ways of preventing spread of infectious diseases in hospitals. It is important to prevent nosocomial infections as it alleviates further human suffering and reduce costs to patients and the hospital. The general research question is “in what ways can nurses prevent nosocomial infections?”

3 Background

The term infection as used in medicine and health describe the capability of microorganisms to enter or invade the underlying tissues of the human body and discover conducive conditions that can facilitate its growth, survival, and replication (Lowy, 2009)

Explaining this further, infection ensues when a microorganism (agent) including viruses, bacteria, parasite and fungi invades an individual’s body (host) and eventually causes harm to the host’s body (Felman, 2020). Equally, an infection may arise as a result of the host’s immunological reactions to the agent its toxic products resulting in either clinical or subclinical illness (Lowy, 2009). An infection can be localized or spread throughout the “blood or lymphatic vessels to become systemic”. The term prevention in healthcare refers to general measures and actions taken by individuals (both health workers and non-health workers) to prevent the contraction and establishment of diseases. The concept of prevention in healthcare is further categorized into three main levels including primary prevention, secondary prevention, and tertiary prevention.

In preventive medicine, the primary prevention is directed at avoiding the development of a disease (infection) among persons presumed to be healthy but may have the risk factors. The main objective of prevention is to side-step the occurrence of infection or disability in healthy people (Last, 2001). The main objective of this project work is to assess nurses’ role in the prevention of infectious diseases. In the healthcare setup, health promotion activities such as health education to increase the knowledge of individuals (Nurses) on hospital-acquired infections (HAIs) to reduce their risk can be regarded as a primary preventive measure.

In the medical field, the concept of control may consist of several guidelines and principles adopted by healthcare facilities to deliberately avoid the transmission of disease-causing agents and diseases among staff, patients and other visitors or users of the facility (Centrak, 2021). To deliberately avoid the transmission of infectious disease-causing agents and diseases in the health system, steps that many facilities adopt include the development of IPC Standards which is a requirement for nurses to have adequate knowledge of and put into practice. Infection prevention and infection control are therefore two main approaches that are predominantly used in medicine to stop the transmission and management of infectious diseases.

The term infection prevention is recognized as the incursion and multiplication of germs such as “bacteria, viruses, and parasites” that are usually not present inside the body. An infection could have no sign or symptoms, or the infection could result in symptoms leading to it becoming clinically apparent (William, 2018). Infection control, on the other hand, means to prevent or stops the broadcast of infections in a healthcare environment (CDC, 2020). However, according to the WHO, 2020, Infection Prevention and Control (IPC) refers to the “scientific approach and practical solution designed to prevent harm caused by infection to patients and health workers (“WHO Infection prevention and control,” n.d.). It is grounded in infectious diseases, epidemiology, social science and health system strengthening”.

An effective Infection Prevention and Control (IPC) programme is essential for a quality health care service delivery system. It is so because it has the possible benefits of minimizing infection rate in patients, cost/pressure on healthcare institutions and the country at large (Ministry of Health/Ghana Health Service, 2009). In the last two decades, healthcare-related diseases have posed a substantial problem in the area of excellent health care delivery and the financial burden on the patients, health institutions and the state/nation. This are because of the cumulative recognition of healthcare-related infectious diseases as a possible indicator of quality health care to the sick people (MOH/GHS, 2009).

The knowledge and compliance levels of health professionals and nurses in particular to IPC cannot be overemphasized. Nurses whose primary role is to guard patients against getting infections while on admission or when the clients are in a health Centre or facility

to seek health services (Chisanga, 2017). By maintaining an environment without infection, the patient's recovery will be enhanced, and excellent care provided by nurses' care will be rendered. Nurses spend majority of their time with their clients (patients). Therefore, they should possess a good level of knowledge and comply with infection prevention and control practices in health care facilities (Chisanga, 2017).

Nurses play a key role in maintaining effective disease inhibition and control, their activities may also possibly either leads to the spread of infection or prevention (Page et al., 2009). In a study conducted by Damani in 2012, the physical surrounding of a patient should be put in a proper condition to minimize a possible spread of infection (Damani, 2012). IPC protocols objectives are to protect the susceptible public from contracting an infection at the point of seeking health service (Damani, 2012). Deficiency in knowledge and non-compliance amongst healthcare workers in inhibition and control of infectious disease could result in nosocomial disease infections (Mukamurenzi, 2019).

Similarly, lack of or inadequate IPC information among nurses can upsurge the prevalence of nosocomial infections. A study conducted in Zimbabwe which determined the challenges of disease infection prevention and control among health staff (nurses) at the Bindura provincial hospital revealed that majority of the nurses (72%) lack knowledge on infection control principles and 42% of the nurses did not comply with infection control manuals (Tirivanhu, Ancia, & Petronella, 2014). Hayeh and Esena in 2013 explored infection inhibition and management practices among Nurses at 'Ridge Regional Hospital in Accra (Ghana)'. The research revealed that understanding of IPC amongst nurses was little above half of the respondents (51%), convenience and access to IPC materials was (58%) however, overall obedience to IPC guidelines was revealed to be 54% (Hayeh & Esena, 2013).

Another study that assessed the level of knowledge, attitudes and practices regarding disinfection procedures among nurses in Italian hospitals, shows the level of knowledge to be unsatisfactory particularly of the most common hospital-acquired infection and only a small percentage of nurses comply with disinfection procedures in their practical activity. However, the study showed a good positive attitude towards the use of guidelines and protocols for disinfection (Sessa et al, 2011)

Research work conducted to assess the level of knowledge and practice on adherence of infection prevention and its associated factors among 231 nurses in Jimma University Medical Centre (Ethiopia) revealed that majority of the nurses 215 (83.08%) were knowledgeable regarding infection prevention while 16 (16.02%) were less knowledgeable. The compliance rate was 64.06% and non-compliance was 35.09% (Bekele, Yimam, & Akele, 2018). The level of nurse's knowledge on occupational post- exposure to hepatitis B infection in the Tamale Metropolis, Ghana and revealed that 38.9% of the nurses' recap used needles before disposal and 30.2% do not decontaminate blood and body fluids before disposal which are cases of non-compliance (Konlan et al., 2017).

The Ministry of Health and the Ghana Health Service developed a policy framework on IPC 2009 with the ultimate goal of improving the capacity of nurses in preventing and controlling infections and maintaining safety in healthcare settings (MOH, 2009). The policy stipulates "the policy framework within which infection prevention and control measures shall be practiced by all nurses in all health care facilities and service delivery points, provide acceptable standards for the practice of Infection Prevention and Control and outline strategies that shall make Infection Prevention and Control practices routine in all aspects of health care" (MOH, 2009).

An infection is considered nosocomial if it becomes evident 48 hours or more after hospital admission or within 30 days of discharge following in-patient care (Bello et al., 2011). Reported cases of nosocomial infection assumed such a terrifying proportion in 2002 that WHO member states approved a World Health Assembly (WHA) resolution on patient safety (Bello et a.l, 2011). Developing countries were reported to have up to 20 times the risk of contracting a nosocomial infection compared with developed countries. Thus, source(s) of the spread of infection is a major worry for managers in healthcare practice particularly in developing countries where the healthcare system is already overstretched (Bello et al., 2011).

Nosocomial infections are caused by Candida albicans, Escherichia coli, hepatitis virus, herpes zoster virus, pseudomonas, and staphylococcus (Mukwato et al., 2003). These pathogens are transmitted from one person to another through direct or indirect contact and at any time, about 10% of in-patients have Hospital Acquired Infections (HAIs) (Mukwato et al., 2003).

3.1 Epidemiology of Nosocomial Infections

According to Khan et al., (2017) nosocomial infections affect huge number of patients globally, elevating mortality rate and financial loses significantly. According to estimated report of WHO approximately 15% of all hospitalized patients suffer from these infections. These infections are responsible for 4%-56% of all deaths caused in neonates, with incidence rates of 75% in southeast Asia and sub-Saharan Africa. The incidence is high enough in high income countries that is between 3.5% and 12% whereas it varies between 5.7% and 19.1% in middle- and low-income countries. The frequency of overall infections in low-income countries is three times higher than high income countries whereas this incidence is 3-20 times higher in neonates.

3.2 Determinants

Risk factors determining nosocomial infections depends upon the environment in which care is delivered, the susceptibility and condition of the patient, and the lack of awareness of such prevailing infections among staff and healthcare providers (Khan et al., 2017).

3.3 Surveillance of nosocomial infections

Although the aim of infections prevention and control program is to eradicate nosocomial infections but epidemiological surveillance for demonstration of performance improvement is still required to accomplish the aim. The efficient surveillance methods include data collection from multiple sources of information by trained data collectors; information should include administrative data, demographic risk factors, patient's history, diagnostic tests, and validation of data. Following the data extraction, analysis of the collected information should be done which includes description of determinants, distribution of infections, and comparison of incidence rates. Feedbacks and reports after analysis should be disseminated by infection control committees, management and laboratories keeping the confidentiality of individuals. The evaluation of credibility of surveillance system is required for effective implementations of interventions and its continuity. Finally, the undertaking of data at regular intervals for maintenance of efficiency of surveillance systems should be made compulsory (Khan et al., 2017).

3.4 Nosocomial Pathogens

Pathogens that are responsible for nosocomial infections are bacteria, viruses, and fungal parasites. These microorganisms vary depending upon different patient populations, medical facilities and even difference in the environment in which the care is given (Khan et al., 2017).

3.4.1 Bacteria

Bacteria are the most common pathogens responsible for nosocomial infections. Some belong to natural flora of the patient and cause infection only when the immune system of the patient becomes prone to infections. Acinebacter is the genre of pathogenic bacteria responsible for infections occuring in ICUs. It is embedded in soil and water and accounts to 80% of reported infections. Bacteroids fragilis is a comensial bacteria found in intestinal tract and colon. It causes inflammation when combined with other bacteria. Clostridium decifile cause inflammation of colon leading to antibiotic-associated diarrhoea and colitis, mainly due to elimination of beneficial bacteria with that of pathogenic. Clostridium dicifile is transmitted from an infected patient to others through healthcare staff by improper cleansed hands. Enterobacteriaceae (carbapenemresistance) cause infection if travel to other body parts from gut; where it is usually found. Enterobacteriaceae constitute Klebsiella species and Escherichia coli. Their high resistance towards carbapene cause the defence against them more difficult. Methicillin resistance stapholococus aureus (MRSA) transmit through direct contact, open wounds and contaminated hands. It causes sepsis, pneumonia and surgical site infections by travelling from organs or bloodstream. It is highly resistant towards antibiotics called beta-lactams (Khan et al., 2017).

3.4.2 Viruses

Besides bacteria, viruses are also an important cause of nosocomial infection. Usual monitoring revealed that 5% of all the nosocomial infections are because of viruses. They can be transmitted through hand-mouth, respiratory route and fecal-oral route. Hepatitis is the chronic disease caused by viruses. Healthcare delivery can transmit hepatitis viruses to both patients and workers. Hepatitis B and C are commonly transmitted through unsafe injection practices. Other viruses include influenza, HIV, rotavirus and herpex-simplex virus (Khan et al., 2017).

3.4.3 Fungal parasites

Fungal parasites act as opportunistic pathogens causing nosocomial infections in immune-compromised individuals. Aspergillus spp can cause infections through environmental contamination. Candida albicans, Cryptococus neoformans are also responsible for infections during hospital stay. Candida infections arise from patient's endogenous microflora while aspergillus infections are caused by inhalation of fungal spores from contaminated air during construction or renovations of healthcare facility (Khan et al., 2017).

3.5 Health Promotion

According to Chi-Horng and Silviu The World Health Organization defined health promotion as the process by which people and communities can strengthen their control over health determinants. This process requires the direct involvement of individuals and communities to complete the change, guided by political activity, to create a healthy environment. Health promotion refers to the combination of education and environmental support to encourage people to take healthy actions and lifestyle. Hence, health promotion include health education, policy and the environment, as healthy people engage in health-friendly activities in order to lead healthier lives. The target audience of health promotion is usually healthy people that undertake health behaviors and activities. Health promotion also contributes to increasing activity levels of health and achieving individual, family, community and social health. Thus health promotion is a sum of progresssive behaviors that seek to advance health potential, to continously improve one lifestyle. Health promotion helps people change their lifestyle by combining awareness, behavior change, environmental creatio, as well as other factors. In short, health promotion encourages people to improve their lives towards better health (Chi-Horng & Silviu, 2021). Below are the factors of health promotion.

3.5.1 Administration and Management

A quality administration and management system of health promotion is required to lead a successful program. Administrative support must be furnished to new program operations and modified accordingly; the period ahead will involve the redirection of administration and management resources as directed to program needs. This is to say that

administration and management must be prepared to implement program decisions with policies and procedures responsive to the program need with evolved management support required to assure the successful achievement of health promotion program goals (Chi-Horng & Silviu, 2021).

3.5.2 Budget

A budget is a detailed statement of the resources available to a program or activity and what it costs to implement the program. A health promotion program may have a more complicated budget, with multiple funding streams, various expenses, and anticipated changes in both expenses and incomes at various program stages. Thus, it is important to have enough budget to operate any health promotion program (Chi-Horng & Silviu, 2021).

3.5.3 Communication Channel

The communication channel is a type of media that is used to transfer a message from one person or an organization or an organization to another. The chosen channel should be accessible to the health planner and credible to the participant. In a non profit organization specifically, communication channels are the ways information flows in the organization within, and with other individuals and society. In health promotion, the communication campaigns, mass media and health-related product distribution have been used to reduce mortality and morbidity through behavioral change (Chi-Horng & Silviu, 2021).

3.5.4 Leadership

Leadership is the factor most often emperically related to health promotion effects achieved through cooperative work. Primary health care leaders appreciation towards health promotion is important. Charisma and personality traits of the leader can make the followers sincerely admire respect the person, and the leader’s good abilities at caring, motivational skills and the attitude of leading by example will set the leader as the role model of the followers and motivate compliance (Chi-Horng & Silviu, 2021).

3.5.5 Benefits Associated with Participant

Health promotion is aimed to influence the social health behavior and the purpose is to improve the health the health of the people and society. It is a strategic approach to focus on generating and delivering valuable, relevant and consistent health promotion content to attract and maintain the target participant. Thus, the health promotion practitioner should provide a useful framework for systematically understanding the benefits of the health products to the participant (Chi-Horng & Silviu, 2021).

3.5.6 Self-Efficacy

Self-efficacy is the perception of whether to engage in a healthy behavioral shift, how much effort it takes, and how long it lasts in the face of difficulties and failures. Self-efficacy affect the degree at which people set health goals. Self-efficacy is measured through some studies of health practice to assess their potential role in health behavioral change (Chi-Horng & Silviu, 2021).

3.5.7 Skills and Resources

The organization should make sure that there are sufficient skills and resouces for health promotion practices. The ability to work effectively among the members and community is also an important factor leading to the success of health promotion activity. The financial and human resources needed and promotion skills required should be identified before the health promotion program is started (Chi-Horng & Silviu, 2021).

3.6 Levels of Prevention

Prevention, as it relates to health, is really about avoiding disease before it starts. It has been defined as plans for, and the measures taken, to prevent the onset of a disease or other health problem before the occurrence of the undesirable health event. There are three distinct levels of prevention (lumen, n.d).

3.6.1 Primary prevention

Those preventive measures that prevent the onset of illness or injury before the disease process begins. Examples include immunization and taking regular exercise (lumen, n.d).

3.6.2 Secondary prevention

Those preventive measures that lead to early diagnosis and prompt treatment of a disease, illness or injury to prevent more severe problems developing. Here health educators such as Health Extension Practitioners can help individuals acquire the skills of detecting diseases in their early stages. Examples include screening for high blood pressure and breast self-examination (lumen, n.d).

3.6.3 Tertiary prevention

Those preventive measures aimed at rehabilitation following significant illness. At this level health service workers can work to retain, re-educate, and rehabilitate people who have already developed an impairment or disability (lumen, n.d).

4 Theoretical framework

The respondent has chosen the theory of unitary human beings by Martha E. Rogers (1994) to be reflected in the research question findings. Infection prevention is of three forms: Nursing, Health, and education.

4.1 Nursing

Nursing is a learned profession and is both a science and an art. It is an empirical science, and, like other sciences, it lies in the phenomenon central to its focus. Rogerian nursing focuses on concern with people and the world in which they live-a natural fit for nursing care, as it encompasses people and their environments. The integrality of people and their environments, operating from pan dimensional universe of open systems, points to a new paradigm and initiates the identity of nursing as a science. The purpose of nursing is to promote health and well-being for all persons. The art of nursing is the creative use of the science of nursing for human betterment (Rogers, 1994). “Professional practice in nursing seeks to promote symphonic interaction between human and environmental fields, to strengthen the integrity of human field, and to direct and redirect patterning of the human and environmental fields for realization of maximum health potential” (Rogers, 1970, p. 122).

4.2 Health

Rogers uses the term health in many of her earlier writing without clearly defining the term. The uses the term passive health to symbolize wellness and the absence of disease and major illness (Rogers, 1970). Her promotion of positive health connotes direction in helping people with opportunities with rhythmic consistency (Rogers, 1970). Later she wrote that wellness “is a much better term……..because the term health is very ambiguous” (Rogers, 1994b p. 34). Rogers uses health as a value term defined by the culture or the individual. Health and illness are manifestations of pattern and are considered “to denote behaviors that are of high value and low value” (Rogers, 1980). Events manifested in the life process indicate the extent to which a human being achieves maximum health according to some value system. In Rogerian science, the phenomenon central to nursing’s conceptual system is the human life process. The life process has its own dynamic and creative unity that is inseparable from the environment and is characterized by the whole (Rogers, 1970).

4.3 Education

Rogers clearly articulated guidelines for the education of nurses within the science of Unitary Human Beings. Rogers discusses structuring nursing education programs to teach nursing as a science and as a learned profession. Nurses must commit to lifelong learning and noted “the nature of practice of nursing is the use of knowledge for human betterment (Rogers, 1990 p 111).

5 Methodology

Research methods are those methods/techniques used to conduct the research. While the research methodology is a way, the research problem is systematically solved. It is a science of studying how scientifically the research is done (Kothari, 2018, 24-26).

5.1 Systematic literature review

According to Lame (2019) systematic literature reviews (SRs) are ways of synthesizing scientific evidence to answer a particular research question in a way that is transparent and reproducible, while seeking to include all published evidence on the topic and appraising the quality of this evidence. SRs have become a major methodology in disciplines such as

public policy research and health science. This paper provides an overview of the systematic review's method, based on the literature in health sciences.

The adopted research method in this study was done on the existing literatures to come up with findings. The search words used in the research is nosocomial infections, prevention of infections and hospital acquired infections. The study intended to highlight on how infections are spread in hospitals and to teach about infection prevention procedures to keep our patients safe from nosocomial infections. The literature search was done through digital library EBSCO. These findings were used as they proved relevance to the topic in health science literature.

The total findings in the search engine EBSCO 651 and the search words used were nosocomial infections, prevention of infections and hospital acquired infections. 432 after the duplicates were removed and 339 were left for screening. 250 were excluded in the exclusion criteria and they comprised of articles that don't mention infection prevention by nurses, articles published before 2018, articles that don't mention nosocomial infections. 89 articles were assessed for eligibility. 83 were excluded as they contain other languages leaving 6 studies that were eligible for the research. The articles eligible for the research were published between 2011-2021, full text articles, articles that focused on nosocomial infections and finally articles published in English language.

5.2 Ethical Considerations

In this study, ethical consideration was carried according to the Finnish National Board on Research Integrity (TENK) and according to the learning institution Novia University of Applied Sciences. Falsification, fabrication and plagiarism in research study is unethical and forbidden. Therefore, this study ensured that all articles and literature were not manipulated in any way that could falsely affect the results.

5.3 Data Analysis

According to Luo (2022) content analysis is research method used to identify patterns in recorded communication. To conduct content analysis, you systematically collect data from a set of texts, which can be written, oral or visual. Content analysis can be both quantitative (focused on counting and measuring) and qualitative (focused on interpreting and understanding). In both, you categorize or ''code'' words, themes and concepts within the texts and then analyze the results. Researchers use content analysis to find out about the purposes, messages, and effects of communication content. They can also make inferences about the procedures and audience of the text they analyze. In this research, qualitative content analysis is used.

The following criteria shall be used for article inclusion and exclusion criteria

Criteria for article inclusion
Language: articles published in English
Articles published between 2018 - 2021
Nosocomial infections
Full text articles
Qualitative and quantitative articles
Criteria for article exclusion
Articles that don’t mention infections prevention by nurses
Articles published before 2018
Articles that don’t mention nosocomial infections
Language: non-English articles

Table 2: inclusion/exclusion criteria

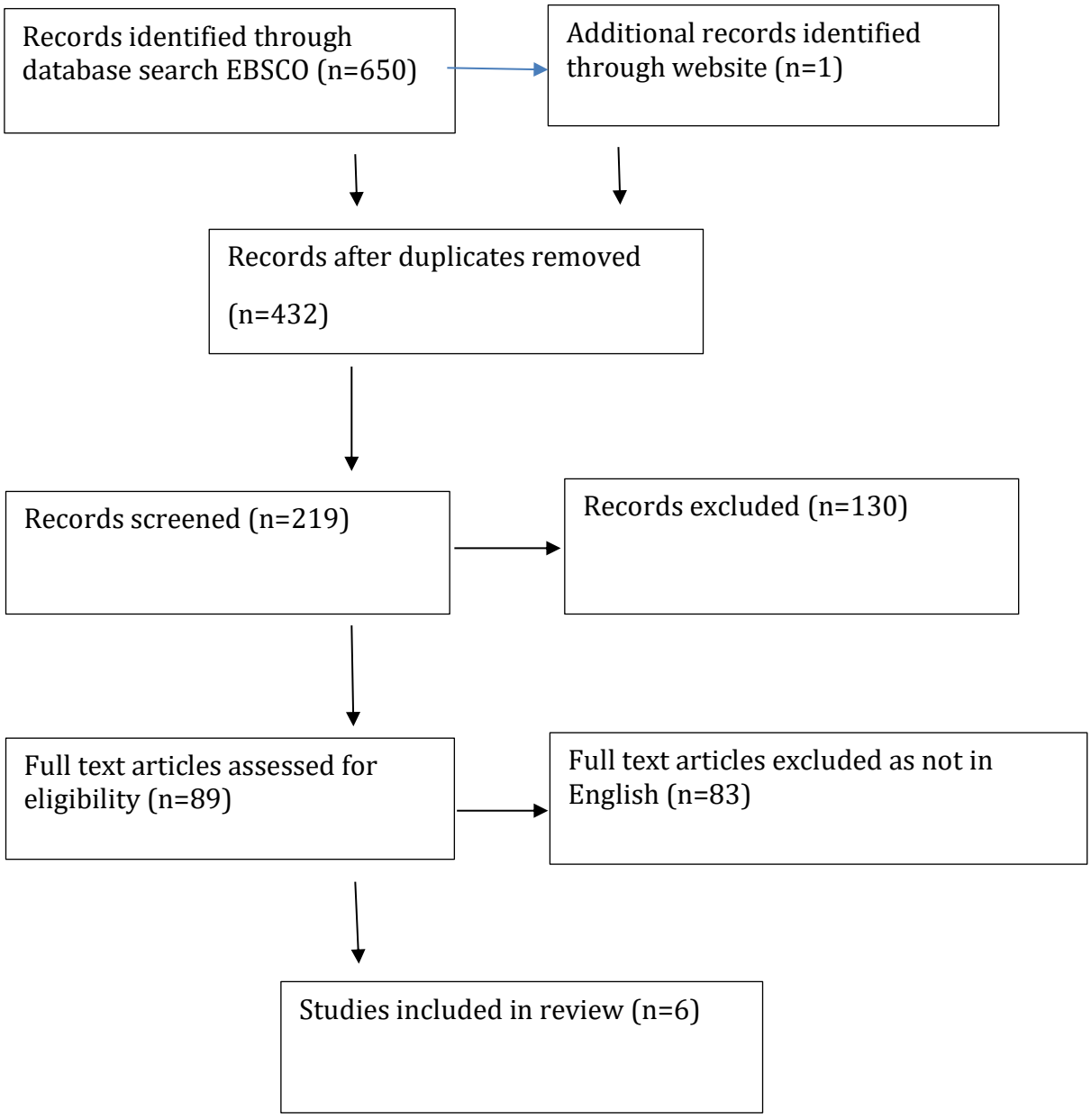

Figure 2 source: Moher et al. (9), The PRISMA Group (2009). Preferred reporting for systematic reviews.

6 Results.

Below are the results and findings.

6.1 Primary prevention

The primary prevention is directed at avoiding the development of a disease (infection) among persons presumed to be healthy but may have the risk factors. The main objective of prevention is to side-step the occurrence of infection or disability in healthy people (Last, 2001).

6.2 Roles of healthcare professionals

Healthcare professionals (HCPs) play a pivotal role in ensuring access to quality healthcare of patients. However, their role in health promotion (HP) and disease prevention (DP) has not been fully explored (Melariri, Kalinda & Chimbari. 2021).

6.3 Costs

Nosocomial or healthcare-associated infections (HAI), exact a high medical and financial toll on patients, healthcare workers, caretakers, and the healthcare system. Interpersonal contact patterns play a large role in infectious disease spread, but little is known about the relationship between healthcare workers (HCW) movements and contact patterns within a healthcare facility and HAI (English et al., 2018).

6.4 Patient environment

The physical surrounding of a patient should be put in proper condition to minimize a possible spread of infection. Infection prevention control protocols are to protect the susceptible public from contracting an infection at the point of seeking health care services (Damani, 2012).

6.5 Equipment associated infections

Below is highlighted ways on how infections can be spread via hospital equipment/procedures and possible ways to avoid spreading infections.

6.5.1 Ventilator associated infections

Di Filippo et al. (2011) explains thorough cleaning of all ventilator and circuit equipment; contaminated hand should be washed frequently and thoroughly with water and soap (antimicrobial or not) or an alcoholic antiseptic solution; moreover, it is good practice to remove all devices such as endotracheal tubes and tracheostomy tubes when clinical indications no longer exist. Poor oral hygiene in patients undergoing mechanical ventilation is often associated with secondary colonization of the respiratory tract, leading to the subsequent development of pneumonia. Removal of endotracheal secretions appears to be a primary step in preventing ventilator associated pneumonia and can be carried out continuously or at scheduled intervals. Periodic aspirations of secretions after instillation of isotonic saline seems to reduce ventilator associated pneumonia incidence with patients with tracheotomies. For patients undergoing mechanical ventilation via endotracheal tube placement, special attention must be paid to the material used to build the device and the integrity of the structure of the device itself. These patients experience an increased risk of nosocomial pneumonia, and micro subglottic contaminated secretions are among the leading causes of ventilator associated pneumonia.

6.5.2 Catheter related bloodstream infections

It is important to maintain aseptic techniques during insertion of intravenous catheters and when applying dressings. Skin disinfection must be done by an appropriate antiseptic before insertion of the catheter and during dressing changes. Topical antibiotics should not be used on the insertion site. To attain the lowest risk of complications for the therapy type and expected duration of therapy, the type of catheter, insertion technique and insertion site should be chosen carefully. Any catheter that is no longer essential should be removed promptly. Catheters impregnated with antimicrobial, or antiseptic are the best choice if they are to remain in place for more than 5 days, and if the infection rate in the ward remains high following the implementation of a global strategy. The risk and benefits of placing a central nervous catheter in the recommended site must be ascertained:

subclavian access is recommended for reducing infection in non-tunneled catheter, and jugular vein or femoral vein use is recommended for dialysis catheter (Di Fillipo, Casini, De Gaudio, 2011).

6.5.3 Urinary tract infections

Closed drainage systems are recommended after aseptic placement of the urinary catheter; catheters should only be placed for the appropriate indications and should be kept in place only if necessary. The duration and use of bladder catheterization should be minimized in patients at increased use for UTI's, such as women, the elderly, and patients with compromised immune systems. Aseptic insertion of the catheter should be ensured. If the rate of UTI's is not reduced after the implementation of strategy (appropriate positioning and proper aseptic maintenance), the use of catheter impregnated with antimicrobial, or antiseptic should be considered. The implementation of hand hygiene measures before insertion of a catheter or any manipulation of the catheter site or devices is mandatory (Di Fillipo, Casini, De Gaudio, 2011).

6.6 Standard precautions and maintenance of healthcare environment

According to Salem (2019) nurses play a crucial role in preventing and controlling transmission of the infection through the application of standard precautions and maintenance of the health care environment. In hospitals, infected patients are a source of infection transmission to other patients, health care workers, and visitors. Healthcare-related infections have a considerable impact on the morbidity and mortality rates in the intra- and extra-hospital environment, resulting in an increase in the time spent and costs of hospitalization, and are thus recognized as a serious world public health problem. For example, Nosocomial infection is one of the leading causes of death. The prevention and control of infections are critical for a well-functioning health system.

All, nurses, in all roles and settings, can demonstrate leadership in infection prevention and control by using their knowledge, skills and judgement to initiate appropriate and immediate infection control procedures. WHO classified some roles of nursing staffs for infection control. Nurses at different levels, namely: the senior nursing administrator, the ward charge nurse and the nurse in charge of infection control. In addition, control committee needs to be established for developing training programmer for members of

the nursing staff, supervising the implementation of techniques for the prevention of infections (Salem, 2019).

Most health care infections are transmitted by healthcare personnel who fail to practice proper hand washing procedures and change gloves between client contacts. Therefore, infection control guidelines from the national and international organizations have supported that hand washing remains the most effective measure in reducing the incidence of health care infections. Brooker, Waugh, and Watson stated that hospitalized patient exposed to infection resulting from a surgical or medical treatment called iatrogenic infection is frequently attributed to an invasive procedure and reported that over 60% of blood infection introduced by intravenous lines or catheter. In addition, it has been reported that the incidence of nosocomial infections in the intensive care unit is about 2 to 5 times higher than in the general inpatient hospital population. Healthcare infections are considered a major public health problem in both epidemic and endemic form because they are the main causes of morbidity, mortality, and economic burden (Salem, 2019).

On the other hand, healthcare providers have exposed to blood borne infection especially hepatitis B. C and HIV due to recapping of a needle and sharps injuries. In 2002 the WHO reports published data demonstrating that 2.5% of HIV cases and 40% of hepatitis B and C cases among healthcare workers worldwide are the results of occupation exposure. According to the joint United Nations program on HIV/acquired immune deficiency syndrome (AIDS) (UNAIDS) about 34 million people are infected with HIV worldwide (Salem, 2019).

7 Discussion and Critical Results

The use of study method, findings and clarification of the results will be discussed in this chapter.

7.1 Discussion of Results

The aim of the study is to identify the factors that leads to nosocomial, or hospital acquired infections and highlight possible ways to avoid them. Problem definition of the study is what are the factors to consider when handling patients in a hospital so that they do not get infections on top of their main reason for being there in the first place. The method

discussed ensures quality of the study and determines that it achieves aim of the study and problem definition.

For patients admitted to hospital with a certain disease, their expectation is to be treated of their condition and go home. The patient usually has total confidence that they are in the safest place as many people perceived hospital healthcare workers to be outmost careful with the procedures and aseptic techniques. When a patient acquires another disease other than their main reason for visiting the hospital, the experience can be stressful.

Nurses and healthcare workers in general have the responsibility of always ensuring aseptic procedural techniques. Small blunder or nurse's carelessness can lead to many patients' sufferings. One nurse can be responsible sometimes for up to 10 patients in each shift. If the nurse does not use proper aseptic techniques, they can carry an infection from one patient and affect all other nine patients. The findings show that nurses have a big role in the prevention of nosocomial infections. They are also responsible for educating the public about importance of aseptic techniques. Family and friends also have a big role to play when visiting loved ones in hospitals.

The theoretical framework by Martha E. Rogers (1994) highlights that nursing as a profession is important as it covers care and with care there is safety. Secondly, she uses health to symbolize wellness and absence of disease. Lastly, Rogers clearly articulates importance of education for nurses.

7.2 The use of method

The use of qualitative research method in this study was found to be appropriate as it identifies the burden of nosocomial infections and ways in which nurse can avoid nosocomial infections.

The six data materials found were chosen carefully as it clearly identifies the ways in which nurses can prevent nosocomial infections. The articles clearly identify various ways nosocomial infections are transmitted and give possible solutions of avoiding it. Therefore, the findings are solely about preventive measures for nosocomial infections rather than its definition.

The findings from the study can be used by nurses in identifying the factors that aid nosocomial infections and how to avoid them to be good healthcare professionals. The writer clearly and openly discusses major reasons for nosocomial infections and give solutions to the menace. The study can also be useful to the public in general as it teaches importance of aseptic techniques in general and especially in hospitals. The theory of unitary human beings is a theory found suitable for the study.

8 Conclusion

It has become difficult for healthcare administrations and infection control committees to reach the goal for elimination of intervals with increased burden of nosocomial infections and antimicrobial resistance. By practicing sound and healthy ways for care delivery designed by infection control committees, controlling transmission of infections using appropriate methods for antimicrobial use, the resistance in emerging pathogens against antimicrobials can be reduced easily. Proper training for hospital staff for biosafety, proper waste management and healthcare reforms and making the public aware of these endemic infections can also help in reduction of nosocomial infections.

Nosocomial infections play a big role in the amount of time a patient need to stay in the hospital as well as amount of medical costs to be paid. If a patient prolongs their stay in the hospital because of a nosocomial infection, the experience can be frustrating as they may need to part with more than what they had initially expected to spend. Infection control and preventions plays a big role and healthcare workers are expected to adhere to rules and guidelines of treatment. The public is also supposed to be trained on the aseptic techniques when they visit their loved ones in hospitals. This will reduce the spread of microbes from outside to hospitals.

Nosocomial infections may also be a big problem to the medical facility for if patients do not get well and go home, the facility may be required to house more than the required capacity at a given time.

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10 Appendix Table of data sources

Author and year	Title	Place of study	Method	Aim of study	The main outcome
Melariri et al. 2021	Training, attitudes and practices among healthcare professionals in the Nelson Mandela Bay municipality, South Africa.	South Africa.	Content analysis.	To determine how training, attitude and practice of healthcare professionals influence their practice.	The healthcare professionals have positive attitude towards health practice but their training in these fields limits them to effectively practice.
English, K.M et al. 2018	Contact among healthcare workers in the hospital setting: developing the evidence base for innovative approaches to infection control.	Canada.	Content analysis.	To identify relationship between healthcare workers movements and contact patterns with a healthcare facility and hospital acquired infections.	Healthcare workers patterns and spatial movement demonstrate significant heterogeneity by occupation.

Salem, O.A.	Knowledge and practices of nurses in infection prevention and control within a tertiary care hospital.	Saudi Arabia.	Content analysis.	To evaluate the knowledge and practices of nurses in relation to infection control measures.	Majority of the nurses had good knowledge about infection control measures, but they showed lack of practice in hand washing and using gloving which are the most significant items to prevent transmission of infections.
Di Filippo et. al	Infection prevention in the intensive care unit	Italy	Content analysis	To identify ways of infection prevention in intensive care units	Intensive care unit nurses had good ideas in infection prevention but needed more training
Last, J.M 2001	A dictionary of epidemiology	Canada	Content analysis	To study epidemiology of diseases	The article identified the

					root of infections
Damani, N.	Manual of infection prevention and control	United Kingdom	Content analysis	Ways of infection prevention and control	The health care workers were able to get more highlight on spread of infection and how to control it