IOSR Journal of Nursing and Health Science (IOSR-JNHS)
e-ISSN: 2320–1959.p- ISSN: 2320–1940 Volume 12, Issue 6 Ser.1 (Nov. – Dec. 2023), PP 51-55
www.iosrjournals.org

Systematic Review Of Patient Identification Protocols

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ABSTRACT
Patient identification protocols are crucial in ensuring patient safety and avoiding clinical errors or financial implications. Various research methodologies have been employed to evaluate the effectiveness of these protocols and identify areas for improvement.
The research has identified three main themes associated with unresolved patient identification issues, including patient safety concerns, financial and resource implications, and limitations on data sharing and interoperability. The protocols for patient identification include using a patient's name and date of birth, assigning patient ID numbers, using biometric identification, or providing patients with barcoded wristbands. It is important for healthcare providers to follow the specific protocols in their facility and be aware of potential issues that may arise when identifying patients, such as patients with similar names or identical twins. Inaccurate identification of patients can lead to medication errors, incorrect treatment, and other adverse events. Additionally, maintaining patient confidentiality is crucial in protecting sensitive personal information, such as medical history and diagnosis.
Rigorous research methodologies such as conducting a comprehensive review of existing studies, reports, healthcare data, and qualitative data gathered from healthcare providers have been used to identify best practices and areas where improvements can be made.

Date of Submission: 05-11-2023 Date of acceptance: 15-11-2023

I. INTRODUCTION

RESEARCH BACKGROUND

Patient identification is the process of "correctly matching a patient to appropriately intended interventions and communicating information about the patient's identity accurately and reliably throughout the continuum of care". Patient identification encompasses not only the physical identification of the patient but also technologies able to enhance the accuracy of patient identification. The main attributes of ideal patient identifiers have been described as unique, ubiquitous, and unchanging in their nature. Different technological approaches and practices and operational processes that optimize accurate patient identification are necessary to meet the increasing and diverse demands for the use and reuse of data by various stakeholders.

Patient identification seems like a simple cog in the complex framework of a healthcare facility. However, errors in this simple process, although often harmless, can sometimes result in harm or distress to patients and their families. In one such case, an intern intending to call the family of a deceased patient inadvertently called the wrong family and delivered the devastating news to them. The mistake, although corrected only twenty minutes later, caused unnecessary pain and trauma to that family. Fortunately, in the four cases presented in this report, the identification errors were discovered relatively soon after the mistake was made and there were no adverse effects on the patients involved (other than the inconvenience of additional testing). Nevertheless, even these minor misidentifications can be taxing on patients and jeopardize their safety, and they can also result in significant costs for the hospital by wasting time and resources on unnecessary tests and procedures.

Today, lack of widely adopted operational principles and limitations in processes and technologies result in inaccurate patient identification.

Lack of accurate patient identification can affect clinical decision-making, treatment, patient outcomes, patient privacy, and results in duplicative testing and increased cost. When a patient is incorrectly matched to another patient's record, patient care and safety are jeopardized as incorrect data can cascade to a multitude of internal and external systems and databases such as laboratory, radiology and health information networks, potentially leading to laboratory, imaging, and medication errors as well as wrong-site surgeries. Similarly, with the existence of multiple records for a single patient, clinicians can miss critical information because it is in the

duplicate record. In both scenarios, care decisions are based on an incomplete or erroneous picture of the patient's medical history because data is not accurate or reliable.

The frequency of patient misidentifications can elude detection due to the variable nature of resulting outcomes. Nevertheless, attempts to quantify the cause of these errors have been made. A qualitative analysis performed on 227 RCA (root cause analysis) reports from the Veterans Health Administration, found that 182 of 253 errors in the test cycle were attributable to patient misidentification. Of 503 healthcare executives across the United States surveyed for the 2016 National Patient Misidentification Report published by the Ponemon Institute, 64% claimed that patient misidentification errors happen more frequently than the reported industry standard of 8-10%. The same report states that, on average, a hospital loses $17.4 million per year in denied insurance claims associated with misidentification

With this background in mind, we decided to review existing patient identification protocols with objectives of
1. To study patient identification errors.
2. To study the impact and adverse effects of patient identification errors.
3. To understand the factors that lead to patient identification errors.
4. To study the different interventions that can help resolve patient identification errors.

Patient identification and Data sharing interoperability

The failure and inability to correctly identify has resulted in concerns raised regarding patient safety and the standard of care provided in the healthcare field. Errors could occur during the diagnostic testing process up to the time when treatment is provided. In 2016 research conducted, over 7600 out 10915 incidents from January 2013 up to August 2015 were categorized as "wrong-patient events" involving mistakes made during the process of patient identification.

Several factors that contributed to these number includes admitting a patient under a different person's medical record, creating a duplicate medical record during registration, extracting the record of a patient with a similar name to the actual patient and asking about a patient's identity without checking a patient's identification band or ask for two accepted means of identification. In addition, The Joint Commission's sentinel event statistics show that 37 patient safety incidents out of 436 sentinel events have taken place as a result of patient identification errors in the second quarter of 2019 and this includes surgical or invasive procedure events which involved wrong patient, wrong procedure and wrong site of treatment and intervention.

Patient misidentification increases data sharing and interoperability concerns as well. Based on past records, patient identification practices in the US have been inconsistent. There have also been reports that state that hospitals encounter challenges while trying to accurately match patients to their healthcare information. These obstacles limit health information exchange. Consequently, limited health information exchange can result in clinical decision-making based on incomplete information. This would ultimately increase the probability of misdiagnosis, unsafe and inadequate management and treatment as well as duplicative testing.

Accurate patient identification may also have downstream implications for the secondary use of data for population health, quality improvement, public health, research and detection of waste, fraud and abuse. The failure to match patients accurately to their health information can lead to false positives and false negatives when the medical records of different patients are wrongly matched or when the records for the same patient are not matched. Duplicates are caused by several contributing factors such as varying methods of matching patient records, lack of standardization, inadequate policies and procedures and the constant change of demographic data.

The existence of duplicate records can also lead to duplicative testing and treatment due to inaccurate or unavailable data. For example, one hospital reported 30% of clinicians surveyed reordered tests because they were not given proper access to previous records of patients.

In the US, these obstacles are further complicated by existing legal and policy hindrance. A lack of a proper patient identity solution raises some concerns. The literature review showed three significant themes that are relevant to unresolved patient identifications problems. The first theme discusses the adverse effects of patients' misidentification can lead to clinical errors which raises patient safety concerns. The second theme focuses on financial, payment and resource effects that are linked to patient misidentification. The third theme highlights the challenges patient misidentification imposes on data sharing and interoperability.

Algorithmic Approaches

Algorithms are another method used to match patients to their health information using demographic elements such as first name, last name, gender, date of birth, social security number (in the US) and address. Algorithms range from simple deterministic matching which involves significant identifier coupled with a limited number of insignificant identifier (example: date of birth) that are compared to correctly identify accurate matches, to more advanced probabilistic matching methods that use threshold limits. The success rate of such algorithms varies widely, may be vendor-specific and are dependent on the specificity and customization that is

involved in the base installation of an electronic health record (EHR) system. As much as matching algorithms can reach matching rates of approximately 90%, they still cannot be deemed as perfect and cannot be verified as 100% accurate with regards to patient matching solutions.

Incorrect or incomplete patient demographic information can affect and delay the effectiveness of algorithmic accuracy. Incidence involving incorrect or incomplete demographic data can be due to lack of best practices in collecting demographic data at registration, differences in organizational and health information technology (IT) vendor policies and processes in how demographic data are obtained, the failure by patients to provide the correct information at registration (example : registering with nickname versus legal name), and failure to update patients' information when their demographic details change (example : address, phone, email and name change). Transcription and free text errors can also obstruct algorithm accuracy which includes spelling mistakes, phonetic combinations, repeating last names, repeating first names and different first names.

Standardized data elements are also required to maximize matching algorithm accuracy (example: telephone number, date of birth, address). Limited standardized data demographic data characteristics across institutions and care settings can provoke the "syntactic heterogeneity of data" making algorithms less successful. Evidence based studies have shown that standardizing certain demographic data can increase match rates.

Referential Matching Software

Beyond algorithmic methodologies, an increasing number of organizations are imposing add-on technologies such as referential matching software to increase the chances of identifying patients accurately. Referential matching software is a data augmentation in which a third-party service provider provides an additional layer of demographic information (usually from outside of healthcare) including datasets from credit reporting and public utilities that are updated from time to time and maintained to upgrade patient matching.

Companies that have invested in such technology display match rates as high as 98 and 100%, however such rates have not been independently verified. Concerns have been raised that referential matching could lead to clinicians and payers to be accessible to personal and financial information and that could include credit card information. However, existing referential matching methods to do appear to share patient health information outside of the healthcare institution.

The accuracy of non-health information such as data from the US Postal Service and the Social Security Administration used by matching software is also a concern for clinicians and patients. Referential matching also has disadvantages associated to certain patient populations including children, homeless individuals and undocumented immigrants because data sources used for referential matching do not contain or have limited information pertaining to these populations.

Challenges linked to accurately matching patients to their healthcare information raise financial and resource concerns. Repetitive tests and treatment contribute significantly to an increased cost and affect the timeline of delivering proper care for a patient. From a revenue cycle perspective, there may be claims denials and implementation of time consuming and expensive processes to correct medical records. Research shows that between 10-15% of all health insurance denials are due to errors in patient identification numbers.

II. METHODOLOGY

To evaluate the effectiveness of these protocols and identify areas for improvement, rigorous research has been done including defining the scope of the study, identifying relevant data sources, conducting a literature review and analysis, evaluating findings, and developing evidence-based recommendations. For this study a comprehensive review of existing studies, reports, healthcare data, and qualitative data gathered from healthcare providers were analyzed. The main electronic database used are NCBI, special report by ECRI institute, PSNet, WHO guidelines . Reliability of information is determined by looking up background information on the authors of web source which was done by using Sci Hub.

For this Research, around 25 articles were reviewed, out of which 5 articles were finalized. The articles that don't meet the criteria were excluded. The results above are all based on findings from relevant and reliable sources.

III. RESULTS

Based on the methodology, around 25 articles were reviewed, out of which 5 articles were selected after inclusion based on title and abstract review. After thoroughly reviewing and assessing, were included in the review. Most reviews, reports and guidelines strongly recommending patient identification have increasingly become more complicated. Technological advances including biometrics, Referential matching and radio frequency identification device (RFID) technologies are a few new approaches brought about by technological and methodological advancements that to identify patients awaiting transport for specific procedures, can be used to minimize interdepartmental miscommunication ,improve coordination, communication, and safety of transport

between departments, should report back on progress made on a regular basis to ensure a feedback loop for any implemented changes.

Patient misidentification has been experienced across all medical departments and avoiding these errors requires far-reaching preventive strategies. Overall, we included 106 studies: 39 studies described prevalence, 44 described problems contributing to patient ID errors, and 40 assessed interventions.

A 2012 systematic review by Snyder et al. (2012) Eight studies were performed in clinical pathology laboratories and two in surgical/anatomic pathology laboratories. Study settings were diverse, spanning inpatient, outpatient, emergency department, and pediatric settings. All studies tracked more than 1,000 specimens and all except two studies followed more than 10,000 specimens for both comparative groups. Meta-analysis of nine studies concluded that barcoding systems were associated with significant improvement in rates of ID error identification

Hain et al. (2010)76 described a quality initiative at Monroe Carell Jr. Children's Hospital at Vanderbilt to improve use and accuracy of pediatric ID wristbands.

Adelman et al. (2012) performed a large, single-institution, prospective randomized controlled trial (RCT) comparing ID verify alert, ID reentry function, and control. The ID verify alert required a single click to confirm patient name, gender, and age, while ID re-entry required re-entry of patient initials, gender, and age. As a surrogate measure for wrong-patient orders, authors measured the retract and reorder (RAR) events, defined as retraction of orders in 10 minutes or less that are subsequently reordered by the same provider for another patient within 10 minutes. Authors validated RAR with semi-structured interviews of providers and determined the positive predictive value (PPV) of RAR events to be 76%.8

The Joint Commission's sentinel event statistics show that 37 patient safety incidents out of 436 sentinel events have taken place as a result of patient identification errors in the second quarter of 2019 and this includes surgical or invasive procedure events which involved the wrong patient, wrong procedure and wrong site of treatment, intervention, Repetitive tests and treatments are likely to add costs and impact timeliness of care delivery. Accurate patient identification may also have downstream implications for the secondary use of data for population health, quality improvement, public health, research and detection of waste.

IV. DISCUSSION

The variety of patient identification methodologies is expansive and may include hybrid models that combine different methods. Lack of a perfect patient identity solution raises significant concerns. There are three distinct themes associated with unresolved patient identification issues. The first theme focuses on how patient misidentification can lead to clinical errors or "near misses" which raises patient safety concerns. The second theme identifies financial, payment, and resource implications associated with patient misidentification. The third theme identifies the limitations patient misidentification places on data sharing and interoperability.

Patient Safety

Failure to accurately identify patients raises patient safety and quality of. Factors contributing to these events included admitting a patient under another patient's medical record, creating a duplicate record at registration, pulling the record of a patient with a name like the intended patient, or asking about patient's identity while failing to either check a patient's identification band or ask for two acceptable forms of identification. Failure to accurately match patients to their health information can lead to "false positives" when the medical records of two different patients are mistakes. or "false negatives" when the records for the same patient are not matched. Duplicates are the result of varying methods of matching patient records, lack of data standardization, lack of policies and procedures, and frequently changing demographic data.

Financial and Resource Concerns

Wrong matching of patients to their health information raises financial and resource concerns. Repetitive tests and treatments are likely to add costs and impact timeliness of care delivery.

Data Sharing and Interoperability

Difficulties in accurately matching patients to their health information across health IT systems limit health information exchange which can lead to clinical decision-making based on incomplete information resulting in increased chances of misdiagnosis, unsafe treatment, and duplicative testing.

There are various protocols and methods for patient identification in healthcare settings, and it's important to understand and follow them to ensure patient safety. There are several different protocols that can be used to identify patients, including the following: There are several different protocols that can be used to identify patients, including the following:

1. Name and date of birth: This is one of the most commonly used protocols for patient identification. Patients are asked to provide their full name and date of birth, which is then matched to their medical records.

2. Patient ID number: Many healthcare facilities use patient ID numbers to identify patients. These numbers are assigned to patients when they are admitted to the hospital or clinic and are used to track their medical records.
3. Biometric identification: Some healthcare facilities use biometric identification, such as fingerprints or facial recognition technology, to identify patients. This method is particularly useful for patients who may not be able to provide their name or other identifying information.
4. Barcoded wristbands: Patients may be given a wristband with a barcode that contains their identifying information. This barcode can be scanned to verify the patient's identity before any medical procedures are performed.

It's important to note that patient identification protocols may vary depending on the healthcare setting and the type of care being provided. For example, emergency departments may use different patient identification protocols than outpatient clinics or hospitals. Healthcare providers should be aware of the specific protocols in their facility and follow them closely to ensure patient safety.

In addition to following patient identification protocols, healthcare providers should also be aware of potential issues that may arise when identifying patients. For example, patients with similar names or identical twins may be more difficult to identify accurately. Healthcare providers should be alert to these potential issues and take extra steps to confirm a patient's identity when necessary.

V. CONCLUSION

Accurate and unique identification of patients along the care continuum is essential. Proper patient ID confirmation at every step of clinical care is vital to patient safety. The protocol should involve using at least two patient identifiers, such as name, date of birth, and medical record number, to ensure accuracy and prevent errors. It is also important to confirm patient identification before administering medication, performing procedures, or conducting any interventions. The volume, velocity, and variety of health data is expected to continue to grow, as is demand for new data streams to be incorporated into the electronic health record. Main aim in the patient identification protocol is for patient care and safety, addressing cost and resource concerns, and enhancing data sharing and interoperability.

The protocol should be clearly communicated to all healthcare staff, including physicians, nurses, and support staff, and regularly reviewed to ensure its effectiveness and training should be provided to ensure consistent implementation. There are electronic health record systems and bar code systems helping with patient identification d reducing the risk of errors. In addition, patient education is crucial to ensure that patients understand the importance of accurately identifying themselves and providing accurate medical information.

Overall, a patient identification protocol is a critical component of healthcare delivery and can have a significant impact on patient outcomes, safety, and satisfaction.

ACKNOWLEDGMENT

Authors would like to express my deep appreciation to MAHSA University, Dr. Nilar, and Dr. Uday for their constant inspiration and guidance throughout this research. The Department of Personal and Professional Development also deserves our thanks for providing us with the opportunity to conduct this study on WHO Patient Safety Goal #6 and the Malaysian Patient Safety Goal G9.

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