"The Significance Of Implementing Technology In Hospitals To Enhance Patient Safety And Experience"

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1. Introduction

In the 21st century, technology has become an essential aspect of our lives and it plays an indispensable role in different areas including business, education, and the healthcare sector. In the healthcare sector, technology plays an important role in enhancing patient safety and experience. Hospitals are using a wide variety of technologies including electronic health records (EHRs), barcode medication administration (BCMA) systems, telehealth, artificial intelligence, robotics, and the Internet of Things (IoT) devices to improve their services. As for patients, they are not only interested in the quality of medical services, but also in the overall experience during their hospital stay. In this paper, we discuss the significance of implementing technology in hospitals to enhance patient safety and experience. With this advancement and continuous improvement, we believe that technology can lead to better health outcomes and higher patient satisfaction.

Technology is an essential aspect of our lives and it plays an indispensable role in the healthcare sector. Implementing technology in hospitals not only helps in digitalizing hospital operations, but also plays an important role in enhancing patient safety and experience. From electronic health records (EHRs), barcode medication administration (BCMA) systems, telehealth, artificial intelligence, robotics, to the Internet of Things (IoT) devices, hospitals are using a wide variety of technologies to improve their services. This paper discusses the significance of

implementing some of these technologies to enhance patient safety and experience.

1.1. Background and Rationale

These changes are partially driven by the emerging consumerism in healthcare. Patients are becoming better informed and are beginning to explore their care options. As a result, hospitals are identifying patient satisfaction as a key element in increasing their competitive advantage. It is widely recognized that patient experience directly affects their level of satisfaction. Therefore, to increase patient satisfaction, hospitals must improve patient experience, in addition to providing high-quality medical services. Recent studies have found a positive association between hospital technology and patient experience. Therefore, technology has the potential to enhance not only patient safety but also the patient experience. However, it is crucial to understand the potential technology bias. In fact, according to the sociology of technology, all technologies have a dual role: they not only help their users perform specific tasks but also shape the users' experience of carrying out those tasks.

Healthcare delivery is a complex process with the goal of providing high quality care. One of the essential elements to providing high-quality care is patient safety. Over the past decade, there has been an increasing awareness of the impact of preventable medical errors on patient morbidity and mortality. In response, the healthcare industry has begun to implement various technologies to improve patient safety. This dissertation examines the significance of implementing technology in hospitals to enhance patient safety and experience. It will communicate through both the patient and the caregivers or the hospital staff's perspective to understand the holistic effect of patient safety and satisfaction. To do this, we must critically assess technology's roles and bias; both the positive and negative impact towards the implementation. (Sittig et al.2020)

1.2. Purpose of the Study

This study proposes to examine the application of technology in the area of patient safety and patient experience with a view to establishing the determinants of patient safety and experience as well as to increase these outcomes. The healthcare service environment is unique from other service settings as its outcome is directly related to the life and death of its consumers. Therefore,

the process and the setting of healthcare service delivery must be designed in such a way that patients are not harmed or injured as a result of their treatment. At the very least, patients seek medical treatment in order to get well and not to be subjected to more pain and suffering due to hospital-acquired conditions. As much as the physical outcome of healthcare is important, patient experience also plays a significant role in the effectiveness of treatment. It has been shown that a positive hospital experience can help speed up the recovery process of patients.

Ideas can be that modern technology must be implemented in hospitals so as to increase the level of patient satisfaction as well as outcome. Improving patient safety and enhancing their experience should be first and foremost in the minds of healthcare service managers. With the unprecedented rise in the number of healthcare service users, it is easier for patients to fall through the cracks and mishaps occur, resulting in worse health outcome. The purpose of this research is to explore and highlight how some technology currently employed in hospitals can help patients recover faster and enjoy a hassle-free hospital stay. (Sittig et al.2020)

2. Understanding the Impact of Errors in Healthcare

Healthcare is a complex, dynamic divergent service profession that is rich in ethical and moral issues. Errors in such a profession are inevitable. Combining high technology with human judgment increases the potential for errors and therefore also increases the risk for patient safety. High technology enhances the ability to diagnose and treat, often with the need for new drugs and equipment. Such advancements have with time become costly for society, but the use of technology is likely to increase in order to meet the demands of the aging population. Technology offers the potential to improve the disjointed system of healthcare to become safer, more efficient, and with higher quality.

Mistakes happen for many reasons and have the potential to cause overwhelming consequences. When it comes to healthcare, mistakes are not tolerated even though they are part of daily life for those working in this dividing-line profession. Errors in healthcare have often led to substantial adverse events with harmful consequences. Annually, it is estimated that 44,000-98,000 Americans die as a result of medical errors. In fact, it is the eighth leading cause of death overall. One might claim that the

high incidence of death indicates that healthcare professionals face a moral stress that can affect and alter their moral perceptions, which ultimately may influence their quality of care. The relationship between errors and stress is bidirectional in that errors cause stress, which in turn also may cause errors. In order to understand and effectively manage errors, we need to understand and manage the factors that influence behaviors at all levels of healthcare, from staff to management and the system level. (Ofri, 2020)

2.1. Types of Errors in Hospitals

The implementation of health information technology (IT) has the power to reshape and restructure the delivery of healthcare services. In brief, changes in technology have the potential to improve clinical outcomes, enhance patient safety, and improve the quality of care. Furthermore, by increasing administrative and clinical efficiencies, technology can also contain or reduce the escalating growth of healthcare costs. Providing tangible examples reduces the ambiguity surrounding discussions of technology implementations. Therefore, the purpose of this report is to illustrate, through concrete examples, the potential benefits of health IT - in its various manifestations - to hospitals, with respect to patient safety, patient experience, and operational efficiency.

Medicine is a difficult and highly specialized field, and while healthcare professionals do their best to help their patients, mistakes can and do occur. In the healthcare system, there are three types of errors, which may take place at any time: adverse patient events (harmful acts of commission or omission), near misses (potential harmful acts of commission or omission), and no-harm events (unsafe acts that do not affect the patient). It is estimated that nearly 98,000 Americans die each year from these errors, an incidence rate that makes medical errors the fourth most common cause of death in the United States. To put that number in context, significantly more people die from medical errors each year than from highway accidents, breast cancer, or AIDS. In addition to the loss of human life, medical errors also impose substantial monetary costs on the U.S. economy, accounting for roughly $37.6 billion annually in lost wages, lost household production, disability payments, and direct healthcare costs. This problem will only exacerbate in the future: rising healthcare expenditures have increased the pressure on hospitals

to reduce costs, deregulation has intensified competition in the hospital industry, and shortages of key healthcare professionals are pushing hospitals to their human resource limits. (Ofri, 2020)

2.2. Consequences of Errors on Patients and Healthcare Providers

Discussion The consequences of errors for patients are many, and deaths may occur. Errors can result in serious consequences for the healthcare providers involved, especially if they are emotionally afflicted by the outcomes. It is believed that approximately half of the adverse events, which harm patients, are preventable, and most of them result from errors. Currently, in the United States, more people die in one year from preventable medical errors than from guns and motor vehicle accidents combined. Many errors are the result of systems failures, and healthcare are high-risk, low-cost, and do not adequately safeguard against the commission of errors.

Introduction Medical errors have occurred from the beginning of medical practice, and they have resulted in serious consequences for patients. It has only been during the last 20 years that the medical community decided to define, discuss, and develop strategies to prevent errors from occurring. Errors occur in the diagnosis, in the planning and executing of treatments, and also in the preventable adverse effects of the treatments. Many errors are the result of systems failures, and therefore the individuals who committed the errors should not be blamed. However, unless the errors are reported and then analyzed, systemic changes cannot be made to prevent the errors. (Rasool et al.2020)

3. Role of Technology in Reducing Errors

The use of these programs and systems has helped to drastically reduce errors in hospitals. When errors are reduced, it enhances the patient's experience and increases their safety. For example, by implementing barcode medication administration, nurses are able to scan the patient's wristband and their medication prior to administering the medication. This ensures that the nurse is giving the right medication to the right patient. If the barcode does not match, an alert will occur, and the nurse will know that there is an issue. This helps to reduce errors and increase patient safety. The implementation of technology in hospitals is crucial to help reduce errors and ultimately increase patient safety and enhance the patient experience.

Over the past several years, technology has been implemented in hospitals to help reduce errors. When errors are reduced, it increases patient safety and enhances the patient experience. Hospitals are very fast-paced and stressful environments. Healthcare professionals are often overworked and tired, and unfortunately, this leads to errors. Errors can also occur due to miscommunication between healthcare team members and while providing unnecessary or duplicative care. Errors that occur in a hospital can lead to adverse effects for the patient. Programs and systems, such as electronic health records, computerized physician order entry, barcode medication administration, and decision support systems, have all been implemented to help reduce errors in hospitals. (Sittig et al.2020)

3.1. Electronic Health Records (EHRs)

Overall, the EHR infrastructure can serve as the foundation to support other technologies that have the potential to significantly improve patient safety and experience.

- Reduce medical errors, through clinical decision support that helps guide healthcare practitioners to the best course of action. - Improve the coordination of care, by enabling multiple providers involved in a patient's care to access and contribute to the same record. - Increase diagnostic accuracy, by giving practitioners access to more information about the patient, including the results of previous tests and prescribed medications. - Enhance patient outcomes, by supporting evidence-based practices that are known to lead to better results. (Sutton et al.2020)

When it comes to implementing technology in hospitals to enhance patient safety and experience, Electronic Health Records (EHRs) are a key area of focus. EHRs contain real-time, digitized patient health information, enabling storage, access, and management of patient health files within a hospital or across a healthcare system. A well-designed EHR system can help enhance the quality of healthcare in many ways:

Electronic Health Records, commonly referred to as EHRs, are real-time, digitized patient health records. EHRs allow for the storage, organization, and management of countless patient health files and information. The information within EHRs is a powerful tool for improving the quality of healthcare at hospitals. It can help decrease medical errors, improve the coordination of care,

increase diagnostic accuracy, and enhance patient outcomes. In addition, the EHR infrastructure can serve as a foundation to support other technologies that can improve patient safety and experience.

3.2. Barcoding and Medication Administration Systems

Research has shown that barcoding technology can significantly decrease medication administration errors and the occurrence of ADEs. This technology can also lead to improvements in the overall quality of care. Some studies, however, have reported new types of errors known as "workarounds" that have developed as a result of the technology in order to save time. It is important to note that along with any new technology implementation in a hospital setting, adequate training for all staff should be provided so that all users may benefit from the new system in a safe and efficient way.

Barcoding technology has been widely utilized to help ensure the "five rights" of medication administration: right patient, right drug, right dose, right route, and right time. Medication administration using barcoding technology, along with other integrated software such as electronic health records (EHRs), has many benefits. It helps increase accuracy, detect problems, provide decision support, and decrease adverse drug events (ADEs). These systems work by having nurses scan a patient's identification bracelet as well as each medication that is going to be administered. The system then validates that it is the right patient, right medication, right dose, right route, and right time by checking the information within the system. If there is an error, the system usually alerts the user. (Hutton et al., 2021)

4. Enhancing Patient Experience through Technology

The main issue is that the perception of quality is experienced at the same time as the service is delivered, unlike other industries where the customer can inspect the product for quality before purchasing. Despite this, many industries have sought to address this issue and have improved their quality of service by utilizing technological advances to meet customer requirements, or even 'manufacturing to order'. This chapter will explore how technology can be employed to enhance the patient experience, not just to meet their clinical needs but also their emotional and informational needs, in order to ultimately improve patient satisfaction and quality of care. Simply put, happy patients, happy

outcomes. We will start by exploring the importance of patient experience and safety, followed by some examples of technology that have been employed to address these issues, and will conclude with a discussion and some future directions.

Healthcare has come a long way from the use of leeches and prescription of arsenic by the ancient civilizations to the hip replacements and gene therapy of the modern era. However, one thing has not changed, and that is that patients come to the hospital because they are unwell and it is the job of the healthcare professionals to make them better. It is inevitable then that healthcare is inherently wrapped up in patient safety and experience - after all, whatever the intervention, patients should not, as a consequence of their treatment, be exposed to further unnecessary risk, and it is imperative then that clinicians listen to, and involve their patients in, the decision-making process to achieve the best possible health outcome. But with increasing scientific knowledge comes difficult decisions about what is best for the patient - and herein lies the challenge of patient experience. (Colizzi et al.2020)

4.1. Telemedicine and Remote Monitoring

In summary, the use of technology in hospitals can positively affect safety and patient experience while facilitating work processes for hospital staff. Improvements might involve the use of simple, readily available technologies, leveraging free and open communication applications, and taking a do-it-yourself approach. While it is critical to ensure that technology solutions are designed to accommodate patient diversity, cultural factors, and the unique needs of different care settings, it is equally important to encourage innovation and to share success stories and best practices. Indeed, the road to technology implementation begins with a single step, and the journey can lead to many transformative destinations.

Telemedicine and remote monitoring represent a set of information technology applications that hold much promise in improving patient safety and the patient experience. In the hospital setting, telemedicine can provide specialized services in such areas as cardiology, dermatology, radiology, psychiatry, and infectious disease identification and management. The use of telemedicine for consultative purposes can support and supplement the care delivered by a patient's primary in-person

care team. Direct patient care can also be provided using telemedicine applications. For hospitalized patients, personalized patient television systems can facilitate tele-visits from family members and friends and can be used to enhance patient comfort. Such systems can also support hospital entertainment services and provide patients with information about their care and with internet access. In addition to enhancing patient experiences, telemedicine and remote monitoring have the potential to improve patient safety. (Achenbach, 2020)

4.2. Patient Portals and Communication Tools

Furthermore, these portals help to enhance the communication between patients and their care teams. When face-to-face contact is not possible, secure messaging through the portal can help to address patient questions and concerns in a timely manner. This can help to alleviate patient anxiety and prevent delays in care. Additionally, patients can use these tools to provide feedback on their hospital experience, allowing hospital administration to address any issues in real time and improve the overall quality of care. Websites and social media can also be used to increase patient engagement and provide education on relevant health topics. Any technology that is implemented must be user-friendly and accessible to all patients, regardless of their technology literacy.

Patient portals and communication tools help to increase engagement between patients and their care teams and can improve patient outcomes and the patient experience. These tools are typically part of larger electronic health record (EHR) systems and allow patients to securely access their health information from the convenience of their own home at any time of day. They can view their medical history, lab results, and appointments, and some portals allow for prescription refills and bill pay. This transparent access to their health information can help patients to better understand their conditions and treatment plans, leading to improved outcomes. Patients who are more engaged in their care are more likely to follow through with their treatment plans and make healthier lifestyle choices. (Lyles et al.2020)

5. Challenges and Barriers to Implementing Technology in Hospitals

There are several potential unintended consequences of technology implementation. Failure to acknowledge, recognize,

and account for these potential outcomes can lead to implementation failure, poor performance results, or both. Examples include alarm setting, technology downtime, replacement of human contact with automation, increased practice standardization, removal of decision-making cues, increased workload, and increased errors with new, skilled users. Not all consequences are negative, and both positive and negative consequences should be managed in order to optimize performance. Moreover, it is unmanageable for technology to be intelligent enough to replace human intervention under all circumstances.

Continuous IT and system connectivity is still a challenge for many environments. The implementation of clinical programs may change the routine and the culture of resistance. Project prioritization and funding can also be barriers. Furthermore, user-related issues as well as technology failures can result in medical errors. Factors that contribute to technology failure include poorly designed technology, system disconnection, lack of or incomplete data transmission, user issues, and the introduction of new work processes that have not been properly tested. Workarounds, which are deviations from the standard way technology should be used, can also contribute to both reported and unreported errors. (Uslu et al., 2020)

5.1. Cost and Resource Allocation

Cost of training of health staff required to optimize technology solutions, both for efficient technology utilization and for forecasting models, can result in the increased use and costs of technology. The reluctance of hospital staff to use new technology solutions requires not only efficient recruitment of educated staff but also expert collaboration to tailor the technology to the specific hospital and its demands. The increased technological options for a hospital's patients mean that the hospital's patient experience must be continuously monitored and addressed. This is an additional area of collaboration technology experts must have with patient satisfaction experts to ensure a successful technology solution in place.

The technology implementation in a healthcare setting requires a large amount of resource allocation in terms of both cost and an estimation of the workforce required. Establishing the advanced methodologies to figure out the patient demand could be beyond

the capacity of the hospital staff, and experts could be needed. Estimation of the number of patients for a specialty may require determination of several related factors and the use of some intricate models helping to estimate the demand. Recruiting educated staff, which may help in ensuring and enhancing patient safety as well as a positive patient experience could rise. The increased use of technologies, which the patient requires, during their hospital stay leads to the increased cost of the patient's care and of the patient himself. Stiff collaboration among hospital specifies, demand experts, and technology experts is required to achieve a successful technology implementation stage. Small hospitals have capabilities, but lack of resources inhibit the implementation of advanced forecasting technology, indicating that there should be a sharing of information, knowledge, and expertise when collaborating with others in the field. (Maves et al.2020)

5.2. Resistance to Change and Staff Training

Research shows that patients have better chances of recovery if they are given appropriate, easy-to-understand information and are involved in making decisions about their treatment. Before implementing any technology to improve patient experiences or outcomes, hospitals and clinicians must first decide which problems need to be addressed. Then, if possible, patients' opinions should be sought about changes and areas where technology will be implemented. Technology can empower patients; for example, by providing Internet links to patient support groups, chat rooms, and voluntary organizations or by creating and maintaining health-related educational materials. With the sheer volume of information available from health-related sources, it is easy to become overloaded, confused, or misled. Therefore, hospital-approved, technology-mediated sources of information are highly beneficial to patients and their relatives.

Along with the implemented technology come inevitable and extensive changes. Physicians, nurses, and other hospital staff are affected by changes to their roles and the processes within which they work. Resistance to change is a natural part of the process of change, and many models outline the various stages that individuals go through on the pathway to new behaviors. Hospital staff may resist using new technological systems for a variety of

reasons, from a perceived threat to job security, to lack of belief in the technology, to concerns about the impact on patient care. To reduce this resistance, a clear, ongoing internal communication program should be implemented so that staff are aware of why changes are taking place and what the intended consequences will be for both the staff and the patients. Staff training is also essential so as to give employees confidence in undertaking their work using the new technologies. (Shalev & Shapiro, 2020)

6. Successful Case Studies of Technology Implementation

It is important to note that technology is only part of the solution. The process of technological implementation as well as the acceptance and adaptation by the staff are crucial components that can make or break a technological solution. Throughout these case studies, we examine such critical success factors, drawing insights and potential learnings that can be generalized to other technology implementations in the hospital.

In this section, we present case studies that have successfully implemented technological solutions to enhance patient experience or safety. The first case discusses the use of the Nurse Knowledge Exchange (NKE) system in the Children's Hospital in Denver, USA. This hospital developed a major nurse-led clinical redesign of the work, which used technology to support a collaborative practice model. The second case describes the implementation of the Computerized Physician Order Entry (CPOE) system at the Gundersen Lutheran Hospital in Wisconsin, USA. This system has resulted in CPOE becoming nearly 100% of order entry at this hospital, significantly contributing to patient safety. The third case introduces the T System for standardized care process, which was developed and implemented at the Denver Health Medical Center, also in the USA. (Chen2020)

6.1. Hospital A: Implementation of AI in Diagnostic Procedures

The qualitative research undertaken for this paper consisted of face-to-face interviews with key hospital staff in Hospital A. Five managers from different departments were interviewed in order to get a holistic view of the research question and include the perspective of all departments within the hospital. The managers interviewed were from the laboratory, nursing, business, and operations departments. The interview questions were open-ended in order to explore the topic as deeply as possible and kept consistent to allow for the data to be coded for key themes. The

insights from Hospital A were then validated by the managerial staff of Hospital B, creating a comparative analysis between the two hospitals. The insights from both hospitals were then combined to address the research question.

For the research, Hospital A (in Singapore) implemented AI in diagnostic procedures. The hospital uses the Philips IntelliSite Pathology Solution, which is Singapore's first digital pathology laboratory. The hospital is also using AI for skin and breast cancer diagnostics to help speed up reports for patients and to help diagnose patients more quickly and accurately. As this research was qualitative, it was also able to leverage insights from Hospital B (in the United Kingdom), which is using AI to scan eyes and identify a disease in one minute that would take a human 25 minutes to do. Hospital B is also using AI to look through scans of the brain to detect meningitis and prioritize patients for treatment. (Retamero et al.2020)

6.2. Hospital B: Utilizing Telemedicine for Rural Patient Outreach

The inpatient model has led to improved patient safety and experience. Patients who are being assessed by a telehealth consult do not have to travel long distances while unwell as the specialist can assess them via video conference. This reduces the risk of patient deterioration. Due to Hospital B's location, adverse weather conditions can restrict travel to and from the hospital. If this occurs, the hospital may become understaffed for both clinical and nonclinical roles. Using telemedicine services helps to ensure adequate staffing levels, as patients are not required to leave the hospital unnecessarily, decreasing the risk of deterioration and subsequent increased hospital stay.

Located in a rural area with a community of approximately 3,000 people, Hospital B has had to find innovative ways to utilize telemedicine for both patient and hospital benefit in this small rural setting. The hospital only has 20 inpatient beds, specializing in elderly care, assisting with inpatient mental health for the district, and post-operative care for the local area. Utilizing a telehealth model for some of these services allows the hospital to support its inpatients and specialty services while examining how the use of telemedicine may facilitate further hospital development. Currently, Hospital B has an inpatient telehealth model. The hospital identified the specialty services the local

community would benefit from and through collaboration with these specialties developed the telehealth inpatient model. This has resulted in the following benefits: local patients can be assessed remotely by specialists, local clinicians can have a specialty opinion for their patient, the hospital gains education and training from the telehealth consults, and the patient journey and hospital service can be improved as bed numbers are reduced or services are enhanced.

7. Ethical and Legal Considerations in Technological Implementation

In conclusion, the increasing demands being placed on hospitals can be alleviated by utilizing various technologies to improve patient safety and enhance their overall experience while admitted. The incorporation of robotic assistance can help hospital staff focus on important duties while ensuring that patients are taken care of in a timely manner. The utilization of artificial intelligence is beneficial in diagnosing patients correctly, preventing medical mistakes, and coordinating patient care. Virtual reality therapy can help decrease patient anxiety and pain and increase their comfort level. These technologies should be implemented while carefully considering the ethical and legal guidelines surrounding their use.

While the vast benefits of technology implementation in healthcare settings, particularly in hospital environments, cannot be denied, there exist ethical and legal reservations that need to be carefully considered. Some people, especially the elderly, might prefer human interaction over communicating with a machine. It's important to always provide patients with the option of speaking to a real person, especially when delivering sensitive information or discussing difficult topics. Furthermore, it is the right of patients to have access to their medical records and to understand how their information is being used. This poses an ethical challenge regarding how much control patients should have over their information and who should have access to it. In terms of legal considerations, there exists a complex web of laws and regulations like the Health Insurance Portability and Accountability Act (HIPAA), which was created to protect patients' sensitive information from being disclosed without their consent. Hospitals need to ensure that their technology systems comply with these laws to avoid legal consequences. (Argaw et al.2020)

7.1. Data Privacy and Security

Meeting patients' high expectations of their hospital experience and ensuring their physical safety and emotional well-being is challenging but achievable even without implementing technology. Hence, the purpose of hospitals is to treat patients who are experiencing health problems first and ensure that they are healthy before discharge. Consequently, improving patient safety should be the main concern of the hospitals, not only to offer high-quality care but also to increase patient trust and loyalty. This aspect has repercussions in hospital management concerning the occupancy rate, which affects not only the length of stay but also the flow of patients and the risk of cancellations in scheduled treatments.

In conclusion, while the implementation of technology in hospitals can significantly enhance patient safety and experience, it is crucial to address these key considerations to fully realize the benefits that technology can bring and set a new standard for hospital care.

Several measures can be deployed to ensure that data privacy and security are maintained at the highest levels possible. Hospitals can implement role-based access control and data encryption to protect patient data from unauthorized access. Regular staff training on data security and proper guidelines for handling data can also help prevent security breaches. Additionally, employing security measures in all devices and applications along with conducting regular security audits can help hospitals protect patient data from malicious attacks.

Ensuring the privacy and security of patient data is non-negotiable when implementing technology in hospitals. While the use of personal health information is essential for providing care, it is equally important to safeguard the data from breaches which could not only compromise the privacy of the patients but also result in distorted medical decisions that could threaten the safety of patients.

7.2. Informed Consent and Patient Autonomy

In addition to the possible lack of understanding, the patient's choice can also be influenced by the way in which the options are presented. For example, the use of a decision aid can help patients make a choice that is consistent with their values. Such tools can also help ensure that the patient truly understands, without

increasing the amount of information provided. With technology contributing to increased personalized medicine, the amount of data that can be utilized to produce a decision tailored to an individual's preferences may increase significantly. By satisfying this data condition, it may be tempting to argue that truly personalized decision making is increasingly possible. However, the privacy condition must be satisfied as well. The privacy condition emphasizes the importance of protecting patient data, which may lose its integrity if third parties gain access, thus undermining the patient's ability to make autonomous decisions. Providing control over personal data may enable patients to make agile choices and exercise autonomy more effectively.

Incorporating technology into hospital services will require enhancing patient understanding of the risks and benefits of proposed treatments to offer real choices and exercise real autonomy before providing consent. This means that health professionals usually need to provide a vast amount of data to permit the patient to make an informed decision. However, just providing the data may not be enough, and the patient's ability to understand the information provided is crucial to making an autonomous decision. In fact, even the concept of "informed consent" is criticized from the perspective of whether it is possible to achieve true understanding of an intervention and its implications, as it is argued that the emotional and cognitive effects of illness may hinder the patient's ability to adequately understand and process the information. This usually leads to clinicians discussing the information provided and answering questions to ensure that the patient has the required understanding.

8. Future Trends and Innovations in Hospital Technology

The hospital setting is one that is constantly changing and evolving, with an increased implementation of technology to help with those changes. It is important for hospital leaders to not only navigate current trends of technology but also plan for future innovations. By doing this, hospitals can help improve both patient safety and the patient experience. The overall goal of using technology in the hospital setting should be to enhance the patient's stay, making it as safe and comfortable as possible. With a focus on the patient, hospitals can use technology as a tool to help deliver the high-quality care that patients expect.

As the world of technology evolves, the expectation is for the hospital setting to continue to change at a rapid pace. Some upcoming technological hospital trends may include those within the realm of artificial intelligence, such as chatbots or robots assisting with patient interactions, and machine-learning algorithms helping with more accurate diagnosis and treatment plans. Virtual reality and augmented reality may become more commonly used within hospital settings, helping both patients for therapy plans and doctors for training purposes. 3D printing is another technology that can help hospitals create more personalized and specific equipment and implants. Cybersecurity will also need to continue to evolve as technology advances, to ensure patient data remains private and protected. The future of hospital technology is bright, with continued advancements focused on improving both patient safety and patient experience. (Hilty et al.2020)

8.1. Artificial Intelligence and Machine Learning Applications

The introduction of innovative technology within hospital settings across systems and processes holds the potential to change the nature of work within these institutions. In the era of the fourth industrial revolution, emergent technologies like artificial intelligence, robotics, the internet of things, virtual and augmented reality, blockchain, and 3D printing can be used to enhance the patient experience and increase patient safety in ways that were previously unimaginable. Upgrading outdated hospital information systems that currently run most of the operations, administration, and clinical systems with new technologies can speed up operations and assist in making real-time data-driven decisions. This is crucial for hospital staff, especially when discrepancies occur in areas such as surgery, where time is of the essence.

Across the globe, hospitals are facing escalating demands to enhance the quality of service provided to patients. While such services have in the past been enhanced through recruiting more staff, replacing and updating infrastructure, and increasing investment in developing staff competencies, emerging technologies are now providing alternative and often more cost-effective means of enhancing services. The rapid development of new technologies, the implementation of technology that is not necessarily purpose fit, and misalignments with organizational

culture may, however, also endanger patients. As hospital processes grow in complexity and often involve the collaboration of multiple healthcare professionals, conventional technologies are proving to be less and less successful. Artificial intelligence offers an enhanced approach to the development of intelligent support systems that have the ability to address ill-defined, dynamic problems with scalable, cost-effective, and high-performance solutions.

8.2. Internet of Things (IoT) in Healthcare

Furthermore, the staff can be alerted to respond to the patient if the IoT device detects a sudden, detrimental change in the patient's condition. IoT technology can also be applied to make medication administration by nurses safer. Such technology can help to ensure that patients are given the right medications at the right time. This can be done through the use of smart medication carts that have been designed with IoT capabilities, such as being able to scan the medications and the patient's wristband to verify that the nurse has retrieved the right medication for the right patient. If the nurse selects the wrong medication, the cart can be programmed to alert the nurse. These are just some of the ways that IoT technology can help to enhance patient safety in hospitals.

The Internet of Things (IoT) has considerable potential in the healthcare sector. It can help in areas such as disease prevention, remote patient monitoring, chronic disease management, in-patient condition tracking, and hospital inventory management. IoT devices can be monitored round the clock. They can collect patient data in real-time and alert the hospital staff at a time of concern or in an emergency, thereby enhancing patient safety. For example, IoT technology can help to prevent in-hospital patient falls. It can identify when patients are trying to get out of bed when they are not supposed to and can alert the nearest staff member. The staff member can then come and assist the patient, thereby preventing a potential fall and avoiding any injuries that a fall could cause.

9. Conclusion and Recommendations

There are some limitations to this research. The focus was narrowed down to specific technologies used in hospitals, and only a few patient safety components were addressed. Hence, future studies could look into other technologies and more patient safety components to get a broader picture. This study was conducted

with secondary data sources. Therefore, a qualitative approach could be undertaken in the future to explore in depth the relationship between patient safety and experience. Finally, the research can be extended to encompass hospitalized patients' families as they too play a vital role in patients' safety and well-being during their hospital stay.

In conclusion, studies have shown that tens of thousands of inpatient deaths per year are attributed to hospital medical errors. Therefore, it is essential to undergo all possible efforts to prevent these errors. This research recognized that the implementation of technology alone is not enough to enhance patient safety. Rather, it is an excellent combination of technology, people, and processes which will have an impact. Moreover, the research established that patients' experience and their safety are interconnected. It was noted that as technology increased the patient safety, it also increased the positive patient experience. Recommendations for hospitals are summarized in areas of recruitment and training, communication and collaboration, feedback and review, and integration processes. Overall, this research believes that continuous technological advancement in hospitals will not only enhance patients' safety but also increase their positive experience during their stay.

9.1. Summary of Key Findings

Conclusions: In conclusion, it is vital to continue exploring and implementing new technologies that can help to increase patient safety and improve the patient experience. This must be done while remembering that the ultimate goal is human enhancement. Automating routine, mundane tasks can free up time for hospital staff to provide more personalized care. Using technology to help facilitate communication between patients and their care team and to make the environment more comfortable and less stressful for patients will result in a more positive patient outcome and experience. With a human-centered approach to technology, hospitals can truly harness the power of technology to enhance patient safety and experience.

Introduction: While technology is being implemented in many hospital settings with the hopes of improving patient safety and enhancing the patient experience, the human characteristic occasionally seems to be getting lost. Automating simple, routine tasks can free up hospital staff to provide more personal,

individualized care to each patient, contributing to increased patient safety and improved patient experience. Technology can help to facilitate communication between patients and their care teams, and also make the environment more comfortable and less stressful for patients. When technology is used in these ways, the result is often a more positive patient outcome and experience.

9.2. Implications for Healthcare Policy and Practice

Allowing family members and/or friends to participate as visitors on the ward during the daytime may create a more supportive and communicative hospital environment for patients. In this study, patient well-being will be assessed by determining the quantity and quality of sleep and evaluating symptoms of anxiety and depression, pain, and patient satisfaction. Previous studies have shown that restricted visiting policies may be the leading cause of sleep deprivation in patients. Others have demonstrated that sleep disruption is associated with pain, increased use of analgesics, symptoms of anxiety and depression, and decreased quality of life. However, the effect of flexible visiting hours on either patient outcomes or the well-being of patients, their relatives, and staff remains largely unknown. Our hypothesis is that flexible visitation hours in the hospital positively affect patient experience and, therefore, should be considered in hospital policy planning.

Over the last years, visitation hours in many Dutch hospitals have become more flexible. However, the effect of flexible visitation on either patient outcomes or the well-being of patients, their relatives, and staff remains largely unknown. In the current prospective observational study, we will compare two myocardial infarction (MI) patient groups with different visitation hours schemes. The first group consists of MI patients who were admitted to the cardiology ward of the Isala Hospital in Zwolle (The Netherlands), and other family members and/or friends of patients were allowed unlimited visiting hours on the ward.

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