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Multidisciplinary Approach to Managing Infectious Diseases: The Roles of Health Assistants, Hospital Administration, Dentists, Nursing, Laboratory, and Pharmacy Technicians

Abdulrahman Yahya Malaihi[1], Ahmed bin Abdullah Sultan Al-Otaibi[2], Hassan Abdullah Al-Zaidani[3], Abdullah Mubarak Alharthi[4], Mohammed Abdullah Eidhah Althobaiti[5], Wajd Naser Al Gazlan[6], Abdulmajeed Ghazi M Almutairi[7], Basma Salim Suleiman Al-Balawi[8], Manal Ibrahim Hawsah[9], Ashwag Hassan Abdurhman Al Grash[10], Mohammed Ahmed Alshehri[11], Salem Homoud Alsaleh[12], Mohammed muhayl Alsubaie[13]

Abstract

Infectious diseases are among the major challenges facing healthcare systems today and require an inter-multi-disciplinary approach to their prevention and management. It discusses how nursing, health administration, laboratory, and pharmacy teams put infection control into practice. Nurses perform hygiene and educate patients about the same. Health administrators ensure resource allocation and proper application of policies. Laboratory experts perform timely and appropriate diagnostics to facilitate treatment decisions, and pharmacy teams ensure that AMS initiatives are taken forward. It has been a very crucial contribution of all these teams combined in reducing healthcare-acquired infections and offering the best welfare to the patients. The findings call for increased collaboration with continued upgrades relentlessly in combating infectious diseases within healthcare settings.

Keywords: *Prevention of Infectious Diseases, Collaboration Between Multi-Disciplines, Infection Control, Antimicrobial Stewardship, Diagnostics.*

Introduction

Infectious diseases present the main concern of the care environment and are very important problems for patient safety and public health. Health-associated infections (HAIs) reflect the need for global strategies both in direct care for patients and in the implementation of control measures within the health system. Because of such challenges, the multidisciplinary effort calls for health assistants, hospital administrators, dentists, nurses, laboratory professionals, and pharmacy technicians to integrate their efforts in solving them. To that effect, through the use of the evidence-based approach, health settings would manage to reduce infectious diseases among patients and achieve good patient outcomes (Pereira et al., 2020).

Success in the management of infectious diseases depends on adherence to infection control practices and available resources. Several professions bring different insights and areas of expertise into play keeping hands clean to monitoring trends in antimicrobial resistance. It is the laboratory professionals who provide

[1] Health Assistant, Bish General Hospital, Jazan Health Cluster
[2] Health Assistant/Health Security, Umm Al-Dom General Hospital.
[3] Health Services and Hospitals Specialist, Branch of the Ministry of Health in Taif.
[4] Hospital Administration, Ministry of Health Branch in Taif.
[5] Senior Specialist - Health Administration, Branch of the Ministry of Health in Taif Governorate
[6] GP Dentist, Dharyah Hospital - Al Samouriah
[7] Nursing Technician, Primary Health Care Center in Al-Qadisiyah, Al-Bukayriyah, Al-Qassim Health Cluster
[8] General Nursing, Ahad Hospital
[9] Nursing Specialist, Ouhd Hospital
[10] Nursing, PHC - Al Maseef
[11] Laboratory Specialist, Almajardah General Hospital, Aseer Cluster
[12] Pharmacy Technician, Khammashia Primary Health Care Center
[13] pharmacy technician, Umm aldoam Hospital

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the necessary diagnostic information that informs antimicrobial stewardship, and it is nurses and health assistants who ensure proper infection control practices at the bedside (Rutala & Weber, 2013; Kim & Hwang, 2020). This describes the essence of a coordinated multidisciplinary effort in the fight against HAIs and other emerging infectious diseases.

Moreover, The roles of hospital administrators in resource allocation, staff training, monitoring of compliance, leadership, and development of policies play major roles in infection control. Health teams are fostered through infrastructure building and the creation of a culture that enhances continuous infection prevention. Health professionals, through proper hygiene standards and proper use of antimicrobials, can implement infection control measures in the healthcare setting. These professionals include dentists and pharmacy technicians who can practice infection control in their settings through stringent hygiene standards, patient education, and proper use of antimicrobials (Cleveland et al., 2016; Barlam et al., 2016). This indeed forms a very formidable system for combating infectious diseases in healthcare.

Despite progress made in infection prevention, challenges persist in the form of antimicrobial resistance, resource constraints, and knowledge gaps. These call for more education, innovation, and commitment by all stakeholders: while new technologies and increased capacity to diagnose infections have created new possibilities for enhancing infection management practices, ultimately, multidisciplinary team efforts will determine how much impact infection management practices can make. Multidisciplinary teamwork in infection management and integrating such practices into the daily running of every healthcare system can reduce the burden that infectious diseases place on public health and, eventually, improve patient outcomes (Hillier, 2020; Tacconelli et al., 2018).

Methodology

This review establishes how various groups of healthcare professionals, nursing, health administration, pharmacy, and laboratory teams can work together in infectious disease prevention and management in a healthcare setting. The literature review for this paper draws from published works from 2010 to 2023, searched from online databases including PubMed, Google Scholar, and Scopus. The key phrases that were used in the literature review include "infectious disease prevention," "multidisciplinary collaboration," "health administration and nursing," "infection control in laboratories," and "pharmacy infection management."

The initial search revealed 320 articles. After removing duplicates and unrelated materials, 80 articles were selected for full-text assessment. Of these, considering the relevance and quality of evidence, 47 studies were included in the final synthesis. These studies represented selected randomized controlled trials, cohort studies, systematic reviews, meta-analyses, and observational studies that focused on the different roles of multidisciplinary teams in infection prevention and management. Data extracted focused on infection control strategies, team-based interventions, and the impact of collaborative efforts in healthcare environments.

Literature Review

A literature review of all available data was conducted to study the roles of nursing, health administration, laboratory, and pharmacy professions in the fight against infectious diseases. Searches were conducted in PubMed, Scopus, and Google Scholar with keywords combined in various ways: "nursing and infection control," "health administration in infection management," "diagnostic laboratories and infection prevention," and "pharmacy antimicrobial stewardship." The reference lists of the selected articles were then manually checked to find other relevant literature.

Published in English in peer-reviewed journals between 2010-2023. Articles would be relevant if they dealt with the management of infectious diseases in healthcare using multidisciplinary approaches and if they involved studies such as RCTs, cohort studies, systematic reviews, and observational studies. Exclusions will be non-human subjects, duplicates, and manuscripts unrelated to infection management. A total of 47

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articles were used to synthesize data for this review on the individual and collective functions of these teams.

Evidence from the selected literature demonstrates that each professional group makes significant contributions to infection management. Nurses, for instance, are directly involved in implementing the infection prevention and management plan, patient education, and compliance with hand hygiene and aseptic techniques. Health administrators make infection prevention and control possible by making available resources, assuring compliance, and providing staff education and training. Laboratory professionals support infection prevention and control through accurate diagnosis using advanced diagnostic modalities like polymerase chain reaction and MALDI-TOF that provide information on pathogen identification and resistance patterns. Pharmacy teams contribute to the effort through the optimization of antimicrobial use, assisting programs of antimicrobial stewardship, and developing institution-wide guidelines for infection prevention and control.

These teams collectively contribute to minimizing the cases of HAIs thus improving patient safety. However, various studies outline that better coordination, frequent training, and the use of sophisticated technologies are quite essential to give more positive results.

Discussion

Infectious diseases rank high among the concerns of any healthcare facility. Infectious diseases, therefore, require a combined effort of expertise from various disciplines to be managed and prevented effectively. Each health assistant, hospital administrator, dentist, nurse, laboratory expert, and pharmacy technician has a unique role in the management of infectious diseases. These unique roles complement one another in enhancing patient safety, reducing HAIs, and thereby contributing to improved healthcare outcomes. An integrated multidisciplinary approach in health care service provision enhances collaboration and follows protocols for infection control hence promoting a safe care environment (Pereira et al., 2020).

Health Assistants in Infection Control

Health assistants are first-line care professionals who provide critical support to infection control practices. Their role encompasses hygiene provision in patient-care areas, provision of patient mobilization, and proper handling of medical equipment and supplies. They also play an important role in promoting hand hygiene practices among patients and visitors regarded as a cornerstone of infection prevention (Hillier, 2020). Their role in cleaning frequently touched surfaces, like bed rails, door handles, and other medical equipment, reduces the chances of cross-contamination (Rutala & Weber, 2013).

In addition, they are the connecting forces in the early detection of infection signs, such as fever or change of color of the wound, and thus report them to the nursing staff for timely intervention. It is also within their scope to teach patients and their families about basic hygiene, including proper hand-washing techniques and the use of PPE (Hillier, 2020). The accomplishment of infection prevention guidelines by health assistants therefore goes a long way in minimizing the risk of incidence of HAIs and ensuring a safe care environment.

Role of Hospital Administration in Infection Management

The administration of hospitals has a primary role in the setting of policies, allocation of resources, and the establishment of a safety culture in hospitals regarding infection prevention and control. They would also bear the responsibility for instituting evidence-based infection control programs and surveillance to ensure compliance with national and international guidelines, and would help facilitate education of their staff regarding practices for infection prevention (Allegranzi et al. 2017).

Administrators also supervise the procurement and distribution of supplies essential to infection prevention such as PPE, disinfectants, and anti-microbial agents during outbreaks and public health emergencies (Rutala & Weber 2013).

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Lastly, this administrator will work with the infection control committees to monitor infection rates, conduct audits, and find gaps in compliance. They help facilitate efforts from multidisciplinary teams by allowing open communication among health professionals regarding the critical factors in infection management (Sharma & Paul 2023). The administrators improve patients' safety and reduce the financial burden of HAIs by setting infection prevention as one of the core functions of the hospital.

Dentists in Infection Control

Dentists play a critical role in infection prevention and control in the delivery of dental health services. During procedures, dentists engage in intense infection control, including strict hand hygiene wearing personal protective equipment, and sterilization of dental instruments and equipment (Cleveland et al., 2016). Production of aerosols from scaling and drilling characterizes most dental procedures; it acts as a medium for carrying infectious pathogens; hence, the dental environment has to be highly free from pathogens (Cottone & Molinari, 2017).

Apart from clinical practice, dentists educate patients about their oral health and precautionary measures, such as proper brushing and flossing. The dentists also give the necessary insight to the patients concerning early consultation and treatment so that it may not further deteriorate the infection in oral health. Dentists, by maintaining current information related to emerging infectious diseases and the most up-to-date evidence-based practices, contribute to minimizing the risk of infection transmission within dental settings and patient morbidity (Cleveland et al., 2016).

Nurses as Infection Control Advocates

Nurses are frontline workers in infection prevention and control in health facilities. They are obligated to observe infection control practices such as hand hygiene, aseptic techniques, and appropriate use of personal protection equipment, which will reduce the chances of causing an infection spread(Hillier, 2020). They are engaged in patient surveillance for signs of infections, educating on infection prevention practices, and liaising with other professionals to ensure necessary and timely intervention (Kim & Hwang, 2020).

However, amidst these critical functions, nurses have limiting factors, which include workload, resource gaps, and knowledge gaps that impede their actions in observing infection control standard practices(Njovu, 2016). Focused education and training, followed by feedback and support to organizations, is likely to have an impact on better adherence to infection prevention practices by the nurses (Barrera-Cancedda et al., 2019). Continuous learning and improvement by the nurses are likely to contribute immensely to HAI reduction and yield better patient outcomes too (Lam,2018)

Laboratory Professionals in Diagnosis and Surveillance

Laboratory professionals have become indispensable in the diagnosis, monitoring, and surveillance of infectious diseases. They conduct microbiological tests, including cultures, PCRs, and antimicrobial sensitivity, and contribute to identifying the pathogen and prescriptive treatment (Messacar et al., 2017). Given that the results come in earlier and more accurately, clinicians can implement targeted therapy, reduce the prescription of broad-spectrum antibiotics, and limit the spread of antimicrobial resistance (Riley, 2018).

As true infection prevention and control experts, laboratory professionals also represent a key ally in infection surveillance. These individuals are responsible for monitoring changing pathogen prevalence and resistance patterns that inform infection control policy and support the development of effective antimicrobial stewardship programs. Such programs are imperative for controlling HAIs and emerging infectious diseases (Tacconelli et al., 2018). On their part, pharmacy staff guarantee the quality and reliability of diagnostic tests, providing a foundation for evidence-based practice in infection control (Shafeeq, 2021).

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Pharmacy Technicians and Antimicrobial Stewardship

In infection management, pharmacy technicians play important roles in antimicrobial stewardship programs by assisting pharmacists in reviewing antibiotic prescriptions, monitoring stock levels, and promoting rational use of antimicrobials (Barlam et al., 2016). The major contribution pharmacy technicians make toward the fight against antimicrobial resistance is preventing overuse and misuse of antibiotics; they promote appropriate antimicrobial use for optimal patient outcomes (Dyar et al., 2017).

Pharmacy technicians are involved in preparing sterile medications—such as intravenous antibiotics—under strict aseptic conditions to prevent contamination (Staes et al., 2013). They play an important role in educating patients on the appropriate use of antimicrobials, as well as other members of health care teams; this support may involve supplying disinfectants or hand sanitizers during outbreaks to assist infection control efforts (Rutala & Weber, 2013). This strengthens infection prevention and control programs in any healthcare setting (Alomi et al., 2021).

Interprofessional Collaborative Practice of Multidisciplinary Infection Management

Management of infection cannot be left to one person; rather, it requires interdisciplinary coordination between health assistants, hospital administration, dentists, nurses, laboratory professionals, and pharmacy technicians. This is where each discipline contributes expertise to make it holistic. The laboratory professionals would provide diagnostic information which is followed by the pharmacy technicians to undertake antimicrobial stewardship. Then, the nurses apply infection control practices at the patient's bedside (Tacconelli et al., 2018).

Administrators can provide a coordinating role at policy levels, resource allocation, and encouraging efforts toward collaboration. Dentists and health assistants add up by maintaining hygiene within the clinical settings and educating patients to observe infection prevention practices (Allegranzi et al., 2017). All these professionals thereby establish a very strong platform for managing infectious diseases and ensuring patient safety (Sharma & Paul, 2023).

Conclusion

The best way to prevent and manage infectious diseases in healthcare involves a unified and comprehensive approach, which incorporates nursing, health administration, laboratory, and pharmacy teams. Nurses are very important in implementing hygiene practices, educating patients, and following through with infection prevention practices. Health administrators also play a very crucial role in resource management, developing policies, and training staff for infection prevention. The laboratory professional provides the diagnostic service accurately and on time, which is invaluable in making treatment decisions, while pharmacy teams work to optimize antimicrobial use and lead stewardship programs. All these professionals together form the backbone of any effective infection management strategy.

Besides the successes, there is still a long way to go; for instance, better interdepartmental communications, availability of sophisticated diagnostic facilities, and education on AMR. Future initiatives need to be geared toward increasing collaboration, integrating new technologies, and tailoring infection control practices to specific healthcare settings. This will enable leveraging the strengths of each team for the healthcare system to better achieve radical reductions in healthcare-associated infections, improvement in patient safety, and overall outcomes.

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