Integrated Infection Control Strategies Across Healthcare Professionals: Multidisciplinary Approach

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| **Abstract**  Healthcare professionals need to understand the serious consequences of healthcare worker-acquired infections. The financial, medical, and social costs to hospitals and patients are enormous. Aggressive infection control measures need to be put in place and upheld in order to reduce the frequency of Healthcare professionals -acquired infections. Evidence-based guidelines for the management of Healthcare professionals -acquired infections have been produced and are still being developed by researchers and national bodies. It is imperative to use a multimodal approach that includes closure wards in outbreaks, infection prevention committees, antimicrobial stewardship programs, daily reassessments-intervention packages, identifying and decreasing risk factors, and ongoing staff education programs. Hospital infection control techniques are a developing field of study to ensure healthcare, hospital and patient safety and quality.  **Keywords:** “Policies”, “Strategies”, “Infection Control”, “Health Worker”, “Safe Practice”, “Acquired Infection”. |

**Introduction**

Hospital practitioners, organizations, and governments have been worried about infections in community and hospital settings for generations. However, in the last few decades, there has been a greater emphasis on the prevention and control of diseases known as health care-associated infections (HAIs). Although there are no global estimates of the incidence of HAIs, it is believed that over four million patients in Europe and 1.7 million in the USA get infected annually, with developing nations having a greater prevalence**.** **(WHO., 2011; Allegranzi et al 2011).**

The estimated prevalence of HAIs was 4%, meaning that 1 in every 25 acute care patients experienced at least one HAI on any given day **(Magil et al.,2014).** Global data reveal that HAIs are the most common adverse event, happening 7.6% of the time globally, according to reports from high-income nations. **(Allegranzi et al 2011).** The difficulties associated with healthcare-associated infections (HAIs) are more acute in an era of rising antimicrobial resistance. This makes it difficult to diagnose and treat patients who are infected or colonized, and it makes limiting the spread of pathogens among patients a vital component of infection prevention and control (**WHO., 2011)**.

Patients incur additional medical expenses, personal expenses, and avoidable negative clinical consequences when they are infected or colonized with a health care-associated pathogen **(currie et al.,2018).** When vulnerable individuals come into contact with contagious microorganisms while receiving care in a medical facility, Healthcare professional-associated infections may result. Whether due to illness, immunosuppressive therapy, invasive procedures, or contact with other infected people, patients in hospitals and long-term care facilities are often more prone to infections than those in the community. Direct contact with infected hands or indirect contact with contaminated objects, such as patient care equipment, healthcare personnel' uniforms, and environmental surfaces, are the most common ways that infectious pathogens are transferred **(Public Health Agency of Canada 2012).**

The goal of Standard Precautions and infection control is to lessen the possibility of microorganisms spreading from one person to another, regardless of whether a patient exhibits symptoms. When patients are suspected or confirmed to have an infection, specific measures depending on transmission should be implemented. There are three types of precautions based on transmission: airborne, contact, and droplet. In conjunction with Standard Precautions, these solutions entail incorporating additional measures based on the path of transmission of the identified or suspected causal microorganism **(Siegel 2007).** Numerous guidelines have been released to manage certain microorganisms, such Clostridium difficile or norovirus; these guidelines complement Standard Precautions rather than substitute them.

The management of infection control relies heavily on routine procedures like aseptic techniques, single-use devices, reprocessing of instruments and equipment, use of antibiotics, handling and use of blood and blood products, as well as efficient work practices and procedures and environmental management practices like managing hospital/clinical waste **(WHO.,2004).**

Despite the Standard Precautions being widely adopted by organizations, there are still gaps in how healthcare professionals apply them. **(Powers et al., 2016)**. Healthcare professionals have identified a number of obstacles, including poor working conditions, ax lack of handwashing stations, a lack of awareness concerning transmission, a lack of personal protective equipment (PPE), risky worker behavior, and inadequate infrastructure **(Porto and Marziale 2016; Oliveira 2010).** As a result, strategies to encourage the application of Standard Precautions as the cornerstone of infection prevention and control have been developed.

**Method**

There were nine articles included in the review according to certain criteria using electronic research of Google Scholar and reviewing the CINAHIL, PubMed, Medline, and Scopus databases. In addition, the websites of the World Health Organization, the International Center for Infectious Diseases, and the Centers for Disease Control and Prevention were among the related websites that were looked up. English was the language used for the studies. The terms that were employed in the search were "infection control" "strategies," "polices," "healthcare," "health staff safety protocol. To find more research, a manual review of the reference lists of the pertinent papers was done.

The titles and abstracts of every article that came up in the searches, as well as the complete texts of the pertinent papers that were found, were examined separately by two authors. The criteria outlined below were used by the reviewers to evaluate the published full-text papers for inclusion; those that did not satisfy all of the requirements were rejected. and third other party adjudication was used to settle disagreements during the full-text review, abstract and title screening, and full-text evaluation.

**Literature Review**

**Purpose of the review: -**

The purpose of the present systematic review is to evaluate the approaches for infection control across Healthcare Professionals through previous studies that focus on the integrated infection control strategies and different intervention across healthcare workers.

**Search Design and selection**

**(Inclusion and Exclusion Standards)**

Evaluate original research studies and reviews evaluating the infection control strategies across healthcare Professionals to prevent infection prevalence. Research released between 2009 to January 2022 that were written in English or other language, and concerns infection control strategies, Research on various infection control interventions were also included., healthcare professional subjects and no geographical restrictions were considered. Publications, without peer review, webcasts, surveys, secondary data analysis, non-original reports, editorials, letters, cost assessments, were also rejected.

**Participants in selected studies**

Any healthcare worker responsible for patient care in a hospital, long-term care facility, community setting, or artificial environment like a classroom or learning lab, including professionals like doctors, nurses, and pharmacists as well as other workers as radiology porters and nursing assistants. There were no appreciable limitations on the requirements for eligibility**.**

**Data Extraction and Quality Assessment**

The authors of the review independently evaluated and abstracted the data from the 9 publications that met the inclusion standards. After the included studies were thoroughly examined, pertinent information was taken from each publication based on the following criteria: An author extracted and documented the study design, setting and demographic characteristics, causative pathogen(s), specifics of other interventions for infection control, results pertinent to the review, and the outcome (role of various techniques for infection control). the procedure comprised evaluation of previous studies the authors used methodological, reliable, and health worker interventional criteria to assess and choose the data from the literature search.

The quality of the incorporated research was assessed using standardized tools appropriate for the various study designs. Narratively, the research findings from the studies that were included were merged.

**Result**

There were 439 items located from 2013 to September 2022 of them, 388 did not meet the inclusion criteria, consequently 51 full-text publications were examined. After further revision, 9 articles were finally included in the systematic review.

**Table (1): - summary for approved research: strategies for infection prevention and control, as well as targeted interventions**

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| Cite | Setting, country | I.C intervention | outcome | Pathogen type |
| (García et al., 2009) | ICUs at a tertiary hospital, Spain | Cleaning/disinfection (intervention); clinical procedures limited; isolation; dedicated HCW; contact precautions; HCW and environmental screening; education | Cleaning/disinfection led to a decrease from 3.2 to 1.6 episodes per 100 patients, and incidence density of 9.2 to 5 infections per 1000d of stay | predominant infection Acinetobacter baumannii |
| (Illingworth et al.,2011) | Teaching hospital, England | 2006–2008: Early ward closure | New policy led to significant reduction in: length of closure (p < 0 .041) and in bed-days lost (p < 0.001) | Gastrointestinal: norovirus |
| 2008–2010: Closure of ward bays; architectural installation; environmental disinfections; enlarged infection control team |
| (Haill et al.,2012) | Teaching hospital, England | 2005–2007: ward closure; meet criteria before reopening; terminal cleaning | 1-Many norovirus outbreaks can be controlled by bay closures when combined with adequate infection control support  2- New policy are essential for reducing: duration of closure from 6d to 5d and bed-days lost from 180 to 96A | Gastrointestinal: norovirus |
| 2007–2011: isolation in bays to facilitate disinfection |
| (Nathavitharana et al.,2017) | Teaching hospital, United Kingdom | robust monitoring and evaluation (WHO checklist for periodic evaluation of TB-IC in health-care facilities | The National TB Program and the global WHO level are essential for reducing the spread of nosocomial TB, including occupational TB. | nosocomial TB transmission |
| (Baldwin et al.,2010 | health administration areas in Northern Ireland. | infection control education and training program | significantly higher infection control audit scores within the intervention group. But The program had no effect on MRSA prevalence among residents or staff over the 12-month study period | methicillin-resistant Staphylococcus aureus |
| (Sandoe et al.,2015) | The BSAC was the host organization in collaboration with the BCS, BHRS, BHVS and BSE.in United Kingdom | treatment policies and guideline NICE guidelines es used in the development of educational and training material by the relevant professional societies. | Antibacterial prophylaxis was potentially beneficial, skin antisepsis concluded | ICED infections by Gram positive (68-93%) or  Gram negative (18%) bacteria |
| (Mamishi et al.,2014). | Medical Center Hospital, a teaching children's hospital and a tertiary care referral unit in Tehran, Iran | evidence-based guidelines | improvements in infection control practices in the hospital among health workers | Nosocomial infection |
| (Li et al.,2021). | Operating room in hospital, china | an approach for infection control for all healthcare workers and patients in preoperative areas. | reduction in cases suggests this is an effective technique. | Corona-virus |
| Browne et al.,2022). | 10 wards of one large Australian hospital | dedicated cleaning and disinfection of shared medical equipment on each ward. | risk in the environment will be significantly reduced. | Nosocomial infection |

\*Implantable cardiac electronic devices (ICEDs).

\*methicillin-resistant Staphylococcus aureus (MRSA)

**Discussion**

An IPC program or strategy must include a number of crucial components, including governance, policy and procedure, education and training, surveillance, and hospital hygiene monitoring. All services should address these components. The effectiveness and impact of infection control are reduced when there is no management strategy in place or when clinical and managerial influence is minimal.

Strategic managerial involvement is crucial to ensuring that efficient infection control measures are in place, as is the backing of senior management and clinical directorate heads. Health care providers and individuals alike bear the obligation of preventing nosocomial infections. One of the most crucial phases in the planning and monitoring of infection control is the selection of relevant health-related indicators. Patients may be at danger if strategic decision-makers lack the information or the mechanisms to guarantee that infection control is considered, as well as if they fail to monitor a range of procedures, results, and incidents **(Brannigan et al.,2009).**

The three categories of infection prevention strategies according to **(Olsen and fraser.,2002)** are education-based, process-based, and systems-based. Other solutions, such "use antibiotics wisely" and "educate and train staff," have been proposed, but putting them into practice could be challenging and ambiguous **(fleming et al.,2000).**

**Multidisciplinary group and teamwork**

In order to safeguard the public's health, health officials must manage infection. In every environment, an infection control committee is essential for information sharing since it offers interdisciplinary cooperation and feedback. The infection control committee is in charge of creating policies that address infection prevention and control by offering fundamental infection control measures, educating and training healthcare workers, identifying potential hazards, and implementing improved practices to lower likely risks across the board in the healthcare facility **(Mamishi et al.,2014).**

The previous study agrees with the WHO.,2014 guidelines that reveals that the daily operations of the infection control program, including scientific and technical support roles like research and surveillance, practice supervision, sterilization and disinfection supervision, and the implementation of suitable staff training in infection control and safety management, fall under the purview of the infection control team.

**Behavioral transformation**

In 2007 the study of whitby and his colleagues revealed that the most difficult challenges in some situations is behavioral change, particularly in developing nations like Iran. It has been demonstrated that workforce levels and training have a significant correlation with infection risk. Despite training initiatives, hand hygiene standards violations—which are often regarded as the most crucial infection control strategy—may result in cross-contamination of patients by healthcare workers whose hands are contaminated **(whitby et al.,2007). prescription guidelines for antibiotics**

Monitoring the use of antibiotics is another crucial component in every environment, requiring multidisciplinary and multidimensional approaches. The most successful interventions, according to reports, are those that alter prescription behavior. Furthermore, the most consistently successful methods for lowering the use of antibiotics have been the primary care environment, patient-based interventions such as patient leaflets and nonprescription pads, and enhancing prescribers' ability to communicate with patients **(Francis et al.,2009).**

A multidisciplinary approach aimed at reducing the unnecessary prescription of antibiotics was evaluated by Saizy-Callaert et al., 2003.Four goals were part of the program: training for prescribers, a restricted prescription strategy for the priciest antibiotics, and local consensus on a prescribing guide. This strategy altered the way that prescriptions were written, and as a result, the percentage of improper prescriptions decreased significantly from 6% to 3% **(Saizy-Callaert et al., 2003).**

**Monitoring hospital and hand hygiene**

In order to monitor the implementation and efficacy of the hospital's routine procedures on cleaning, housekeeping, disinfecting or sterilizing instruments and equipment, improved clinical waste disposal procedures and segregating clinical and other waste, and kitchen hygiene, infection control teams should work in conjunction with other pertinent staff members. Infection control teams should conduct an environmental audit cycle that includes problem identification, pertinent education and training, an action plan, and a reaudit.In a neonatal intensive care unit **(Mamishi et al.,2014).**

Usually, HCWs' hands are the source of MRSA and VRE transmission during temporary contact based upon the results of **(ducel et al.,2002).** While **Helder et al.,2010** investigated the impact of a multimodal intervention on hand hygiene habits and found that following the educational program, there was a noteworthy decrease in nosocomial bloodstream infections.

**Transmission and infection control**

Precautions based on transmission are seen to be essential to infection control procedures. In many studies, moving patients frequently could be a significant risk factor for the spread of bacteria and nosocomial infections. And according to an earlier research, P. aeruginosa would mostly colonize or infect through cross-transmission, the findings showed significant P. aeruginosa cross-transmission between patients from different wards as well as within a single ward. **(pourakbari et al.,2011).** Inadequate infection control practices, risk management, and systems-based solutions may be to blame for the spread of pathogens across the hospital. Inadequate cleaning, disinfection, or sterilization can also lead to the airborne spread of microorganisms from environmental surfaces **(Ghazi et al.,2012).**

**Conclusion:**

It is vital that the institution have a documented policy in place to closely monitor each of them, as well as to measure and provide feedback on specific infection control process measures and ensure that infection control procedures are followed. Maintaining a qualified and integrated infection control strategy depends critically on the regular identification and management of hospital dangers that could endanger people's health, safety, or welfare.

Prior studies on infection control among healthcare workers at the level of health facilities considered a wide range of contextual and system factors, with a primary focus on health system hardware. To improve and sustainably implement infection control strategies at the health facility level, we must, however, take a whole system approach. To do this, we must: (1) further investigate system cross-cutting influences and interactions that have bearing on the healthcare infection, paying special attention to health system software, policy processes, and the larger context; and (2) develop strategies.

Obstacles to compliance and inadequate facility design, unworkable rules and regulations, no risk management framework, disregard for behavioral change theory, and insufficient responsibility and enforcement by infection control staff

Conclusions concerning the effectiveness of the strategies are challenging because to the wide range of interventions and outcome measures utilized, as well as the significant possibility of bias and variability in the certainty of the evidence. The necessity for more thorough research analyzing comparable intervention kinds and employing comparable outcome measures is highlighted by this review. We found little evidence, which, along with the inconsistent results, decreased our confidence or certainty about the evidence found. It is unclear which strategy, or combination of strategies, is most effective for knowledge of Standard Precautions, or for reducing (potential infection) rates.

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