JOURNAL OF INTERNATIONAL CRISIS AND RISK COMMUNICATION RESEARCH
ISSN: 2576-0017
2024, VOL 7, NO S8

Crisis Management in Healthcare: Guiding Nursing Professionals and Midwives to Optimize Informatics for Enhanced Health Surveillance, Effective Communication, and Sterilization Practices

Aisha Ali Abutaleb Mubaraki[1], Fayruz Abdullah Almasoud[2], Sahari Sultan Salman Alyami[3], Hamda saleh Ali alyami[4], Afnan Mousa Yahya Daghriri[5], Mohammad saad alshaklia[6], SALEH MASHHUR ALGHAMDI[7] , ALhussain Ali Hamad Alyami[8], Saleh Hassan Saleh Alyami[9]

1 East jeddah Hospital
Nursing.
2 Nursing midwife
Albalad dispensary
3 King Khalid hospital najran
Nursing midwife.
4 Nursing technician
King khalid hospital Najran.
5 Healing informatics specialist
Al-ahsa Health cluster
6 Hospital Administration Specialist
Jeddah Mental Health Hospital
7 Health administration specialist
Psychiatric Hospital in Jeddah
8 Nursing Specialist
Najran health cluster, Kingdom of Saudi Arabia
9 Anaesthesia tech
Najran General Hospital

Abstract

Healthcare crisis management necessitates the integration of informatics to guide nursing professionals and midwives in enhancing health surveillance, effective communication, and sterilization practices. This paper explores the intersection of crisis management principles and healthcare informatics, emphasizing the roles of nurses and midwives in ensuring quality care during crises. By leveraging informatics tools for health surveillance, professionals can identify emerging threats, implement evidence-based interventions, and maintain aseptic conditions to minimize risks of infection. Effective communication frameworks are analyzed to optimize team coordination and stakeholder engagement. Additionally, the importance of robust sterilization protocols is highlighted as a cornerstone of infection control in healthcare settings. Challenges such as workforce shortages, resource limitations, and ethical dilemmas are addressed, alongside innovations in technology and interdisciplinary collaboration to strengthen crisis response systems. This study underscores the pivotal role of informatics in bridging gaps in healthcare delivery and promoting resilience against crises.

Keywords: Healthcare crisis management, nursing professionals, midwives, health informatics, health surveillance, effective communication, sterilization practices, infection control, interdisciplinary collaboration, healthcare innovation.

1. Introduction to Crisis Management in Healthcare

Crisis management in complex organizations has become a point of interest due to its many particular applications, and in the case of the healthcare sector, the tasks become more complicated and comprehensive. There are diverse factors that generally alter the different agents based on the particular conditions and characteristics of the healthcare organization. In general terms, moral values have to contemplate a certain sense of calling as well as a continuous tension between serving their charge at any time with the highest demands that an individual, or collective, in this case, a team, can assume nearly permanently. In healthcare, particularly when managed by complex institutions, many care crises are part of common occurrences in everyday tasks. There is a wide variety of special circumstances, a certain normlessness, which is integrated with the regular professional care of the various members. Patients are indifferent to their own actions, defined by a particular medical condition that requires attention and healthcare by medical personnel. It is also clearly important that on some occasions can be a source of claims that express some harmful effects, or it may be regarding the actions of a group of professionals where some elements or organizational structures are a source of laxity, incomplete knowledge, lack of care, or guarantees that are expected from providers of service to the healthcare user.

1.1. Defining Crisis Management

Crisis management is essential in situations of threat, when a sudden side effect of either a natural or manmade disaster strikes. A crisis is characterized by surprise and how it exceeds available resources. Crisis management is about going from a state of surprise, confusion, and unclear responsibilities to a clear, mutually agreed framework of decision-making among a number of organizations and often solves multiple problems. Crisis management is about understanding and making an intervention in the concentration of problem-solving processes of those who are involved in solving individual problems. In other words, a crisis occurs if an event provides past or future consequences and will lead to multiple serious problems unless it is apparent. (Krichen et al.2024)

Crisis management defines how to deal with authority and structure, safety, and security. Bringing order to a temporary imbalance is characteristic of crisis management. The better the crisis is anticipated, planned, and exercised for, the higher the probability that the crisis will be managed correctly. Crisis management focuses on preparing, implementing, and recovering from the situation. Crisis management places a strong responsibility for health on the organization and its managers. It is about introductions, guiding concepts and ideas, as well as giving some advice to handle an unpredicted event and prevent it from igniting. (Hao et al., 2020)

1.2. Importance of Crisis Management in Healthcare

At present, healthcare delivery makes heavy use of both traditional and information technology (IT)-enabled practices. Avoiding events with unanticipated consequences, which we will for convenience term as crises, is the goal of organizations such as those contained within national health ministries. Quality, cost, and efficiency, among other criteria, are used in order to define healthcare delivery. Health surveillance, comprising monitoring, prevention, and control, is fundamental to achieving this goal. The nursing profession, including midwives, is the largest group working in healthcare, with regular and prolonged contact with the population delivering care. With its presence and diversified content, the care provided by nurses is influenced by the environment, habits, and lifestyles presented by the individuals they care for. In the presence of community-acquired diseases, including the re-emergence of long-term uncontrolled diseases, midwives and medical professionals collaborate in order to avoid such situations. The effective communication introduced by nursing professionals in the coordination work conveyed is important. Cleanliness and hygiene, in particular effective sterilization practices, are important in preventing infection and ensuring aseptic conditions. With nursing professionals in short supply, their resistance to work skepticism regarding the top-down strategy of organizations dimensioning the team, composition, and real working conditions means they face difficulties in performing their activities. Promoting the demonstration of the performance indicators' relation to the added value in using informatics in the various activities may help overcome these complications in the perception of contributions to the healthcare parity act.

2. Role of Nursing Professionals and Midwives in Crisis Management

Nursing professionals have been noted for their caring attitude and knowledge of healthcare by providing primary healthcare services. Their roles are recognized by society, with the trust that patients and communities give to nursing professionals. Their training is not only for nursing treatment but also for doctors and other nursing professionals. Prior to providing patients with specialized care, nursing professionals have wider communication with patients and assess the care activities that will allow for more effective diagnosis. They also take on the role of supervising the implementation of treatment and performing follow-up. Throughout the entire stage or phases of healthcare, the nursing professional carries out these responsibilities.

Recognizing that nursing professionals and midwives are important, the data used for these purposes are valid. To strengthen health security activities and risk behavior research, these healthcare providers can provide important surveillance data. There is a shortage of such information generated by nurses and midwives working in health facilities that are well-coordinated and equipped with the Division of Infectious Disease Epidemiology and Laboratories in the Ministry of Health. This is because the information from nurses and midwives would provide insight into the

rate of adherence to infection prevention and sterilization practices, perception of risk for exposure to infectious diseases, as well as knowledge, attitudes, and practices on disease control.

2.1. Responsibilities and Duties

When crisis management is discussed, it must be determined what the requirements are, how and what facilities will be provided, and what kind of organization should be established. Likewise, the responsibilities and duties of the heads and all members of the organization should be determined. Depending on the nature of the crisis that may arise in hospitals and urgent care institutions, make an inventory in the form of a handbook or guide that includes the necessary preparedness requirements, emergency scenarios, staff responsibilities, information management rules, contact numbers, etc., which will be used in the process of crisis management planning. The importance of a plan is emphasized. Responsibilities and duties should be determined according to the background of an institution, its structure, and its financial and social reality, to define who will do what to whom and how, based on potential threats and hazards and the specific needs of the institution. (Abbas et al.2021)

The primary concern of a healthcare institution is the patient. It is, therefore, important to ensure that staff will provide the necessary care to patients in case of emergencies. In essence, patient examinations are performed in real time, and current medical services will continue. In contrast, if the work has the mass characteristic associated with the emergency, the pre-arranged crisis management plan and the management regime will be applied. These procedures will be followed by the essential disease prevention and public health response during and following the emergency event. Health services in healthcare institutions will not be suspended because of an anticipated crisis. Detailed security planning may be required at various alternative service locations in cases in which there is a potential threat to healthcare institutions. Also important are the security of health institutions and the control and restriction of access to necessary individuals. As necessary, it is imperative to ensure the rapid development of crisis response systems in support of healthcare institutions, such as medical personnel, equipment, and disease prevention information publication.

2.2. Challenges Faced by Nursing Professionals and Midwives

Midwives and nurses are required to be ready for any crisis that may arise in their service area. They can be asked to serve in areas unfamiliar to them, and they may be exposed to numerous risks during this service. In many cases, they lack both opportunities and knowledge. They are generally not paid sufficient attention, nor do they have comfortable working opportunities that match the efforts they put in. Everywhere throughout the world, nurses and midwives are more susceptible to contagious diseases compared to those working in other professions. In addition to these problems, there are also high rates of physical, psychological, and psychosocial side effects.

It has been shown that the presented service is generally not adequate in cases where they are exposed to environmental violence. Since fast services are given in the areas they work in, it is seen that this causes more physical injuries. There are many risks in the service areas of midwives and nurses in health institutions. However, one way to avoid encountering these risks is to increase the opportunities and provide preventive services.

3. Utilizing Informatics in Healthcare Crisis Management

Crisis management in healthcare: guiding nursing professionals and midwives to optimize informatics for enhanced health surveillance, effective communication, and sterilization practices. Utilizing informatics in healthcare crisis management is crucial to uphold the health and safety of healthcare providers and patients by enhancing safety and infection control. Indeed, crisis management in healthcare can be optimized and enhanced using the different facets of informatics. During outbreaks, health informatics has important roles in health surveillance, effective communication, and ensuring appropriate sterilization practices, nestled in all other efforts needed for pandemic preparedness. These points include health surveillance, conducting effective communication, training and policy development, and empowering professional control. The use of informatics in surveillance involves using electronic health records to manage health complaints to identify emerging infectious diseases, syndromic surveillance tools to monitor public health, and the use of technology to detect and monitor diseases among communities using platforms that enable surveillance during crises. Furthermore, the use of information systems and data analytics in healthcare can be used to track the handling of an outbreak as well as active data collection needed for further epidemiologic investigation and control protocols. In informatics for surveillance, the potential of barcoding or radio frequency identification in tracking biological, chemical, or radiologic contamination is crucial not only for patients but also for supplies in healthcare settings.

3.1. Overview of Health Informatics

Health informatics is a relatively new and rapidly evolving specialty area within information technology. It is uniquely defined to optimize the use of information, often assisted by the use of technology, to improve individual health, health care, public health, and biomedical research. The core area of health informatics includes the study and use of such systems that support the effective and efficient acquisition, management, and use of data, information, and knowledge.

Improving health surveillance to avert potential public health crises is one of the 21st century information challenges confronting the world community. It has been predicted that if health information is made more accessible, the response time in detecting the outbreak of diseases would be reduced, thus averting potential public health crises. Ensuring the effective collection, analysis, interpretation, and dissemination of data to forecast, identify, and respond to public health threats at the earliest possible moment is among the major strategic initiatives to protect Americans. Prompt and accurate communication among healthcare professionals,

decision-makers, and the media is crucial to keeping the public notified in an effective manner. While an interdisciplinary or multidisciplinary approach is required for health informatics, scholars and health informatics experts argue that the special focus of informaticians is to optimize the use of data, information, and knowledge collected and applied by professionals in health and biomedicine. In sum, health informatics can help optimize health surveillance via healthcare professionals. (Allam & Jones, 2020)(Keshta & Odeh, 2021)(Nasiri & Khosravani, 2020)

3.2. Benefits of Health Informatics in Crisis Management

Health informatics is a rapidly developing discipline that plays a vital role in addressing and resolving various complexities in patient care. By harnessing the power of technology and data, it enables nurses and midwives to receive timely and accurate health updates, empowering them to take immediate action in critical health crises. The field of health informatics not only facilitates effective communication systems but also equips nurses with comprehensive alerts and notifications, thereby enhancing the quality of individual patient care as well as overall population health. Through seamless collaboration between healthcare professionals and advanced health informatics technologies, the burden on nurses is significantly alleviated, leading to improved efficiency and productivity. Moreover, the integration of health informatics optimizes the process of data collection and analysis, providing healthcare providers with a wealth of valuable insights. This invaluable data contributes to evidence-based practices, enabling better decision-making and enhancing the overall quality of care provided to patients. Furthermore, healthinformatics plays a pivotal role in fostering interdisciplinary collaborations among healthcare professionals. By establishing efficient communication channels and promoting the exchange of information and expertise, it strengthens teamwork and enhances coordination among different healthcare sectors. This multidisciplinary approach not only improves patient outcomes but also ensures greater consistency and continuity in healthcare delivery. In summary, healthinformatics is a dynamic and essential field that empowers nurses and midwives in delivering exceptional patient care. With its emphasis on real-time information exchange, improved communication systems, and streamlined data analytics, it serves as a key catalyst for positive change in healthcare. By embracing health informatics, healthcare organizations can effectively address challenges, promote innovation, and ultimately improve health outcomes for individuals and communities alike. (Atique et al.2020) (Okolo et al., 2024) (Awrahman et al.2022)

4. Enhancing Health Surveillance during Crisis Situations

Crisis and disaster, natural or induced, can cause extreme distress to society, risking public health and welfare. In this chapter, we guide nursing professionals and midwives in building effective structures using health surveillance informatics to face and manage public health emergencies and crises effectively. Informatics interventions in health surveillance can strengthen public health preparedness, detection, forecasting, risk assessment, and response in times of crisis situations, and early containment, helping to prevent and protect against public health threats

and their effects. Studies reveal that the effectiveness of global, national, and regional surveillance systems is uneven, with substantial and persistent shortcomings, especially during time-sensitive and rapidly evolving emergency situations. The increasing vulnerability of societies to human, zoonotic, and pathogen threats is of significant concern. (Gholamzadeh et al.2021)

Stress to public health security agencies the urgency of improvements in the effectiveness, efficiency, and flexibility of global resource mapping, development, implementation, and continuous evaluation of national public health surveillance systems focused on timely, consistent, and realistic evidence-based information. Efficiency and effectiveness depend on the outcome of resources and vigilance as well as on sustainable and equitable partnerships supported by international technical cooperation, permanent research, training, advocacy, and sustainable global health governance structures. In this chapter, we hope to train and guide nursing professionals and midwives to adopt sustainable methods, tools, and practices with informatics in health surveillance in order to face and meet common and complex crisis issues that arise, such as pathogen exposure, violent behaviors, cyberattacks, and other unexpected security threats, susceptibility and vulnerability of hospital structures, and the strengthening of both organizational optimization and effective community engagement required for overall patient safety. (Heaslip et al.2024)(Hübner et al., 2022)

4.1. Importance of Health Surveillance

Statistics are an important tool in managing healthcare affairs. In Eastern Europe and the Commonwealth of Independent States, hospitals report that roughly 25% of all children die without having ever been born. Such reporting is very important; otherwise, the pursuit of knowledge about who these children are and why they died becomes more difficult. Countries with efficient health surveillance systems—almost 16% of all low-income countries have extensive systems—live, on average, 14 years longer in health than developing countries with inadequate resources. Nationally, systematic methods exist for measuring disease and injuries, and the system encompasses the chronological, geographical, and personal details of each case. Health surveillance improves system operations and enables prioritization of resources. (Coffman et al.2021)

Clinical informatics can save lives by integrating with health surveillance systems. It offers tools for hospital- and national-level surveillance in both developed and developing areas. The focus is on data access, communication, education, and management. Patient data during hospital stays and diagnosis-related grouping codes are used to determine the cause of death. Control charts based on inpatient sequences can predict impending deaths 24 to 36 hours in advance, allowing for intervention to prevent untimely demise.

4.2. Technologies and Tools for Health Surveillance

The regular and structured collection, analysis, interpretation, and dissemination of health data and information, providing priority information for decision makers at

all levels in a health system, are central to health management. Health surveillance is the systematic process of analyzing and disseminating information related to health threats. Its function is to provide relevant data in real time, so the response can be efficient. With the increase in the use of the internet and mobile phones for accessing and producing data, the concept of eHealth is evolving to incorporate health surveillance functions. It encourages patients' engagement and empowerment, offering them tools and resources for not only taking care of their own health, but also to monitor and measure health data supported by real-time communication methodologies.

The use of information and communications technology for health surveillance as a component of public health, in terms of significance and nature of the data collected, consistency of the information, and communication of the data with sufficiently low duration, is identified as a transformative tool. New and emerging active data collection paradigms have changed the role of nurses. It is no longer just the data collectors that analyze and disseminate data, no matter how diverse and comprehensive the function. Due to technological advances, changes in sociocultural, economic, and productive patterns, the functioning of surveillance is increasingly important in, for example, the prediction of outbreaks, the detection of events such as new diseases or new patterns of transmission. Interventions focused on specific communities can be formulated and better implemented. A surveillance system contains not only people and rules, but also technologies. Through risk assessment, risk management, risk communication, and partnerships for the control of local, national, and international community health threats, these health surveillance systems play a key role in trust management for public health safety. The objective of this chapter is to provide nurses and midwives access to technologies and tools for health surveillance to fully implement their responsibilities. After an introduction that provides some basic knowledge about health surveillance technologies and tools that also include organizational aspects, the chapter is organized into five main sections. The first presents knowledge mapping about the main technologies and tools currently supported by national health surveillance security policies. The remaining sections address procedures for infectious disease notifications and patient safety incidents, methods of epidemiological surveillance, personal protective equipment, and patient room cleaning, as well as a specific personal medical information system for tuberculin. The focus turns to the tools provided by the national public health authority. (Marques & Ferreira, 2020)(Stoumpos et al.2023)

5. Effective Communication Strategies in Crisis Management

The role of the Nurse Informatics Officer is always increasing and evolving. One role they perform is the optimization of the communication process in crises that threaten the life of a patient, such as healthcare-associated infections. Knowing that time is of the essence in solving any crisis, the Nurse Informatics Officer needs to design and adapt the communication process to minimize delays in resolving the issue. There are multiple technologies that have changed and evolved the way we

think of communication, and some of the important technologies to be considered for a nurse manager to manage the crisis and optimize care are telehealth, information systems, sensor systems, and mobile communication. Currently, integrating the multidisciplinary control bundle for a healthcare-associated infection in the health information system may be one of the most powerful means of coordinating the immune host patient needs to eliminate that specific infection in the shortest possible time.

Telehealth has the potential to solve many problems specific to the control of healthcare-associated infections. It offers the possibility of frequent touchpoints in order to screen and successfully identify all patients developing symptoms that made the computerized decision support systems recommend effective health communication. When expert advice is needed, it exists via phone or planned video consultations with the experienced team. It can also help instantly evaluate an area in case of a suspected outbreak initiated by a healthcare-associated infection. Nurses need to utilize telehealth possibilities by persuading patients to accept the difficult-to-understand necessity for telehealth monitoring and finally come to expect and prefer it by engaging them in their telehealth evaluation process and effectively communicating the plan of care based on transmitted information. Through digitally connected patients, vital signs or potential healthcare-associated infection signs transmit to the nurse in real-time; their problem-solving capability, coupled with the patient data, can help the nurse sharpen their next questions in an ongoing virtual patient visit. The system needs to allow the nurse to send back suggested orders to be approved by the patient when manual intervention is needed. Such a shift will help to alleviate the scheduling demand. Ultimately, the use of workforce tools and specialization of function allows for increased trust in the information gathered and the ease and speed with which those results are received. To prevent alert fatigue, nurses should only receive an alert when it is actionable and significant. This can be achieved by utilizing all set criteria at all times to determine if such attention to severity is needed. Should interventions be recommended, this should be done before alert notification is sent to minimize delays and promote the automaticity of interventions. (Cagle Jr et al., 2022)(Kwon et al.2024)

5.1. Communication Models and Theories

Part of developing good communication skills means understanding the communication process, its inherent effects, and its modulatory presence in various contexts. Healthcare is no exception, as multiple and overlapping translational medical communications construct synchrony and harmony in the hospital environment. Since the early years of the 20th century, communication scholars have been working feverishly on the communication process model, and their work has evolved into various models and theories. Model symptoms may have been the deconstruction of elements and their interpretative meanings in analytical and interpretative communication models, visual models, interactive models, politeness models, and five W's models. The infodemiological and infoveillance fields produce data streams before, during, and after outbreaks and pandemics, augmenting

communications by planners with the public in an attempt to mitigate crisis responses and public health responses.

Several steps are involved in putting communication into operation, and the results of the process are usually present at both the sending and receiving ends. Messages, film, and mediation points continue to reveal themselves. From a perspective, a rapid processing of messages can – and will – be taken from the sending end, and the receiver will substitute and have a mediating point through inferential, latent, and medium-used communication. Inferential and latent communication principles are important for rapid communication needs, critical to information-seeking behaviors, and are important principles as crises progress. As citizens and professional healthcare workers are interested in different types of health information, it is crucial that these principles not only keep health information accessible but also up-to-date and unbiased. (Letaief et al.2021)(Chen et al., 2024)(Park et al.2021)

5.2. Barriers to Effective Communication

Barriers to effective communication include a lack of trust and a perceived power differential. A significant part of effective communication is trust. Trust is essential for individuals to feel able to express their thoughts clearly, often on sensitive subjects. It is particularly important when individuals need to raise sensitive patient safety issues requiring interpretation and judgment, and when giving and receiving feedback, to reassure the other person that they have been heard and understood. It was also highlighted that families and patients have intense needs for communication and maintaining relationships, warmth, and trust, and thus communication with staff is also imperative for that trust to be present. The hierarchical structure of hospitals is frequently an impediment to communication. This is evident in the decision not to challenge the clinical decision of a senior colleague. Sometimes communication issues can also be related to psychological complexities experienced by the healthcare team involved. Communication is fundamental to the functioning of safe healthcare organizations. Effective communication is significant for optimal patient outcomes, including a reduction in preventable adverse events, improving patient safety, lessening litigation, and improved health service user satisfaction. Good communication also builds positive relationships with staff and patients, resulting in the successful nursing care of people. Nurses spend the most time with patients compared to any other healthcare provider and therefore need the skills to effectively communicate with patients and perform their job duties. Effective communication relates to advocacy and patient safety. The key components of communication are the distance from the patient, the type of relationship with the patient, the nature of the communication, the setting, and the topic. Environmental factors in the workplace setting can affect communication. For example, workplace stress and high noise levels may impact an individual's ability to concentrate and be in tune with other staff for effective communication. (Rawlinson et al.2021) (Morrison-Smith & Ruiz, 2020)

6. Sterilization Practices in Healthcare Crisis Management

Sterilization processes go beyond the use of disinfecting chemicals and follow specific step-by-step measures aimed at producing a 100% sterilized area. The majority of the spaces perform all these processes, starting from the presterilization area that is prepared to assist in the performance of the packaging service with a clean and airy environment that facilitates the correct completion of all the previous steps. The sterilization service is the core of control in product processing used for patients, as ensuring that the rules are being followed includes the process of sterilization, personnel training, and the concept of quality for sterilized products. This is not always considered in the production of these materials, but it promises the safety of the product and, most importantly, that workers are performing their tasks. This facilitates a better quality of the sterilization activities that take place in health services, which take into account the presence of microorganisms that contaminate products and materials, and are planned using different methods approved by various sciences.

Performing this process is much broader than it seems. When effective in safety, it decreases morbidity and mortality rates, improves the quality of health service performance, creates a culture of evidence, contributes to the rational use of antibiotics, and mainly reduces the costs of treatments and illnesses. The microbiological quality of the instruments used for patients' diagnostic and therapeutic procedures depends to a large extent on the quality of sterilization. Nurses who are part of the medical area question whether the low microbial load from these processes can harm patients' health if they understand that the atmosphere of the environment needs to be controlled using this method of sterilization. I am aware of the contamination to which people who are going to perform the control of sterilized material are exposed. (Dioguardi et al.2021)

6.1. Importance of Sterilization

The sterilization of instruments and other healthcare equipment is one of the fundamentals in healthcare. Every healthcare unit deals with the general and specialized tools that entail sterilization techniques. While every healthcare unit's management, welfare, and survival will be seriously jeopardized due to administrative, human resource, and sterilization equipment issues, the security of services in these healthcare units and the Vaccine Preparation Unit is especially important. Sterilization is given importance in both public and private healthcare organizations' business plans and work programs. Sterilization units are designed such that filters prevent the exit of microbial aerosols into an external environment. Sterilization devices are an essential complement to centralized production. The size and functions of the sterilization devices must be coherent with the needs and tasks of the healthcare structure. Sterilization equipment and supplies must be suitable for assigned activities, and the number of healthcare personnel responding to the number of healthcare activities must be adequate. In other words, people must be provided with knowledge and competencies in order to assign personnel

managing the unit's sterilization and processing those instruments and supply materials. (Rutala & Weber, 2021)

Every healthcare unit should choose the most suitable sterilization techniques. This choice must be made in relation to the number of subjected tools and supply materials, the type of materials and instruments to be processed and sterilized, other services, costs, and the method of providing healthcare. The choice of sterilization is functional to safeguarding the health of patients and healthcare personnel. The human body is a potentially dangerous source of microbial contamination. During resting periods inside a host, cells are not subject to being inactivated by environmental factors. Non-infected people that transmit infections due to physiological and anatomical changes, together with habits and lifestyle, constitute a high-risk category. The use of disposable supplies and sterilization equipment is an encouraging approach. The surface is an essential means of disinfestation, as it removes many materials, thus reducing the risk of creating resistant strains. The flammability of surface disinfectants determines if they also have detergent properties. These detergents are essential when there is a high risk of transmission due to the presence of secretions, excretions, and connection with infected or potentially infected materials and/or surfaces.

6.2. Sterilization Techniques and Protocols

Health care settings, frequently being environments surrounded by or caring for sick individuals, are home to many different viruses, bacteria, fungi, and toxins. Healthcare facilities also expose people to numerous deadly pathogens and serious infections. Infection control is important to prevent the spread of healthcare-related diseases and to keep patients, healthcare workers, and the public at large safe. To prevent the transmission of harmful microbes, infection control in nursing and midwifery care should be in place and rigorously enforced. Implementing an infection prevention program can help to control the spread of infection, reduce microbial colonization, resulting in lower rates of HAIs, create a safer health care environment for front-line workers and patients, and help reduce health care costs. Nurses can play a crucial role in stemming the spread of infection. (Laupland, 2022)

The sterilization of medical and nursing equipment should be a highly regarded and standardized procedure within hospitals and healthcare organizations to minimize the risk of healthcare-acquired infections. The procedures followed are important; they represent the first procedural step in ensuring the sterility of instruments to be used in clinical practice. Nurses should ensure that all sterilization principles are applied, maintained, and followed by every professional involved. Complete proficiency in technical services such as sterilization of medical instruments is required to ensure the well-being and security of the patients attending any healthcare institution. The key goal of instrument sterilization is infection control. The most common way to accomplish sterilization is to apply heat. The sterilization methods rely heavily on and promote the overall efficiency of sterilization. Instruments can be sterilized by using time, heat, and steam under pressure. The simple heavy-duty sterilization wrap is the best to be used for instruments. Prompt and proper validation of sterilization should be the sole task of the end user. All

tools should be inspected, particularly for contamination and deformation, to determine their functionality. The system of sterilization should involve a training package for personnel maintenance.

7. Ethical Considerations in Crisis Management

Crisis management in healthcare facilitates a safe healthcare environment for both patients and healthcare professionals. To prevent crises from exacerbating and evolving, proactive and systematic risk management must be performed, which includes intelligence, planning, readiness, resilience, and involving all healthcare stakeholders. Many measures, interventions, protocols, and procedures are helpful and necessary to prevent and neutralize crises, while others may present ethical challenges and dilemmas related to their implementation. Ethical considerations focusing on the level of patients as well as healthcare professionals will ensure integration and inclusion of all stakeholders' needs and interests, boosting their adherence, ensuring respect for their autonomy, and contributing to their safety and dignity. This chapter aims to identify ethical considerations that must be taken into account in the design, implementation, and revision of strategic protocols for crisis management. (Singh & Matthees, 2021)(Anderson et al.2020)

7.1. Ethical Principles in Healthcare

Ethical dilemmas and decision-making in healthcare are determined by at least two main reasons: the development of science and personal attitude. The growing knowledge of medicine and the possibilities of scientific and technological research result in the development of medical-scientific knowledge that becomes the norm for health practices through an increasing process of personal opacification. Instead, the consideration of the ethical implications of its application and the careful use of public authorities or research institutions represent ways to keep human beings in a central position. The understanding of ethical and bioethical problems facilitates the integration of all actors. Healthcare is a human drama concerning communication between people who perform the role of caregivers and those who are taken care of or their families; it also involves all kinds of intermediaries, including health, legal, and religious authorities. Their concern is primarily focused on the maintenance of life, the promotion of health, the preservation of health, and the adaptation of the scope and holding of the illness and the protection of the autonomy of the individuals concerned. Health professionals have the responsibility to protect these basic ethical principles when they use health informatics. In particular, healthcare workers have the legal obligation to respect confidentiality and professional secrecy. In these circumstances, the task of healthcare workers is to clarify the context of the aids required by individuals and to help them develop techniques to accept the stress caused by different life circumstances.

7.2. Ethical Dilemmas in Crisis Situations

The ethical challenges that arise from exposure to an infectious or contagious disease vary in intensity depending on the level of infection control measures. During SARS, many healthcare workers experienced profound ethical distress

between the duty to serve and their own fear of getting infected. Some professional groups felt at risk compared to others who could stay at home. This contributed to severe burnout with long-lasting consequences for individuals and the workgroup. This is a risk that we have to combat, not only for psychological but also for infection control reasons. Uncertainty, the risk of long-lasting harm, and safety for oneself and family members are typical concerns that necessitate dialogue, support, and management leadership at all levels. (Jamrozik & Selgelid, 2020)

It is important to try to reduce uncertainty by providing all available information about the current infectious disease and the suggested measures. Healthcare workers have a right to know about their rights and the measures taken to protect them. In cases of quarantine and contact tracing, there can be concerns about exposure to stigma and unwarranted accusations that harm patient-nurse relationships and employer-worker relationships. Coping and fear management can be facilitated through a continuous flow of information, clear and repeated communication from the highest point in the chain of command. This is part of the psychological risk assessment necessary in leadership and management during a crisis. With information, it is easier to distinguish welfare aspects of available protective measures from less important features of protection. Trust in the organization is likewise dependent on unbiased information. The more the nurse is involved and can be heard in the construction and reasoning of protective measures, the more trust is built in the organization. (McKay et al., 2020) (Daye et al., 2020)

8. Training and Education for Nursing Professionals and Midwives

Giftedness, in nursing as well as in midwifery, is a direct consequence of specialized training and continuous education. The work of health professionals, and certainly the work of nurses and midwives involved in crisis management, is very demanding due to the natural course of their profession. The contribution of midwives and nurses to offering quality health care services to citizens is invaluable. Education and training are largely considered to be key components of the preparation of any person pursuing a career in health care. Quality education should be consistent, well-structured, and have clear goals. The specific area of knowledge these professionals need is not limited to clinical skills combined with knowledge in the field of health and health care but also extends to knowledge of the National Health System and social policy.

Professional expertise in different disciplines helps develop students' abilities and knowledge for future work in healthcare. Nurses need experience and knowledge of patients' conditions to effectively monitor and control their health. Ongoing training is necessary to adequately monitor health conditions. Education in specialty areas enhances patient care. Students gain clinical skills and use techniques for quality healthcare. High-quality training in professional expertise is vital for theoretical and practical efficiency. Educational strategies promote integration into clinical practice. The goal is to help students work autonomously, apply knowledge, and reflect on nursing work. (Morandini et al.2023)(Sallam et al., 2023)

8.2. Training Programs and Workshops

Training programs with the majority of participants coming from public health centers and the number of education programs in public health centers are the most important factors for the lower compliance with the existence of a preventive training program in respect to education. A series of 90-minute workshops to educate nursing students with the knowledge and skill set needed to implement the standard disease outbreak system enhanced knowledge of local surveillance resources and improved upper respiratory illness reporting surveillance. The community building, outreach, research, and training reply outreach behavior for training and prompt recognition of bioterrorist agents and all-hazards surveillance training programs aimed at accreditation scenarios. A one-day postgraduate course and training package to promote compliance and confidence in knee joint aspiration for healthcare professionals was developed. (Spicer et al.2021)(Rueda et al.2023)(Guignet et al.2024)(Sidhu et al.2023)

Community-based dermatology training is essential, but trainees underused their autonomy. Healthcare professionals had low perception, but training can improve exposure and decrease fear. Nurses with practical training showed better behavior and skills. Training on sexual abuse intervention should involve participatory planning. Patient safety should never be compromised during surgical training. Virtual reality trainers can classify learning styles in echocardiography training. (Virtanen et al.2021)

9. Collaboration and Teamwork in Crisis Management

The presentation of the current study provides an analysis of interdisciplinary and team cooperation as the main key to successful crisis management. An optimal integrated response requires harmonized operation, coordination, improvement, and supportive responses from multidisciplinary teams, specialists, and diverse organizations within the healthcare system. In order to accomplish the objectives in crisis situations, the nursing and midwifery personnel collaborate effectively with health professionals and specialists from hospitals, emergency stations, and departments; healthcare and social services; maternity and pediatric wards; laboratories; radiology and ultrasound offices; neonatal units; intensive care units; anesthetic and resuscitation care; specialized offices; and specialists; logistics and supply departments. The collaboration and harmonious teamwork between the personnel in the health system during crisis situations contribute to finding collaborative solutions that improve the patient's condition, ensure the delivery of safe, efficient, quality services, and achieve the best interest of the patient, family, and community. At the same time, effective team communication allows for making decisions and discussing sensitive issues in various ways. Communication is influenced by culture, group status, hierarchy, religion, managerial competencies, health sector policies, interests, working relationships, confidentiality, daily routines, protocols, and equipment. Through the use of an adequate communication strategy, health professionals eliminate barriers and resolve misunderstandings, ensure and promote the quality of medical services, contribute to patient and

institutional safety, and help prevent the occurrence of adverse events, litigation, and medical errors. (Zhou et al., 2021)(Zajac et al.2021)(Thielsch et al.2021)

9.1. Interprofessional Collaboration

Nurses and midwives are healthcare professionals who spend a considerable amount of time at the point of care and are often the first points of contact for patients. Engagement of these professionals cannot be underestimated in improving patient outcomes in healthcare. Because patient outcomes are inextricably linked to access to nursing education, cooperation between accredited schools of nursing and midwifery, governments, and healthcare institutions is crucial in enabling the monitoring and analysis of shifts in population health status and for intervention at the population and societal levels. Another true value of nursing and midwifery practice lies in the personal satisfaction achieved from intimate, personal relationships that nurses and midwives form with their clients. Interprofessional education plays a key role in improved healthcare delivery. To develop students' attitudes toward teamwork, decision-makers need to focus on the importance of interprofessional communication and healthcare collaboration. The older adult social community must be integrated with academia to prepare for the interprofessional direction that healthcare is taking. This includes the aging services field partnering with nursing, public health, pharmacy, occupational therapy, speech, hearing, physical therapy, dental, and many other programs. Interprofessional fellowships should also be created so that scholars may routinely engage with others. Funding support is needed so that the public health, social work, and the nursing and midwifery practice, education, and scholarship community can work together to conduct research that advances knowledge, translation, and the practice of an interprofessional workforce designed specifically to meet the health and long-term care needs of an aging America. (Hobbs et al.2021)(Bright et al.2021)(Schmiedhofer et al.2021)(Buhlmann et al., 2021)

9.2. Team Dynamics and Roles

To ensure an efficient intervention team and exchange of accurate and precise information, an efficient and clear communication strategy has to be established by defining the roles and functions of the professionals involved. This purpose can be achieved by developing a list of contact numbers in case of crisis for the members of the healthcare team with specific roles, by instructing them how to act in terms of the task description and the hierarchy, and also through the daily assessment of the intervention team. These measures will ensure a reduced possibility of professional errors, incompatibilities, confusions, and conflicts in cases of crises. (Rachmad, 2022)(Newman & Ford, 2021)(Kim & Kreps, 2020)

In the maintenance and resolution phase, the dressing, the instruments employed for durable recovery, the team, and the therapeutic strategy are determined by the category and experience of the healthcare professionals. In the vision of spatial management, the teamwork is well demarcated, and each member of the healthcare team knows their duty based on the predefined expectations and needs. This way, the nurse and the nurse assistant collaborate in a harmonious and efficient way, following the steps undertaken by the postoperative intervention protocol, adapted

to the interposed surgical intervention, but also the complications and the pains revealed by the specific manifestations; thus, being able to intervene and interrelate factors mentioned in the site management model to prevent any unfavorable consequences as listed in the following: the appearance of pressure sores, the formation of decubitus, the severity of blood extravasation in the surgical site, the postoperative formation of abscesses or hematomas, and/or the presence of bleeding.

10. Innovations and Best Practices in Crisis Management

Thirdly, while anywhere from 50-60% of present national and global capacity to adequately respond to public health crises rests with nursing and midwifery professionals, opportunities are still rife to enhance their critical capacity to manage crises. Only about 1% of the budgets of national governments are devoted to public health crises sufficiency challenges for nursing and midwifery professionals and the pertinent conception and practice development initiatives. Additionally, the concepts of public health and crisis management could benefit significantly from often-cited sufficiency gaps discourse. The opportunities for establishing that critical capital in wealthier countries and regions are insufficient to noise and omnipresence are ample. Government and other organizational best practice models, governance modalities, and appropriate sufficiency decisions are fundamental for effective and risk-opposing nursing and midwifery professionals' managed public health prevention and crisis response efforts. The scarcity and disparity of manpower and skill mix in healthcare as streams, and disparities in access to properly conceived and informed healthcare IT-enabled emergency medical service assistance between high- and low-income countries are real crises accompanying challenges that such public health capacities are supposed to thwart. It is also telling that while healthcare IT-readied capacity is associated with optimal EMS performances, anticipating healthcare IT provision sufficiency levels at which optimal EMS response to crisis level trends await is still a gap.

10.1. Emerging Technologies

The fourth Industrial Revolution, the swift digitalization of the world, is materializing. In everyday life, technology surrounding the Internet of Medical Things (IoMT), also known as healthcare analytics, is already implemented. The IoMT is a model that integrates sensor devices with smart medical applications. Smart applications such as smart clothing, neckwear, a video camera for retinal scans, and targets located on the body provide continuous heart rate telemetry and accurately monitor the respiratory rate of hospitalized children who meet respiratory distress criteria. New wearables and implantables have been created with advancements to improve patient safety. In our rapidly growing digital society, IoMT has transitioned to bring knowledge-driven care to personalized and public health applications that promote health. This has resulted in disruptive changes in healthcare, and oncology is no anomaly in this context. (Swayamsiddha and Mohanty2020)

New technology, centered on digitalization, has exacerbated supply chain inequalities among countries and health facilities, due to disruptions in medical device distribution. Regulatory programs for remote patient management have been expedited. These advancements have revolutionized remote clinical practice. Healthcare professionals are vital in creating a working alliance during operating room crises in oncology care.

11. Global Perspectives on Healthcare Crisis Management

This chapter highlights healthcare crisis management to guide nursing professionals and midwives in optimizing informatics for enhanced health surveillance, effective communication, and sterilization practices. Healthcare informatics, health surveillance, and communication play a vital role in healthcare crisis management while ensuring the surveillance, assessment, and management of acute public events. Maintaining healthy communities requires aptitude and resources to intervene rapidly and effectively when crises arise. Information technology is helping to explore the main reasons behind healthcare crises in developed and developing countries. (Sharma et al.2022)(Wang & Wu, 2021)(Wager et al., 2021)

Guidance on managing such crises and maintaining the health of communities is abundant, and strategies are implemented to avert crises and manage the community when crises happen. Fighting diseases and improving communities' health status is vital work. When healthcare crises arise, health informatics is a significant interdisciplinary field. The significant objective is the assistive role of healthcare informatics in both crisis and epidemic communication. In this context, health informatics must deal with resource content, policy, communication, and expertise to better surveil the health status of the community, effective crisis communication response, and utilization of healthcare resources for public needs. Public health is a major area of focus. Emergency health response requires a combination of structure, resources, clinical and administrative IT, research, and consultation. These factors contribute to diminishing the number of injured and deceased individuals during a crisis. Such rational prevention steps may encompass taking care of individuals at risk, immediate handling, education, legal regulation and guidance enforcement, and health promotion to lessen disease and mortality, and sustain prevention and control programs. (Weber et al.2022)(Hübner et al., 2022) (Emami et al.2024)(Okolo et al., 2024)

11.1. Comparative Analysis of Healthcare Systems

The most prevalent form of healthcare policies outside of national insurance models is state-funded national health services. National health services were created in the United Kingdom and the Soviet Union at approximately the midpoint of the 20th century. National, or socialized, health systems separate the purchasers and providers of care, which distinguishes them from both Bismarck model health systems and national insurance models. The essence of a national health service is to provide healthcare to all residents of the country. This makes the government the only payer. Hospitals are government-owned, and doctors are government employees. Health services typically are paid through a national general tax, like the

national insurance model, albeit with all services paid by a single tax, or a payroll tax.

Governments generally exercise substantial control over health services under national health system arrangements. Health services rarely require significant financial contributions and health services are generally provided tax-free. Because health services are free at the point of delivery, demand is theoretically unlimited, and health services often experience long waiting times. Despite these drawbacks, national health systems typically cost less than insurance models, providing more extensive coverage at a lower cost. On the downside, health services are more difficult to alter as the needs and desires of the populace change, and national health models require high relative levels of taxation. The latter, in turn, can lead to labor shortages, substandard services, and perhaps most importantly, influence the efficiency of the provided services.

11.2. International Guidelines and Standards

Different international organizations and networks of which our institutions are members assist the Tajik Ministry of Health in developing international guidelines for clinical practice. These organizations set reference norms and standards about the procedures that are to be used in vaccination campaigns and healthcare facilities, as well as concerning health and safety at work. A majority of donation funds are determined by these reference norms to assess the reliability and quality of healthcare systems in recipient countries. The clinical work is organized identically in hospitals and district hospitals. Nursing care is inseparable from medical care. It includes the functions of assessment, planning, coordination, and the implementation of caregiving. Our guidelines aim to lay down the framework of our practices by determining how the work is organized in the best way possible and how hospital and health district prerequisites are related. Our guidelines must necessarily comply with these international standards. These obligations are to be clearly taken into account when redacting and fulfilling our guidelines. Area activities include improving knowledge exchange between nurses through research and the development of nursing information systems. (Kluczewska & Korneev, 2021)(Wilkens & Goroshko, 2023)(Health Organization, 2022)(Health Organization, 2020)(Jacobs & Baez Camargo, 2020)

12. Conclusion and Future Directions

We suggest creating a community of practice utilizing this framework, mentors of sorts, to guide nursing professionals and midwives during simulation experiences and in the real world. Experienced nurse informaticists could provide the necessary organizational information (while staying within legal and ethical regulations) to assist with the development of messaging as an example to guide beginners in their journey to develop their programmatic health surveillance and crisis communication skills. Because of the breadth of nursing practice, trusted relationships with clients, as well as the number of practicing nurses, the utilization of health informatics could be an important aspect of the program reaching its full

potential. (Ftouni et al.2022)(Kaplan, 2020)(Esmaeilzadeh, 2020)(Sheikh et al.2021)

Our work is limited in that it is based on research collected from a developing nation with a small cohort. However, our program would have a larger impact upon implementation within low-income and middle-income countries. Based on topics of interest expressed at the time of development, we did not concentrate on the need for socialization in our CAS model. The next phase of our work is to incorporate these new microservice/device-based technologies in the program flow, including notification triage. In conclusion, practical utilization of the proposed framework should be slowly introduced at increasing levels of complexity in a wider community of practice.

References:

Krichen, M., Abdalzaher, M. S., Elwekeil, M., & Fouda, M. M. (2024). Managing natural disasters: An analysis of technological advancements, opportunities, and challenges. Internet of Things and Cyber-Physical Systems, 4, 99-109. sciencedirect.com

Hao, F., Xiao, Q., & Chon, K. (2020). COVID-19 and China's hotel industry: Impacts, a disaster management framework, and post-pandemic agenda. International journal of hospitality management. nih.gov

Abbas, J., Wang, D., Su, Z., & Ziapour, A. (2021). The role of social media in the advent of COVID-19 pandemic: crisis management, mental health challenges and implications. Risk management and healthcare policy, 1917-1932. tandfonline.com

Allam, Z. & Jones, D. S. (2020). … (COVID-19) outbreak and the smart city network: universal data sharing standards coupled with artificial intelligence (AI) to benefit urban health monitoring and …. Healthcare. mdpi.com

Keshta, I. & Odeh, A. (2021). Security and privacy of electronic health records: Concerns and challenges. Egyptian Informatics Journal. sciencedirect.com

Nasiri, S. & Khosravani, M. R. (2020). Progress and challenges in fabrication of wearable sensors for health monitoring. Sensors and Actuators A: Physical. [HTML]

Atique, S., Bautista, J. R., Block, L. J., Lee, J. J., Lozada-Perezmitre, E., Nibber, R., ... & Topaz, M. (2020). A nursing informatics response to COVID-19: Perspectives from five regions of the world. Journal of Advanced Nursing, 76(10), 2462. nih.gov

Okolo, C. A., Ijeh, S., Arowoogun, J. O., & Adeniyi…, A. O. (2024). Reviewing the impact of health information technology on healthcare management efficiency. International Medical …. fepbl.com

Awrahman, B. J., Aziz Fatah, C., & Hamaamin, M. Y. (2022). A review of the role and challenges of big data in healthcare informatics and analytics. Computational intelligence and neuroscience, 2022(1), 5317760. wiley.com

Gholamzadeh, M., Abtahi, H., & Safdari, R. (2021). Suggesting a framework for preparedness against the pandemic outbreak based on medical informatics solutions: a thematic analysis. The International Journal of health planning and management, 36(3), 754-783. nih.gov

Heaslip, V. A., Shannon, M., Janes, G., Phillips, N., Hamilton, C., Reid, J., ... & Langins, M. (2024). Engaging nursing and midwifery policymakers and practitioners in digital transformation: an international nursing and midwifery perspective. BMJ leader. worktribe.com

Hübner, U. H., Wilson, G. M., Morawski, T. S., & Ball, M. J. (2022). Nursing Informatics: A health informatics, interprofessional and global perspective. [HTML]

Coffman, V. R., Jensen, A. S., Trabjerg, B. B., Pedersen, C. B., Hansen, B., Sigsgaard, T., ... & Stayner, L. T. (2021). Prenatal exposure to nitrate from drinking water and markers of fetal growth restriction: a population-based study of nearly one million Danish-born children. Environmental Health Perspectives, 129(2), 027002. nih.gov

Marques, I. C. P. & Ferreira, J. J. M. (2020). Digital transformation in the area of health: systematic review of 45 years of evolution. Health and Technology. google.com

Stoumpos, A. I., Kitsios, F., & Talias, M. A. (2023). Digital transformation in healthcare: technology acceptance and its applications. International journal of environmental research and public health, 20(4), 3407. mdpi.com

Cagle Jr, S. D., Hutcherson, B. L., & Wiley, A. T. (2022). Health care–associated infections: best practices for prevention. American family physician. aafp.org

Kwon, J. H., Advani, S. D., Branch-Elliman, W., Braun, B. I., Cheng, V. C. C., Chiotos, K., ... & Mody, L. (2024). A call to action: the SHEA research agenda to combat healthcare-associated infections. Infection Control & Hospital Epidemiology, 1-18. cambridge.org

Letaief, K. B., Shi, Y., Lu, J., & Lu, J. (2021). Edge artificial intelligence for 6G: Vision, enabling technologies, and applications. IEEE Journal on Selected Areas in Communications, 40(1), 5-36. ieee.org

Chen, Z., Zhang, Z., & Yang, Z. (2024). Big AI models for 6G wireless networks: Opportunities, challenges, and research directions. IEEE Wireless Communications. [PDF]

Park, J., Samarakoon, S., Elgabli, A., Kim, J., Bennis, M., Kim, S. L., & Debbah, M. (2021). Communication-efficient and distributed learning over wireless networks: Principles and applications. Proceedings of the IEEE, 109(5), 796-819. oulu.fi

Rawlinson, C., Carron, T., Cohidon, C., Arditi, C., Hong, Q. N., Pluye, P., ... & Gilles, I. (2021). An overview of reviews on interprofessional collaboration in primary care: barriers and facilitators. International Journal of Integrated Care, 21(2). nih.gov

Morrison-Smith, S. & Ruiz, J. (2020). Challenges and barriers in virtual teams: a literature review. SN Applied Sciences. springer.com

Dioguardi, M., Laneve, E., Di Cosola, M., Cazzolla, A. P., Sovereto, D., Aiuto, R., ... & Lo Muzio, L. (2021). The effects of sterilization procedures on the cutting efficiency of endodontic instruments: A systematic review and network meta-analysis. Materials, 14(6), 1559. mdpi.com

Rutala, W. A. & Weber, D. J. (2021). Disinfection and sterilization in health care facilities: an overview and current issues. Infectious Disease Clinics. shahealthcare.org

Laupland, K. B. (2022). Preventing healthcare-related infections among older adults: a focus on cross-transmission of antibiotic-resistant bacteria. Expert Review of Anti-infective Therapy. [HTML]

Singh, J. & Matthees, B. (2021). Facilitating interprofessional education in an online environment during the COVID-19 pandemic: A mixed method study. Healthcare. mdpi.com

Anderson, G. S., Di Nota, P. M., Groll, D., & Carleton, R. N. (2020). Peer support and crisis-focused psychological interventions designed to mitigate post-traumatic stress injuries among public safety and frontline healthcare personnel: a systematic review. International journal of environmental research and public health, 17(20), 7645. mdpi.com

Jamrozik, E. & Selgelid, M. J. (2020). Ethical issues surrounding controlled human infection challenge studies in endemic low-and middle-income countries. Bioethics. wiley.com

McKay, D., Heisler, M., Mishori, R., Catton, H., & Kloiber, O. (2020). Attacks against health-care personnel must stop, especially as the world fights COVID-19. The Lancet. thelancet.com

Daye, M., Cihan, F. G., & Durduran, Y. (2020). Evaluation of skin problems and dermatology life quality index in health care workers who use personal protection measures during COVID-19 pandemic. Dermatologic therapy. wiley.com

Morandini, S., Fraboni, F., De Angelis, M., Puzzo, G., Giusino, D., & Pietrantoni, L. (2023). The impact of artificial intelligence on workers' skills: Upskilling and reskilling in organisations. Informing Science, 26, 39-68. unibo.it

Sallam, M., Salim, N. A., Barakat, M., & Ala'a, B. (2023). ChatGPT applications in medical, dental, pharmacy, and public health education: A descriptive study highlighting the advantages and limitations. Narra J. nih.gov

Spicer, J. O., Nguyen, T. T., Arnold, M. W., Anderson, T., & Khalife, R. (2021). A faculty development workshop for planning and implementing interactive virtual case-based teaching. MedEdPORTAL, 17, 11126. mededportal.org

Rueda, A. E., Monterrey, A. C., Wood, M., Zuniga, L., & Rodriguez, B. D. R. (2023). Resident education and virtual medicine: a faculty development session to enhance trainee skills in the realm of telemedicine. MedEdPORTAL, 19, 11302. mededportal.org

Guignet, M., White, H. S., Novotny, E. J., Nwogu, I. B., Zaraa, S., Stergachis, A., ... & Bacci, J. L. (2024). Community Pharmacist-Centered training program improves confidence in delivering epilepsy care. Epilepsy & Behavior, 158, 109933. [HTML]

Sidhu, M., Walton, H., Crellin, N., Ellins, J., Herlitz, L., Litchfield, I., ... & Fulop, N. J. (2023). Staff experiences of training and delivery of remote home monitoring services for patients diagnosed with COVID-19 in England: A mixed-methods study. Journal of Health Services Research & Policy, 28(3), 171-180. sagepub.com

Virtanen, L., Kaihlanen, A. M., Laukka, E., Gluschkoff, K., & Heponiemi, T. (2021). Behavior change techniques to promote healthcare professionals' eHealth competency: a systematic review of interventions. International Journal of Medical Informatics, 149, 104432. sciencedirect.com

Zhou, Y., Li, Z., & Li, Y. (2021). Interdisciplinary collaboration between nursing and engineering in health care: a scoping review. International journal of nursing studies. [HTML]

Zajac, S., Woods, A., Tannenbaum, S., Salas, E., & Holladay, C. L. (2021). Overcoming challenges to teamwork in healthcare: a team effectiveness framework and evidence-based guidance. Frontiers in Communication, 6, 606445. frontiersin.org

Thielsch, M. T., Röseler, S., Kirsch, J., Lamers, C., & Hertel, G. (2021). Managing pandemics—demands, resources, and effective behaviors within crisis management teams. Applied Psychology, 70(1), 150-187. wiley.com

Hobbs, C., Moxham, L., Green, H., Almasi, E., Middleton, R., Halcomb, E., & Fernandez, R. (2021). It's just not that easy!: Challenges faced by nurses and midwives in the work environment in adhering to social distancing during covid-19. TheAustralian Journal of Advanced Nursing, 39(1), 27-33. ajan.com.au

Bright, D., Gray, B. J., Kyle, R. G., Bolton, S., & Davies, A. R. (2021). Factors influencing initiation of health behaviour conversations with patients: Cross-sectional study of nurses, midwives, and healthcare support workers in Wales. Journal of Advanced Nursing, 77(11), 4427-4438. wiley.com

Schmiedhofer, M., Derksen, C., Keller, F. M., Dietl, J. E., Häussler, F., Strametz, R., ... & Lippke, S. (2021). Barriers and facilitators of safe communication in obstetrics: results from qualitative interviews with physicians, midwives and nurses. International journal of environmental research and public health, 18(3), 915. mdpi.com

Buhlmann, M., Ewens, B., & Rashidi, A. (2021). The impact of critical incidents on nurses and midwives: A systematic review. Journal of Clinical Nursing. ecu.edu.au

Rachmad, Y. E. (2022). Communication Optimization Theory. academia.edu

Newman, S. A. & Ford, R. C. (2021). Five steps to leading your team in the virtual COVID-19 workplace. Organizational Dynamics. nih.gov

Kim, D. K. D. & Kreps, G. L. (2020). An analysis of government communication in the United States during the COVID-19 pandemic: recommendations for effective government health risk communication. World medical & health policy. nih.gov

Swayamsiddha, S., & Mohanty, C. (2020). Application of cognitive Internet of Medical Things for COVID-19 pandemic. Diabetes & Metabolic Syndrome: Clinical Research & Reviews, 14(5), 911-915. nih.gov

Sharma, G. D., Kraus, S., Srivastava, M., Chopra, R., & Kallmuenzer, A. (2022). The changing role of innovation for crisis management in times of COVID-19: An integrative literature review. Journal of Innovation & Knowledge, 7(4), 100281. sciencedirect.com

Wang, W. T. & Wu, S. Y. (2021). Knowledge management based on information technology in response to COVID-19 crisis. Knowledge management research & practice. [HTML]

Wager, K. A., Lee, F. W., & Glaser, J. P. (2021). Health care information systems: a practical approach for health care management. [HTML]

Weber, P., Peltonen, L. M., & Junger, A. (2022). The Essence and Role of Nurses in the Future of Biomedical and Health Informatics. In Achievements, Milestones and Challenges in Biomedical and Health Informatics (pp. 164-176). IOS Press. iospress.nl

Hübner, U. H., Wilson, G. M., Morawski, T. S., & Ball, M. J. (2022). Nursing Informatics: A health informatics, interprofessional and global perspective. [HTML]

Emami, S. G., Lorenzoni, V., & Turchetti, G. (2024). Towards resilient healthcare systems: a framework for crisis management. International journal of environmental research and public health, 21(3), 286. mdpi.com

Kluczewska, K. & Korneev, O. (2021). Policy translation in global health governance: localising harm reduction in Tajikistan. Global Social Policy. sagepub.com

Wilkens, J. & Goroshko, A. (2023). Budgetary space for health in the Republic of Tajikistan: options for more public resources. who.int

Health Organization, W. (2022). Improving the Quality of Hospital Care: strengthening primary health care by avoiding unnecessary hospitalizations in Tajikistan: health systems evaluation report. who.int

Health Organization, W. (2020). Assessment of business planning in primary care facilities in Tajikistan, 2019. who.int

Jacobs, E. & Baez Camargo, C. (2020). Local health governance in Tajikistan: accountability and power relations at the district level. International journal for equity in health. springer.com

Ftouni, R., AlJardali, B., Hamdanieh, M., Ftouni, L., & Salem, N. (2022). Challenges of telemedicine during the COVID-19 pandemic: a systematic review. BMC medical informatics and decision making, 22(1), 207. springer.com

Kaplan, B. (2020). Revisiting health information technology ethical, legal, and social issues and evaluation: telehealth/telemedicine and COVID-19. International journal of medical informatics. nih.gov

Esmaeilzadeh, P. (2020). Use of AI-based tools for healthcare purposes: a survey study from consumers' perspectives. BMC medical informatics and decision making. springer.com

Sheikh, A., Anderson, M., Albala, S., Casadei, B., Franklin, B. D., Richards, M., ... & Mossialos, E. (2021). Health information technology and digital innovation for national learning health and care systems. The Lancet Digital Health, 3(6), e383-e396. thelancet.com