

Understanding Medical Error: A Comprehensive Overview

Luis Enrique Nunez Moscoso, MD^{1-3*}

¹Emergency Department, Hospital Nacional “Carlos Alberto Seguin Escobedo”
EsSalud, Arequipa, Peru

²School of Medicine, Universidad Nacional de San Agustin, Arequipa, Peru

³School of Medicine, Universidad San Martin de Porres, Arequipa, Peru

Introduction

Medical error is a critical issue that affects healthcare systems worldwide. It refers to mistakes made in the delivery of healthcare services, which can lead to patient harm or adverse outcomes. These errors can occur in any aspect of healthcare, from diagnosis to treatment and follow-up. Addressing medical errors is vital for improving patient safety, enhancing the quality of care, and reducing healthcare costs. With the increasing complexity of medical procedures and the growing reliance on advanced technology, the risk of medical errors has become a critical concern in modern healthcare. The consequences of such errors can be profound, leading not only to patient harm and adverse health outcomes but also to increased healthcare costs and diminished trust in the healthcare system. Recognizing the importance of addressing medical error is essential for fostering safer healthcare environments and improving patient outcomes. This essay will explore the history, concepts,

epidemiology, development, and implications of medical error, providing a comprehensive understanding of this significant issue.

History

The concept of medical error has evolved significantly over time, reflecting changes in medical knowledge, practices, and the healthcare environment. Historically, medical errors were often overlooked or misunderstood due to limited medical knowledge and the lack of formal reporting systems.

Ancient and Medieval Periods

In ancient times, medical practices were based on rudimentary knowledge and often intertwined with religious or mystical beliefs. Errors in treatment were likely common but seldom documented due to the lack of systematic record-keeping. Early physicians, such as Hippocrates and Galen, laid the groundwork for medical ethics and practice, but their understanding of diseases and treatments

was limited by the scientific knowledge of their eras. Mistakes in diagnosis and treatment were inevitable, but their implications were not fully understood or systematically analyzed. During the medieval period, medical knowledge expanded somewhat, but errors remained a part of medical practice. The development of medical schools and the gradual improvement in the quality of medical texts provided more structured knowledge, yet many practices were still based on tradition rather than scientific evidence. Errors were often attributed to external factors rather than systematic flaws in the practice of medicine.

Renaissance and Enlightenment

The Renaissance marked a significant advancement in medical science with increased emphasis on empirical research and anatomical studies. Physicians like Andreas Vesalius and William Harvey contributed to a more accurate understanding of human anatomy and physiology. Despite these advancements, medical errors persisted, primarily due to the limited scope of medical knowledge and the lack of standardized practices. The Enlightenment era brought about a more scientific approach to medicine, with an emphasis on evidence-based practices. However, even as medical science progressed, the complexity of new treatments and the growing use of surgical procedures increased the potential for errors. The understanding of infection, for instance, was still developing, which often led to preventable complications and errors in treatment.

20th Century

The 20th century saw significant advancements in medical technology and practices, including the introduction of antibiotics, sophisticated

diagnostic tools, and complex surgical techniques. However, this period also highlighted the increasing frequency of medical errors and their impact on patient safety. Early studies and reports began to acknowledge medical errors as a significant issue. For instance, in the 1970s, the concept of "iatrogenic" disease—illnesses caused by medical intervention—started gaining attention. The turning point came in 1999 with the publication of the Institute of Medicine (IOM) report, "To Err is Human: Building a Safer Health System." This landmark report revealed that medical errors were a leading cause of death in the United States, with estimates suggesting that between 44,000 and 98,000 deaths annually were attributable to medical errors. The report was a wake-up call for the healthcare industry, emphasizing the need for systemic changes to improve patient safety and reduce errors.

21st Century

Since the IOM report, there has been a growing focus on understanding and addressing medical errors. Efforts have included the development of more rigorous reporting systems, the implementation of patient safety protocols, and the promotion of a culture of transparency and learning within healthcare organizations. The adoptions of electronic health records, simulation training, and other technological advancements have been introduced to reduce the incidence of errors. Despite these improvements, medical errors continue to be a significant challenge, reflecting the complexity of modern healthcare systems and the ongoing need for vigilance, innovation, and improvement in patient safety practices.

Concepts

Medical errors can be classified into several categories:

- **Diagnostic Errors:** Mistakes in diagnosing a patient's condition, which can lead to incorrect or delayed treatment.
- **Treatment Errors:** Errors in the administration of treatment, including incorrect medications, dosages, or procedures.
- **Preventive Errors:** Failures to provide appropriate preventive measures, such as vaccinations or screenings.
- **Other Errors:** Errors related to communication, patient safety protocols, or system failures.

Understanding these concepts helps in identifying where improvements can be made in healthcare systems to prevent such errors.

Epidemiology of Medical Error

The epidemiology of medical error is a crucial aspect of understanding its impact on public health and improving patient safety. Medical errors refer to preventable adverse events resulting from the failure of healthcare professionals or systems, encompassing diagnostic errors, treatment mistakes, and procedural failures. The epidemiology of medical errors involves studying their frequency, causes, and consequences across various healthcare settings and populations [1].

Prevalence and Impact

Medical errors are a significant concern in healthcare worldwide, with substantial implications for patient safety and healthcare systems. The prevalence of medical errors varies by study and setting, but estimates consistently indicate that they are a leading

cause of harm to patients. A pivotal study by the Institute of Medicine (IOM) in 1999 estimated that medical errors result in between 44,000 and 98,000 deaths annually in the United States alone, making them a leading cause of death. Subsequent research has supported these findings, suggesting that the incidence of medical errors is high and that they often go underreported. More recent studies have continued to highlight the substantial burden of medical errors. For instance, a 2016 study published in *BMJ Quality & Safety* estimated that medical errors might account for approximately 250,000 deaths annually in the United States, which would make them the third leading cause of death, following heart disease and cancer [2].

Types of Medical Errors

The epidemiology of medical errors reveals that they can occur across various domains of healthcare:

- **Diagnostic Errors:** These include incorrect or delayed diagnoses. Studies suggest that diagnostic errors affect around 5% of adults in outpatient settings. Misdiagnoses can lead to inappropriate treatments, worsening conditions, or missed opportunities for effective intervention.
- **Treatment Errors:** Errors in treatment encompass medication mistakes, incorrect dosages, surgical errors, and improper use of medical devices. Treatment errors are particularly concerning because they directly impact patient outcomes and can result in severe adverse effects or even death.
- **Preventive Errors:** Failures in preventive care include missed

vaccinations, screenings, or preventive treatments. Preventive errors can result in the progression of diseases that could have been prevented or detected early.

- **Other Errors:** This category includes errors related to communication breakdowns, system failures, and failures in patient safety protocols. Poor communication among healthcare providers, between providers and patients, or within healthcare systems can contribute to misunderstandings and mistakes [3].

Contributing Factors

Several factors contribute to the prevalence of medical errors:

- **Human Factors:** Fatigue, stress, and cognitive overload can impair healthcare providers' ability to perform tasks accurately. Human errors are often exacerbated by high workloads and insufficient support.
- **Systemic Issues:** Inadequate protocols, lack of standardization, and ineffective communication systems can lead to errors. Complex healthcare systems with fragmented care processes are more prone to errors.
- **Technological Challenges:** While technological advancements like electronic health records (EHRs) have improved healthcare, they also introduce new risks, such as data entry errors, system failures, and cybersecurity threats.
- **Reporting and Data Collection:** Accurate data collection and reporting are essential for understanding the

scope of medical errors. However, underreporting remains a significant issue. Healthcare professionals may fear repercussions or blame, leading to reluctance to report errors. Initiatives to improve error reporting systems and create non-punitive environments for reporting are crucial for gathering accurate data and driving improvements in patient safety [4].

Addressing medical errors involves a multifaceted approach. Key areas of focus include:

- **System Improvement:** Implementing systemic changes such as electronic health records, standardized procedures, and better communication channels to reduce errors.
- **Education and Training:** Enhancing the training of healthcare professionals to ensure they are equipped with the knowledge and skills to avoid common errors.
- **Patient Engagement:** Encouraging patients to be active participants in their care by providing clear information and involving them in decision-making processes.
- **Reporting and Transparency:** Establishing non-punitive reporting systems where healthcare professionals can report errors without fear of retaliation, fostering a culture of transparency and learning.

Developing and implementing these strategies is crucial in mitigating medical errors and improving overall patient safety [5].

Recommendations

- **Implement Comprehensive Safety Protocols:** Healthcare institutions should adopt and enforce comprehensive safety protocols to minimize the risk of errors.
- **Promote Continuous Education:** Ongoing education and training for healthcare professionals should be prioritized to keep them informed about best practices and emerging risks.
- **Foster a Culture of Safety:** Develop a culture within healthcare organizations that prioritizes patient safety, encourages open communication, and supports error reporting without blame.
- **Enhance Patient Involvement:** Encourage patients to take an active role in their care by providing them with the necessary information and involving them in decisions about their treatment.
- **Invest in Research:** Support research into the causes and prevention of medical errors to develop innovative solutions and improve healthcare practices [6,7].

Conclusions

Medical error is a pervasive issue that poses significant challenges to healthcare systems. Despite advances in medical technology and practice, errors continue to occur, often with serious consequences for patients. Addressing medical errors requires a comprehensive approach that includes systemic improvements, enhanced education, patient engagement, and transparent reporting practices. The recognition and analysis of medical errors are essential for driving progress and ensuring safer healthcare delivery. Tackling medical errors is an ongoing

challenge that demands concerted efforts from all stakeholders in the healthcare system. By implementing these recommendations, healthcare systems can make significant strides toward reducing medical errors and improving patient safety.

Bibliography

1. [Nicoletta C von Laue I, David L Schwappach, Christian M Koeck. The Epidemiology of Medical Errors: A Review of the Literature. Wien Klin Wochenschr. 2003;115\(10\):318-25.](#)
2. [TA Brennan, LL Leape, NM Laird, L Hebert, AR Localio, AG Lawthers, JP Newhouse, et al. A Prospective Study of Adverse Events in Hospitals: The Harvard Medical Practice Study. N Engl J Med. 1991;324\(6\):370-6.](#)
3. [DC Classen, et al. Reducing Medical Errors and Improving Patient Safety. J Patient Safety. 2010.](#)
4. [L Carayon. The Role of Human Factors in Medical Errors: A Review of the Literature. J Patient Safety. 2014.](#)
5. [Improving Diagnosis in Health Care: A Report from the National Academy of Medicine. National Academy of Medicine, National Academies Press, 2015.](#)
6. [Atul Gawande. Complications: A Surgeon's Notes on an Imperfect Science. Metropolitan Books. 2002.](#)
7. [Institute of Medicine \(US\) Committee on Quality of Health Care in America Linda T. Kohn, Janet M. Corrigan, Molla S. Donaldson. To Err Is Human: Building a Safer Health System. Institute of Medicine \(IOM\), National Academy Press, 2000.](#)

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