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Patient Harm and Malpractice Payments in Inpatient Settings According to Type of Medication Administration Error

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This is to certify that the doctoral study by

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Walden University
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Abstract

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MHA, Des Moines University, 2017

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Doctoral Study Submitted in Partial Fulfillment

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Abstract

While preventable, medication administration error rates surpass most estimates and result in poor quality care. Researchers have demonstrated that interventions have been identified, new technology has been deployed, and training and education have increased, yet the errors persist. Researchers have yet been able to establish the most prevalent, harmful, and costly types of medication administration errors. The purpose of this quantitative study was to identify trends in medication administration errors committed in inpatient settings, specific to the type of error, patient outcomes, and malpractice payment amounts. Donabedian's model for healthcare quality, derived from the three categories of structure, process, and outcomes, was utilized to determine how mistakes persist despite numerous interventions targeted at these factors. The data set utilized included malpractice claim data points with year of act or origination dates between 2010 and 2020 through the NPDB Public Use File. A correlational analysis was conducted utilizing Pearson's *R* and multiple linear regression to define the relationships between the independent variable of medication administration error type and dependent variables of severity of alleged malpractice injury and total payment. Analysis of the data indicate a greater prevalence of administration errors related to wrong medication and wrong dose; of these, wrong dosage errors resulted in greater harm to the patient, though medications administered via the wrong route resulted in greater payment amounts. Also, malpractice payment amounts increase with greater severity of harm. Positive social change may include the promotion of more precise error-targeting interventions for preventing medication administration errors in inpatient settings.

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Section 1: Foundation of the Study and Literature Review

For decades, the rates of medication administration errors have baffled researchers, healthcare professionals, and the public. Most notably, “To Err is Human” published by the Institute of Medicine in 1999, drew rapid attention to the systemic failures occurring within the healthcare industry while also making a point to demonstrate that healthcare itself was a contender in the leading causes of death. Despite representing a major opportunity for improved patient safety and reduced health spending within the healthcare field, little progress has been made specific to medication administration errors. The five rights of medication administration represent a well-known set of principles governing the administration of medications in most settings. According to the Institute for Healthcare Improvement, these include the right patient, the right medication, the right time, the right dosage, and the right route (Federico, 2021). While any error among these five rights may result in an adverse reaction, it is relatively unknown which of these five rights are more commonly violated, much less, of those violated, which are more likely to be pursued legally, which produce a higher degree of harm, and which results in a greater cost to the health system as a whole.

To better understand medication administration errors, as they relate to the five rights, a retrospective review of the impact of these occurrences was conducted. This study may assist in the development of direct and influential interventions specific to the nature of the error. Data from the National Practitioner Data Bank (NPDB), which houses reports on medical malpractice payments and adverse actions specific to healthcare providers, was used for data inclusion. This section provides an overview of medication administration errors as we have come to know them today, followed by the rationale for extending research on this topic with a brief overview of how it was conducted. The research questions are then presented, and the theoretical framework discussed. A literature review is included in which recent studies on prevalence, recognition, reporting, non-observance, and interventions are examined. Definitions, assumptions, and limitations follow to more clearly define specific aspects of the study and disclose potential shortfalls. Finally, the significance is addressed as it relates to the impact on future research within this field and scope of study.

Background

In the United States alone, between 7 and 9,000 people die due to a medication error annually (Dirik, et al., 2019). According to Wittich et al. (2014), prior studies, including those conducted by the Institute of Medicine, have found that inpatient medication error rates range between 4.8% and 5.3%; however, multiple other studies believe this range to be much higher due to lapses in recognition and reporting. Furthermore, prior estimates by the Institute of Medicine link one out of every 131 outpatient and one out of 854 inpatient deaths to medication errors (Wittich et al., 2014). Per Durham et al. (2016), hospitalized patients are typically subject to one medication error per day, most often occurring during drug administration. Similarly, Armstrong et al. (2017) state that between 25-33% of medication errors occur at the administration phase.

Though prior studies have indicated that adverse drug events occur in fewer than 1% of all medication errors, the Patient Safety Network (2019), asserts that adverse drug events occur during the care of around 5% of all hospitalized patients. One in three hospital adverse events is caused by a medication error that led to a harmful adverse drug event (Durham et al., 2016). Therefore, considering the compounding of these odds, the true number of medication errors may very well exceed any prior estimates. Additionally, hospital stays may also be prolonged between 1.7 and 4.6 days due to such adverse drug events caused by medication errors (Durham et al., 2016).

Unless having caused harm, medication administration errors are generally undetectable due to low visibility, rare interceptions, and underreporting (Durham et al., 2016). Härkänen et al. (2015) also point out that the medication process involves a myriad of experts and specialists, numerous medication combinations, and heavy reliance on technology according to patient diagnosis, comorbidities, and health status, making medication administration highly complex. Armstrong et al. (2017) note that adverse drug events remain the most frequently occurring adverse event for inpatients with 2 million cases occurring annually. According to Armstrong et al. (2017), around 25% of adverse drug events are caused by medication errors with estimates of 380,000-450,000 preventable adverse drug events occurring annually in U.S. hospitals. Moreover, according to Suclupe et al. (2020), intensive care unit patients are more vulnerable to the occurrence of medication errors due to the complexity of the care required in conjunction with the patient’s limited physiological reserves. Suclupe et al. (2020) also noted that critically ill patients receive twice as many drugs as patients in other units, making them more difficult to manage. This study is needed to address the gap in retrospective analysis of prior claims for trends related to the nature of the error, the harm caused to the patient, and the cost to the healthcare system. Implications for social change include the thoughtful development of interventions taking into consideration current trends in medication administration errors specific to the type of error.

Problem Statement

Despite an increased focus on medication error rates, studies have demonstrated limited progress in reducing the number of medication administration errors committed in inpatient settings such as acute care hospitals, intermediate care facilities, and skilled nursing facilities, among potential others. Mendes et al. (2016) note that medication errors may cause further complications leading to prolonged hospital stays, additional health care interventions, patient disabilities, and death. Mustafa et al. (2016) add to this, noting that there may also be damage to the healthcare professionals' reputation and misguided distrust of the health care system by patients and society, as well as legal issues resulting in poor public images. Prior research by Yung et al. (2017) indicated that patients or their families made aware of a medication error in less than 10% of cases, which is consistent with their finding that only 10.8% of errors were documented in the patient chart. Studies indicate contradiction in patient/family reaction where some note that patients/families would be less likely to pursue legal action if informed honestly, whereas public perception believes in penalizing health professionals to prevent future negligence (Yung et al., 2017).

Prior research on this topic covers many factors, from many angles, and yet the collective knowledge has provided little contribution to medication administration error reductions. Studies on prevalence of medication administration errors continue to baffle the healthcare society. Studies on recognition, reporting, and non-observance represent psychological classifications of error at the human, individual, or behavioral level. Studies targeting interventions such as technology, education, and behavior or attitude aim to reduce error rates via error proofing, knowledge enhancement, or cultural standards at organizational, system, and individual levels. While all well-derived, no studies have taken into consideration trends related to the nature of the errors themselves.

Purpose of the Study

The purpose of this quantitative study was to identify trends in medication administration errors committed in inpatient settings such as acute care hospitals, intermediate care facilities, and skilled nursing facilities, specific to type of error, patient outcomes, and malpractice payment amounts. The intent was to define the relationships between the independent variable of ‘specific malpractice allegation’ (i.e. medication administration error type) and dependent variables of ‘severity of alleged malpractice injury’ and ‘total payment’ while controlling for the covariate variables of ‘patient gender’ and ‘patient age’.

Research Question(s) and Hypotheses

Research Question 1 (RQ1): Is there a correlation between specific malpractice allegation related to medication administration errors committed in inpatient settings and severity of malpractice injury while controlling for age and gender reported to the NPDB within the last 10 years?

$H_0 1$: There is no statistically significant correlation between severity of malpractice injury and specific malpractice allegation related to medication administration errors in inpatient settings while controlling for age and gender reported to the NPDB within the last 10 years.

H_a1: There is a statistically significant correlation between severity of malpractice injury and specific malpractice allegation related to medication administration errors in inpatient settings while controlling for age and gender reported to the NPDB within the last 10 years.

Research Question 2 (RQ2): Is there a correlation between specific malpractice allegation related to medication administration errors committed in inpatient settings and total malpractice payment amount while controlling for age and gender reported to the NPDB within the last 10 years?

H_02: There is no statistically significant correlation between total malpractice payment amount and specific malpractice allegation related to medication administration errors in inpatient settings while controlling for age and gender reported to the NPDB within the last 10 years.

H_a2: There is a statistically significant correlation between total malpractice payment amount and specific malpractice allegation related to medication administration errors while controlling for age and gender in inpatient settings reported to the NPDB within the last 10 years.

Research Question 3 (RQ3): Is there a correlation between severity of malpractice injury and total malpractice payment amount while controlling for patient setting and specific malpractice allegation related to medication administration errors committed in inpatient settings while controlling for age and gender reported to the NPDB within the last 10 years?

H_o3: There is no statistically significant correlation between severity of malpractice injury and total malpractice payment amount while controlling for age and gender reported to the NPDB within the last 10 years.

H_a3: There is a statistically significant correlation between severity of malpractice injury and total malpractice payment amount while controlling for age and gender reported to the NPDB within the last 10 years.

Framework

The framework of this study was centered on Donabedian's model for healthcare quality (Donabedian, 2005). This theory focuses on the three domains of structure, process, and outcomes where these categories represent the context, transactions, and effects of services and their influence on the quality of the healthcare system. Prior studies have focused on a multitude of personal and environmental factors leading to such behaviors; however, this study focused on the behaviors or errors as they are influenced by organizational setting and potential consequences. A sampling of tested theories and potential findings is listed below, though none take into consideration the outcomes for the patient.

Ribeiro Mendes et al. (2016) assert that healthcare professionals are predisposed to the occurrence of errors due to organizational factors such as staffing shortages, lack of materials and resources, interruptions, heavy workloads, long working hours, excessive noise, and poor lighting. Similarly, Dirik et al. (2019) assert that medication errors occur when error-producing circumstances are present such as heavy workloads, poor communication, interruptions/distractions, and lack of knowledge about medications. According to Durham et al. (2016), time pressure, poor human-system interface, information overload, misperception of risk, and lack of system feedback are all primary contributors to errors as well.

Härkänen et al. (2015) classified error producing conditions as either work environment, team, person-specific, patient-specific, or medication-related. Though Suclupe et al. (2020) assert that “errors in administration are more closely related to environmental and professional factors such as stress or work overload.” (p. 1193) According to Latimer et al. (2017), most medication errors are not a result of carelessness, rather they occur at the broad intersect of system factors such as work environment, individual, team, task, and organization. Whereas Athanasakis (2019) attributes medication errors to either individual factors such as non-adherence of the five rights or organizational factors such as distractions. Armstrong et al. (2017) also suggest that medication administration errors are derived from system and nurse-level factor interplay. Additionally, Armstrong et al. (2017) assert that system-level interventions fail to take into consideration professional roles which may help to provide insight in developing and implementing interventions at the professional level.

Nature of the Study

A quantitative correlational research approach was utilized for this study. A cross-sectional study was performed utilizing deidentified data from the NPDB Public Use File. The NPDB publishes updated data files which include Adverse Action Reports and

Medical Malpractice Payment Reports on a quarterly basis. I analyzed the data according to the “Medication Related’ category for nature of the allegation and then by specific allegations of ‘Medication Administered via Wrong Route’, ‘Wrong Dosage Administered’, ‘Wrong Medication Administered’, and ‘Wrong Patient’ where the patient is considered ‘inpatient’ at the time of the incident as this would include data from entities such as acute care hospitals, intermediate care facilities, and skilled nursing facilities, among potential others. The intent was to define the relationships between the independent variable of ‘specific malpractice allegation’ (i.e. medication administration error type) and dependent variables of ’severity of alleged malpractice injury’ and ‘total payment’ while controlling for the variables of ‘patient gender’ and ‘patient age’. The covariate variables are patient age and gender. The nature of this data and potential for correlation between dependent and independent variables deemed a quantitative approach most appropriate for data analysis.

Secondary Data Types and Sources of Information

Data was gathered from the NPDB public use files. The public use file contains adverse action reports, judgement or conviction reports, and malpractice payment reports. This study utilized the malpractice payment reports which include the following variables: practitioners state of license, field of license, allegation group, allegation type, severity of malpractice injury, payment amount, paying entity, patient age, and patient gender.

Literature Search Strategy

To conduct the literature review, I searched databases such as Good Scholar, PubMed, Thoreau, CINAHL Plus, and Medline using the following keywords:

medication administration error, medication error type, acute care hospital, adverse drug event, patient harm, medication error reporting, medication error interventions, types of medication administration errors, 5 rights of medication administration, right person, right dosage, right time, right route, right medication, malpractice, malpractice claims, and *malpractice payments.* Results were limited to peer review, full text, and published between 2016 to 2021.

Literature Review

Recent studies have grappled with the phenomenon of relatively limited progress in reducing the prevalence of medication administration errors despite a wide variety of interventions designed to mitigate risk factors associated with this process. Issues among recognition, reporting, and non-observance have also gained attention. Impacts to the healthcare system remain insurmountable due to the unchecked issue of medication administration errors.

Prior Studies on Prevalence

Suclupe, et al. (2020) conducted a cross-sectional study focused on the prevalence and magnitude of medication errors specific to circumstances or events capable of causing errors or leading to near misses. Out of a total of 249 drugs provided to 52 patients, 294 potential administration errors were identified for a prevalence rate of 73.5% (Suclupe et al., 2020). Interruption during drug administration was the most common potential cause for error. Overall, out of 249 medications administered, one or more potential errors were identified in 183 of the administrations, indicating an average of six potential errors per patient. The prevalence of potential medication administration errors was 73.5% with a 19.7% magnitude of error. Furthermore, Suclupe et al. found that out of the mean 4.8 medications administered per patient, at least one of the six potential error types was observed in 3.5 of these. Interruptions were cited in 47% of the direct observations of medication administrations. Suclupe et al., noted that all potential error causes are preventable.

Per another recent cross-sectional study of medication administration errors within medical and surgical wards by Härkänen et al. (2015), at least one medication error occurred in 22.2% of all medication administration observations. Of the 22% medication error rate, 63.4% of these were directly related to administration and 18.3% were related to documentation (Härkänen et al., 2015). Härkänen et al. noted that of the medication administration errors identified, 59.1% were due to an incorrect administration technique. More importantly, 3.4% of these errors did result in harm to the patient. And in only 27.9% of observations did the nurse ensure the patient received the medication. Factors found to increase risk of error, according to the researchers, included morning shifts, surges, nurses asking for help, and high medication counts per patient. Similarly, factors found to decrease errors were oral administration, double-checking, and more people in the medication room. Härkänen et al. also alluded to another study in which it was stated that many medication administration guidelines are not followed, rules are violated, and protocols are not observed. Due to this, Härkänen et al. assert that rules, protocols, and guidelines are not sufficient in limiting errors, especially errors related to deviations from best practice.

Finally, in a recent study from Ribeiro Mendes et al. (2018), 303 observations of intravenous drug preparation and administration occurred within at university hospital emergency department. In 31.35% of observations, the patient had more than one medication ordered for the same time, of which only 17.89% were compatible; the majority of 56.84% were not compatible and the remaining 25.26% were not assessed (Ribeiro Mendes et al., 2016). Similarly, they found that 69.7% of medications were administered at the wrong time causing compromise of the medication's efficacy. Additionally, many drug recommendations, such as taking the patient's pulse, were ignored, though Ribeiro Mendes et al. note that ongoing vigilance and monitoring of patients are crucial practices within medication administration.

Recognition, Reporting, and Non-Observance

According to Shrivastav and Sachdeva (2018), there are four psychological classifications of medication errors; these include knowledge-based errors, rule-based errors, action-based errors, and memory based-errors. A sampling of the impact of these psychological factors is provided below.

Recognition

Ribeiro Mendes et al. (2016) noted that medication errors may only be avoided if they are identified. Berdot et al. (2016) also point out that most reporting systems require the recognition of the error by the healthcare professional committing the error. According to Latimer et al. (2017), much of medication safety education at the undergraduate level focuses on the five to 10 medication administration rights and medication calculation competency; however, there is little education on the skill sets required to detect an error. Findings by Härkänen et al. (2015) show that a limited number of errors are noticed and even then, only between 10 and 20% are reported. Meanwhile, Dirki et al. (2019) conducted a descriptive survey in which 18 sample cases were provided to nurse participants who then had to conclude whether errors had occurred and how they should be reported. The average rate of error identification across all cases was 81.8%. In the study, most participants did not view lack of monitoring during administration as an error. Of the errors identified, reporting averages were as follows: 46.7% not reporting, 49.9% reporting to the physician, and 29% reporting using the incident reporting system. Participants more consistently identified and reported errors that would result in patient harm rather than errors that they believed less harmful. Reasons provided for not reporting included fears of being viewed as incompetent (71.9%), fears of punishment (66.7%), and failure to recognize mistake (66%). Dirik et al. recommend demonstrating how to provide good care in challenging circumstances rather than focusing on the unfavorable or conditions causing those circumstances.

Reporting

Underreporting also skews true medication administration error rates. According to Vrbnjak et al. (2016), prior reports estimate that proper reporting of medication errors occurs in only 37.4 to 67% of occurrences. Further, they note that underreporting only makes it more difficult to analyze the true nature of the error (Vrbnjak et al., 2016). Their findings suggest that a variety of organizational barriers such as culture, reporting system, and management reaction, as well as personal barriers such as fear, accountability, and nurse characteristics contribute to lapses in reporting medication errors. Similarly, Hammoudi et al. (2017) conducted a descriptive cross-sectional study in which they found that the main barriers to reporting included the administrative response, fear of reporting, and disagreements regarding the definitions of errors. Additionally, 58% of the nurses in this study reported beliefs that fewer than 20% of medication errors were actually reported, though the computed average demonstrated 25.8% of actual errors reported. Additionally, Athanasakis (2019) reported that many nurses rely on personal experience or known experiences by peers of reporting, to decide if they will report. Finally, Yung et al. (2016) conducted a cross-sectional descriptive study in which they found that despite access to online reporting systems, 88.9% of errors were reported orally and in most cases to a colleague or head nurse rather than their supervisor. In this scenario, fears of incriminating evidence prevented professionals from reporting via document or online submission. (Yung et al., 2017). Yung et al. (2017) assert that eliminating fear is a crucial issue in reducing under-reporting.

According to Vrbnjack et al. (2016), factors that may increase reporting include knowledge base, an anonymous reporting system with low reporter burden, professional accountability, supportive and collaborative environment, and clear medication error definition. Above all, they noted that reporting and sharing information related to these reports is crucial to enhancing patient safety (Vrbnjack et al., 2016). Yung et al. linked the importance of reporting to the development of prevention strategies and formulation of experience lessons stating "the development of strategies to reduce errors is hampered by a lack of accurate information regarding the prevalence, causes, and consequences of errors. Under reporting has limited the extent to which reports can be used as a valid and reliable tool to measure incidents and to evaluate whether interventions may be effective in improving patient safety." (p. 581).

Non-Observance

Non-observance has been relatively under-studied as it alludes to the deliberate defiance of standard operating procedures in the name of convenience. Jin et al. (2018) conducted a cross-sectional survey study in which they found a total of 637 medication administration errors, of which 384 (60.3%) were related to non-observance with 163 (25.6%) directly related to workload-related non-observance. Jin et al. pinpointed seven workload related non-observance issues which included external pressures on time, body, and cognition. Jin et al. also identified six categories of non-observance errors including selective cognition, partial cognition, predictive judgement, self-invented operational method, prioritizing operation, and operation omission. The researchers summarized the study stating that "inability or failure to observe operational rules mainly results from an operational process that is perceived as unreasonable, ignores human behavioral characteristics, and increases the work-load." (p. 6). Jin et al. concluded that operational processes should take into consideration the characteristics of the operators, especially in terms of their perception of workload.

Interventions

Interventions specific to one factor or another have been sought since the recognition of the medication administration error crisis. To verify the effectiveness of researched interventions, Berdot et al. (2016) conducted a systematic review and meta-analysis of trials and studies aimed at reducing medication administration errors by means of a specific intervention. Berdot et al. evaluated the efficacy of the interventions via random effects model and found the majority of these studies skewed while also citing a high risk of bias among most. Out of seven intervention-based studies, the researchers found no difference between the control group and the intervention group. Interventions included pharmacist-led training programs, simulation-based training, dedicated medication nurses, interactive CD programs, computerized prescribing, and automated dispensing. Berdot et al. noted small successes where wrong dose errors were decreased throughout the training-based studies and omission errors were decreased among the technology based studies; however, most of the decrease came from category C errors which are considered least harmful in nature and no effect on harm producing errors was noted. Berdot et al. concluded that no evidence was found in support of any intervention causing a significant and effective decrease in administration errors and speculated that barriers to change were not appropriately identified and addressed prior to intervention planning and implementation as well. Taking this into consideration, a few interventions-based studies will still be discussed but should be carefully interpreted.

Educational Interventions

Kim and Lee (2019) stated that current nursing curricula fails to adequately equip nurses with the required clinical competency levels to manage the complexity and continuous progression of medication administration. Furthermore, when errors do occur nurses are again ill equipped to cope with or correct the error committed (Kim & Lee, 2019). Latimer et al. (2017) asserted that prevention is fostered through awareness and understanding of the factors associated with medication errors. Traditional error education training includes encouragement training, guidance training, and avoidance training (Kim & Lee, 2019). Kim and Lee noted that avoidance training causes many nurses to fear medication errors which results in lower confidence levels when performing these skills. Conversely, they found that medication encouragement training boosted confidence in medication administration, enhanced emotional control, and increased foresight for managing the situation (Kim & Lee, 2019). This study falls short in connecting confidence levels to reduced error rates; however, the mindset of those administering medication remains a crucial factor within the theoretical framework.

Mostafa et al. (2019) stated that insufficient pharmaceutical knowledge is also primary contributor to medication administration errors. Mostafa et al. (2019) conducted a prospective pre- and post-interventional study using clinical pharmacist-led interventions focused on improving nurses drug knowledge and awareness of errors. Prior to deployment of the pharmacist-led intervention, error rates ranged around 34.2% while post-intervention error rates ranged around 15.3% resulting in an 18.9% medication error reduction rate (Mostafa et al., 2019). Mostafa et al. also found a significant reduction in the outcome severity of medication errors post intervention. According to their findings, the most common errors were wrong drug-preparation errors (such as improper dose or quantity), deteriorated drug errors, and wrong administration technique errors. Mustafa et al. (2019) summarized their study asserting that the presence of a clinically trained pharmacist in the patient care setting reduces the potential for errors to occur.

Technological Interventions

Armstrong et al. (2017) noted that despite electronic health records, computer physician orders, entry bar code medication administration systems, and structured prescribing forms, medication errors remain an all-too-common occurrence. Shah et al. (2019) were also quick to notice this trend and in their research recognized the emergence of new errors in association with new safeguard technologies such as bar code programs, automated dispensing cabinets, and e-prescribing within electronic health records. Shah et al. (2019) found that each technology comes with its own error types, some traditional, some that persist despite its use, and some new yet specific to the technology itself. For example, e-prescribing resulted in the elimination of four error types altogether, however four new error types emerged, and four error types remained unaffected (Shah et al., 2019). The same was found in the employment of the automated dispensing cabinet (Shah et al., 2019). In terms of errors reviewed, eliminated errors included legibility, labeling, dispensing, and transcription errors; new errors included overrides, computer system, and duplicates errors; and persistent errors included time delays, inaccuracy, and wrong patient error. According to Shah et at., each new type of health information technology should therefore be associated with its own technology-specific error relationship. Shah et al. (2019) asserted a “need to determine optimal risk reduction approaches for each unique health information technology introduced, and to design safety practice improvement for error types unaffected by the introduction of health information technology use.” (p. 1480). Further, the researchers concluded that future studies should also consider error frequency data specific to each technology system and type of error. These findings build on a study by Durham et al. (2016), who noted that "technological fail-safes are most effective at error proofing, but over-reliance on technology may drive the unintended consequence of decreased mindfulness and critical thinking." (p. 80).

Behavioral, Attitude, and Experience Studies

Durham et al. (2016) focused on system issues rather than human factors and identified error-reducing behaviors such as the utilization of checklists, mindfulness techniques such as refocusing attention between interruptions, and error interception prerequisites such as knowing the patient, environment, and policies in order to double check during the process. They combined these system-level approaches to create a brief checklist which touched on mindfulness and policy, as well (Durham et al., 2016). In their study, the checklists were attached to all automatic dispensing cabinets and workstations. Though results demonstrated fewer reported errors after program initiation, they found that complexity still thwarted the system . They found, however, a positive association between number of days caring for a patient and reductions in medication errors which encouraged continuity of care.

Nurses' attitudes towards safety culture, reporting, workload, and protocols are crucial to tackling the issues of recognition, reporting, and non-observance. Armstrong et al. (2017) conducted a study on nurses' attitudes towards updated safety concepts and noted a positive trend between nurses' attitudes related to medication administration safety concepts and their perceived skills in adhering to these concepts, though statistical significance was not found between perceived skills and administration error rates.

Armstrong et al. (2017) concluded that nurses have low perceived skills necessary for implementing updated safety practices, though attitudes towards safety may predispose them to better practices. Meanwhile, despite policy, ease of access to and use of reporting systems, as well as patient safety concern, reporting of errors also rests on the attitudes and decisions of the healthcare professionals. Though Yung et al. (2017) found that most attitudes toward reporting were slightly more positive in nature, they noted that most negative attitudes were most often derived from questions of reporting instances of no harm. Though the majority of survey participants indicated beliefs that all medication errors be reported, an even larger majority noted that they would not report if there was no harm to the patient (Yung et al., 2017). More importantly, Yung et al. found that the more negative the attitude related to reporting, the greater the number of perceived barriers. Similarly, Jin et al. (2018) noted that non-observance is often associated with attitudes towards workload, policies, and culture where perceptions of unnecessary, unimportant, cumbersome, or tedious protocols may be ignored in the interest of time.

Prior experience also serves a role in shaping future practice. Nurses grapple with complex emotions upon committing a medical error; these may include guilt, fear, shame, powerlessness, despair, regret, self-recrimination, restlessness, depression, post-traumatic stress disorder, and suicidal ideation (Athanasakis, 2019). Though having a devastating moral and emotional impact, Athanaskis found that registered nurses employed strategies to cope with their errors and the consequences, and even more developed their experience into methods to prevent future errors, concluding that many lived experiences resulted in acknowledgement of the health professional's role, avoidance of multitasking, increased vigilance related to medication tasks, improved self-awareness, and the development of a 'personal rule.'. According to Athanasakis, retrospect related to a medication error allowed nurses to identify factors that contributed to the error occurrence. To further promote healthy responses to medication administration errors, Yung et al. (2017) recommend counseling for health professionals who have committed an error to help them cope with the emotional elements, a reporting system that guarantees anonymity, and incentives that encourage reporting with positive feedback. Yung et al. also recommend that head nurses encourage reporters to use the appropriate online forms, showing them how if necessary, and reassuring them of no direct reprimand.

Definitions

Adverse Drug Event: "an injury resulting from medical intervention related to a drug" (U.S. Department of Health and Human Services, 2014, p. 5).

*Inpatient: "*Patient who is admitted to and is assigned a bed in a health care facility while undergoing diagnosis and receiving care" (Stedman, 2011, pp. 5).

Inpatient Setting: "means an institution; licensed in the state in which it is located, which includes a short-term hospital, general, a chronic and convalescent nursing home, or a short-term hospital, special, hospice. A rest home with nursing supervision may also be included for the provision of respite care only" (Regulations of the Connecticut Department of Public Health, 2001, p. 167).

Medical Malpractice: "Medical malpractice is defined as any act or omission by a physician during treatment of a patient that deviates from accepted norms of practice in the medical community and causes an injury to the patient. Medical malpractice is a specific subset of tort law that deals with professional negligence." (Bal, 2009, p. 340).

Malpractice Payment: "exchanges of money made as a result of; a written complaint or claim alleging damages related to a practitioner providing or failing to provide health care services that demands financial compensation for damages" (NPDB, 2009, p. A-6).

Medication Errors: "A medication error is any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the health care professional, patient, or consumer. Such events may be related to professional practice, health care products, procedures, and systems, including prescribing, order communication, product labeling, packaging, and nomenclature, compounding, dispensing, distribution, administration, education, monitoring, and use." (The National Coordinating Council for Medication Error Reporting and Prevention, 2021, pp. 1)

*Medication Administration Error: "*a medication error that occurs while administering a medication to a patient" (Baraki, 2018, pp.1); "any difference between what the patient received or was supposed to receive and what the prescriber intended in the original order" (Feleke et al., 2015, p. 2).

National Practitioner Data Bank (NPDB): "The National Practitioner Data Bank (NPDB) is a web-based repository of reports containing information on medical malpractice payments and certain adverse actions related to health care practitioners, providers, and suppliers." (NPDB, 2022, pp. 1).

Patient Harm: "an incident that results in harm to a patient such as impairment of structure or function of the body and/or any deleterious effect arising there from or associated with plans or actions taken during the provision of healthcare, rather than an underlying disease or injury, and may be physical, social or psychological." (Panagioti et al., 2019, p. 1).

Patient Outcome: Per the NPDB guidebook, this variable represents the 'severity of alleged malpractice injury' for which data is defined on a Likert scale of 1 to 9, where one equals 'emotional injury only' and 9 equals 'death' (NPDB, 2022).

Severity of Alleged Malpractice Injury: Per the NPDB guidebook, this is the formal definition for the 'patient outcome' variable (NPDB, 2022).

Specific Malpractice Allegation: Per the NPDB guidebook, this is the formal definition for the 'allegation nature' variable which outlines the type of error cited in the claim (NPDB, 2022).

Total Payment: Total payment amount made on behalf of the practitioner involved in the claim as reparations to the plaintiff (NPDB, 2022).

Type of Error: Per the NPDB guidebook, this variable represents the 'specific malpractice allegation' for which data is defined by the specific act that led to the malpractice claim (NPDB, 2022).

Assumptions

Though many healthcare professionals are able and authorized to administer medications, nurses, including registered nurses and licensed practical nurses, are among the most employed health care professionals across a wide variety of healthcare settings

(Marvanova & Henkel, 2018). Mostafa et al. (2019) notes that all members of a health care team are capable of committing a medication error though the majority are made by nurses due to comprising the largest therapeutic team in most inpatient settings. It is also estimated that nearly 40% of all nursing work involves medication administration tasks (Kim & Lee, 2020). Due to this information, most studies on this topic have focused on the nurse as the primary population contributing to medication administration errors. Though this may result in the assumption that nurses remain the culprit behind the majority of medication administration errors, this study is inclusive of all healthcare professionals who may have committed the error and no distinctions were made to further classify those accused.

A secondary assumption may be related to the classification of medication administration errors. Though traditional training suggests five categories or 'rights' of medication administration, additional studies may cite additional rights which further defines errors in greater specificity. For example, Shrivastav and Sachdeva (2018) also take into account extra dose errors, omission errors, and wrong form errors while the Patient Safety Network includes documentation, reason, form, and response errors as well (MacDowell, et al. 2021). Therefore, we cannot assume that the specific violations of right route, right patient, right medication, and right dosage as the categories selected for use in this study are inclusive and representative of all medication administration error types.

Scope and Delimitations

The data set for this study involved all malpractice claims reported to the National Practitioner Data Bank, though this study only included claims limited to inpatient settings. The inpatient setting serves as the licensed entity at fault where the nature of the allegation is medication related, however, only errors specific to administration were assessed provided that medication administration is the final stage in which an error may be prevented. This means that medication errors associated with preliminary steps in the medication administration process such as prescribing, or dispensing were not assessed even though they may contribute to an administration error. Similarly, errors of monitoring were not included thought they may be directly related to a medication administration error.

Limitations, Challenges, and/or Barriers

The greatest limitations of this study included standardization of results as medication administration errors may occur at differing frequencies depending on the specific healthcare setting and clinical differences in care, such as types of medications utilized, average quantity of medication utilized, and risk of serious injury due to these additional factors, therefore this study fails to control for variation and this may result in a weak effect size. Furthermore, while the public use file accounts for and categorizes errors of the wrong route, wrong dosage, wrong medication, wrong patient, and omission, it does not specifically identify errors of wrong time which have been recognized to result in reduced medication efficacy and potential incompatibility with other medications given at the appropriate times. Additionally, due to inconsistencies among reporting entities across organizations, states, and regulatory officials, many instances of medication error claims may go unreported to the NPDB. Therefore, this data set may not be representative of overall general population and any subsequent results then lack generalizability.

Significance

Despite the preventable nature of medication administration errors, rates of errors have not subsided. Though medication errors may occur at any stage within the patient care process (i.e., prescribing, ordering, preparing, administering, and monitoring) this study focuses on administration, as this step represents the final stage in which a medication error may be prevented. While a multitude of studies have attempted to prove the efficacy of various interventions, little progress has been made in thwarting the unreasonably high rate of medication administration errors. Prior studies have dug deep for the root cause examining technological, behavioral, and educational interventions. They have all cited similar theoretical frameworks and provide recommendations for future studies in which specific error-producing factors are targeted. They attempt to build upon prior research, however, the nuances involved make this a moot task. Most importantly, they are all forward thinking, and solution focused. The gap in research addressed by this study is related to the limited research on claims associated with adverse events specific to medication administration errors. Namely, which errors are most often pursued legally, which errors cause the greatest patient harm, and which errors result in the largest malpractice payments. This retrospective study targeted the nature of the error itself as it related to patient harm and malpractice payment amounts.

Furthermore, the findings may provide hospitals and other inpatient care settings such as intermediate care facilities, mental health institutions, and skilled nursing facilities, among potential others with a basis for future intervention development specific to medication administration error types in order to reduce medication error rates, improve patient safety, and minimize monetary damages through the prevention of malpractice claims.

Summary

In Section 1, the problem statement was presented to validate gaps in research. Research questions were devised and a literature review on the topic of medication administration errors occurring within inpatient settings was conducted. The issue of limited progress in curbing medication administration errors was emphasized. The potential impacts of this study were also acknowledged. Section 2 examines the research design with rationale, the methodology utilized for data sourcing and analysis, and threats to validity.

Section 2: Research Design and Data Collection

The purpose of this quantitative study was to identify trends in medication administration errors committed in inpatient settings such as acute care hospitals, intermediate care facilities, and skilled nursing facilities, specific to type of error, patient outcomes, and malpractice payment amounts. In this section, the research design is outlined with rationale. Methodology is also discussed with inclusion of population and sampling procedures, power analysis, operationalization, and the data analysis plan. Finally, threats to validity are addressed and ethical considerations were examined.

Research Design and Rationale

A quantitative cross-sectional research design was deemed most appropriate based on the associative nature of the research questions chosen. The cross-sectional design is popular among health science studies. The intent was to define the relationships between the independent variable of 'specific malpractice allegation' (i.e., medication administration error type) and dependent variables of 'severity of alleged malpractice injury' and 'total payment' while controlling for the variables of 'patient gender' and 'patient age. The nature of this data and potential for correlations between dependent and independent variables from data gathered at a single point in time also indicated a best fit utilizing cross-sectional design.

Methodology

Population, Sampling, and Sampling Procedures

The sample population for this study includes healthcare practitioners cited in medical malpractice claims as reported to the National Practitioner Data Bank (NPDB).

The NPDB houses reports from healthcare entities, licensing boards, medical malpractice payers, and health plans related to medical malpractice payments and adverse actions as they pertain to health care practitioners, providers, and suppliers. Registered health care entities may query the NPDB to obtain reports on practitioners prior to involvement to ensure no damaging performance exists. A public use file is readily available through the NPDB website. Using SPSS, the public use file was downloaded, and data was restricted to inpatient cases where the practitioner was accused of a medication-related malpractice. The sample was limited to claims involving in-patients between the years of 2010-2020. A 10-year interval was elected to ensure a viable sample size and the dates were chosen to provide a buffer for claims occurring in 2020 to be settled and recorded accurately within the data set. Data was divided by the specific malpractice allegation to further identify trends between the types of errors as they include 'Medication Administered via Wrong Route,' 'Wrong Dosage Administered,' 'Wrong Medication Administered,' and 'Wrong Patient.'

Power Analysis

Given that no prior studies have utilized this data set or these specific variables in an equivalent manner, I used the G*Power analysis calculator to determine the necessary and ideally representative sample size for the study population. A small effect size along with the alpha and beta values of .05 and .80 respectively were utilized in this analysis.

The results for the power analysis specific to each hypothesis can be found in Table 1. A sample size of 208 was indicated. The sample size used in this study is $N =$

267 providing sufficient power to detect a strong or moderate correlation between variables but insufficient power to detect a weak correlation.

Table 1

*G*Power Contingency table for RQ1, RQ2, and RQ3*

Parameter name	Parameter coefficient
Input	
Effect Size	.03
A err prob	.05
Power (1-β err prob)	.80
Total # of Predictors	6
Output	
Critical *t*	1.65
df	201
Sample Size	208

Research Questions and Hypotheses

Research Question 1 (RQ1): Is there a correlation between specific malpractice allegation related to medication administration errors committed in inpatient settings and severity of malpractice injury while controlling for age and gender reported to the NPDB within the last 10 years?

$H_0 1$: There is no statistically significant correlation between severity of malpractice injury and specific malpractice allegation related to medication administration errors in inpatient settings while controlling for age and gender reported to the NPDB within the last 10 years.

$H_a 1$: There is a statistically significant correlation between severity of malpractice injury and specific malpractice allegation related to medication administration errors in inpatient settings while controlling for age and gender reported to the NPDB within the last 10 years.

Research Question 2 (RQ2): Is there a correlation between specific malpractice allegation related to medication administration errors committed in inpatient settings and total malpractice payment amount while controlling for age and gender reported to the NPDB within the last 10 years?

> H_o2: There is no statistically significant correlation between total malpractice payment amount and specific malpractice allegation related to medication administration errors in inpatient settings while controlling for age and gender reported to the NPDB within the last 10 years.

> H_a2: There is a statistically significant correlation between total malpractice payment amount and specific malpractice allegation related to medication administration errors while controlling for age and gender in inpatient settings reported to the NPDB within the last 10 years.

Research Question 3 (RQ3): Is there a correlation between severity of malpractice injury and total malpractice payment amount while controlling for patient setting and specific malpractice allegation related to medication administration errors committed in inpatient settings while controlling for age and gender reported to the NPDB within the last 10 years?

> H_o3: There is no statistically significant correlation between severity of malpractice injury and total malpractice payment amount while controlling for age and gender reported to the NPDB within the last 10 years.

H_a3: There is a statistically significant correlation between severity of malpractice injury and total malpractice payment amount while controlling for age and gender reported to the NPDB within the last 10 years.

Operationalization

In this section, the variables operationalized in the study are described.

Patient Age

This refers to the age category of the patient at the time of the event. Per the data set, the age groups were defined as follows: Fetus, Less than 1, 1-9, 10-19, 20-29, 30-39, 40-49, 50-59, 60-60, 70-79, 80-89, 90-99.

Patient Gender

This refers to the gender of the patient at the time of the event as they were classified as either female or male.

Patient Type

This refers to the status of the patient at the time of the event. Data was limited to patients classified as 'inpatients' in the reports to ensure greater generalizability across age and gender while controlling for the organizational setting which may include acute care hospitals, intermediate care facilities, skilled nursing facilities, as well as mental health facilities.

Malpractice Allegation Group

This refers to the classification of error involved in the report. Data was limited to 'Medication Related' for this variable.

Specific Malpractice Allegation

This refers to a more specific classification of error involved in the report. Data was limited to the following categories: 'Medication Administered via Wrong Route,' 'Wrong Dosage Administered,' 'Wrong Medication Administered,' and 'Wrong Patient.'

Severity of Alleged Malpractice Injury

This refers to the patient outcome and degree of harm. This variable utilizes an interval scale from least harm to most harm.

Total Payment

This refers to the total amount paid on behalf of the payer (reporter) for the practitioner cited in the claim.

Data Analysis Plan

Upon obtaining Institutional Review Board (IRB) approval to collect data, the most recent public use data file was downloaded in Statistical Package for the Social Sciences (SPSS) form. Data was limited to reports with origination dates occurring between 2010-2020, claims specific to medication related errors, and patients classified as an inpatient. Data was analyzed in SPSS using correlational analysis for all research questions. The RQ1, RQ2, and RQ3 variables were tested to accept or reject the hypothesis. After calculating the means for harm and payment according to each type of error and while controlling for age and gender, I used Pearson's *R* and hierarchical multiple regression analysis to test for correlation while controlling for covariates. Regression diagnostics including TOL and VIF to test for multicollinearity and Durbin

Watson and Cooks to test for autocorrelation and influential outlier respectively, were conducted. Results were interpreted by the correlation coefficient for effect size.

Threats to Validity

Threats to Internal Validity

It can take months to years for judgement or settlement to occur. Secondary payments or appeals may occur after reports have already been made to the NPDB. Providing a grace period of one year for data inclusion should help to minimize these threats to internal validity as the odds for report completeness and accuracy increase over time. Additionally, there may be unknown confounding variables beyond the specific setting, professional characteristics, or patient attributes that were also not controlled for which may have skewed the strength of the correlations.

Threats to External Validity

Medication administration errors may occur at any step within the medication administration process, including prescribing, ordering, preparing, and dispensing. It can be difficult to determine at which step the original error occurred and data may be skewed if the original error occurred prior to administration. The lack of clear definitions surrounding the types of errors classified within the NPDB report may result in a lack of generalizability in terms of the errors associated with administration.

Ethical Procedures

This research does meet the requirements of Walden's standards for doctoral research. The secondary data set utilized for this study is available to the public for download via the NPDB Public Use Data File website. All data included in the data set is de-identified for confidentiality prior to being published by the NPDB. No protected data was utilized or stored. After careful consideration by the IRB, approval was granted with the following IRB number 07-01-22-0992328.

Summary

This section reviewed the research design and rationale. It described the methodology which included the sampling procedures, power analysis, operationalization, and data analysis process for data collected from the NPDB. Section 3 includes the findings of the data analysis.

Section 3: Presentation of the Results and Findings

The purpose of this quantitative study was to identify trends in medication administration errors committed in inpatient settings such as acute care hospitals, intermediate care facilities, and skilled nursing facilities, specific to type of error, patient outcomes, and malpractice payment amounts. With RQ1, I sought to find a correlation, if any, between the specific malpractice allegation and the severity of malpractice injury. With RQ2, I sought to find a correlation, if any, between the specific malpractice allegation and the malpractice payment amount. With RQ3, I sought to find a correlation, if any, between the severity of malpractice injury and the total malpractice payment amount. The selection of null or alternative hypothesis was determined by the statistical significance of the correlation, trend, or association, if any, as indicative of a relationship between the variable of specific malpractice allegation, the severity of injury, and total payment amount.

In Section 3, I review data collection of the secondary data set and speak to results of the statistical analysis conducted. The statistical significance, trend, and associations between the variables is discussed as deemed relevant to the inpatient population. I present the correlation coefficient(s) to explain preliminary conclusions. Finally, I discuss the statistical significance of the relationships as determined by further analysis to accept or decline the null hypothesis of each research question.

Data Collection of the Secondary Data Set

Time Frame for Data

The data set utilized includes malpractice claim data points with year of act or origination dates between 2010 and 2020 as made available through the NPDB Public Use File. The secondary data variables for RQ1 are the specific malpractice allegation and the severity of malpractice injury. The secondary data variables for RQ2 are the specific malpractice allegation and the total malpractice payment amount. The secondary data variables for RQ3 are the severity of malpractice injury and the total malpractice payment amount.

Baseline Descriptive and Demographic Characteristics of the Sample

In this study, I identified specific medication administration malpractice claims as reported to the National Practitioner Data Bank. I examined the correlations between the specific type of alleged medication administration error and severity of patient injury and total malpractice payment amount. In this study, I discussed the relevance, quality implications, and financial losses associated with medication administration errors to encourage the development of additional safeguards or preventative measures within the medication administration phase of the medication administration process. The sample was chosen to be inclusive of all inpatient settings where medication administration is carried out or supervised by a healthcare professional.

After conducting baseline descriptive statistics, I found that there was only one case available for the Wrong Patient Administration error type. This category was then removed due to lack of variability. Additionally, two data points with large residuals, a cook's coefficient of greater than 0.1, and inappropriate data entries were removed due to their undue influence on the regression models. Dummy variables were also created for the categorical variables of error type and gender.

Results

Descriptive Statistics

Table 2 demonstrates that the Wrong Dosage Administered error type was the most common, accounting for nearly half of the data points, among the three error types assessed in this study. According to Table 3, the average total payment for all administration errors was nearly $263,000 with payments ranging from $50 to $2.25 million. On an injury scale of 1 to 9, 1 indicating the least harm and 9 indicating the greatest harm, the average injury from all administration errors was 6.6. Figures 1 and 2 demonstrate frequency distribution histograms for severity of injury and total payment data points. Figure 1 demonstrates the severity of the malpractice injury is skewed towards greater incidences of harm, or more likely, cases with greater harm were more often pursued legally. Similarly, Figure 2 demonstrates that the majority of claims included in this data set received smaller monetary reparations, less than $100,000, whereas outliers in the millions may have a significant impact on the data. Per Table 4, the Wrong Dosage Administered had the highest average level of injury, followed by Medication Administered via Wrong Route, and Wrong Medication Administered. However, the Medication Administered via Wrong Route had the highest associated average total payment followed by Wrong Dosage and then Wrong Medication. Table 5 demonstrates the mean value of an ordinal correlation test where the mean indicates an acceptable internal consistency reliability.

Table 2

Frequency of Specific Malpractice Allegation

	Frequency	Percent	Valid Percent	Cumulative Percent
Medication Administered via Wrong Route	18	6.7	6.7	6.7
Wrong Dosage Administered	131	49.1	49.1	55.8
Wrong Medication Administered	118	44.2	44.2	100.0
Total	267	100.0	100.0	

Table 3

Descriptive Statistics for Severity of Alleged Malpractice Injury and Total Payment Amount

	N	Minimum	Maximum	*Mdn*	*M*	*SD*
Total Payment by this Payer for This Practitioner	267	$50	$2,250,000	$97,500.00	$262,943.45	$397,617.338
Severity of Alleged Malpractice Injury	267	1	9	8	6.60	2.608
Valid *N* (listwise)	267					

Figure 1

Histogram of Severity of Malpractice Injury Frequencies

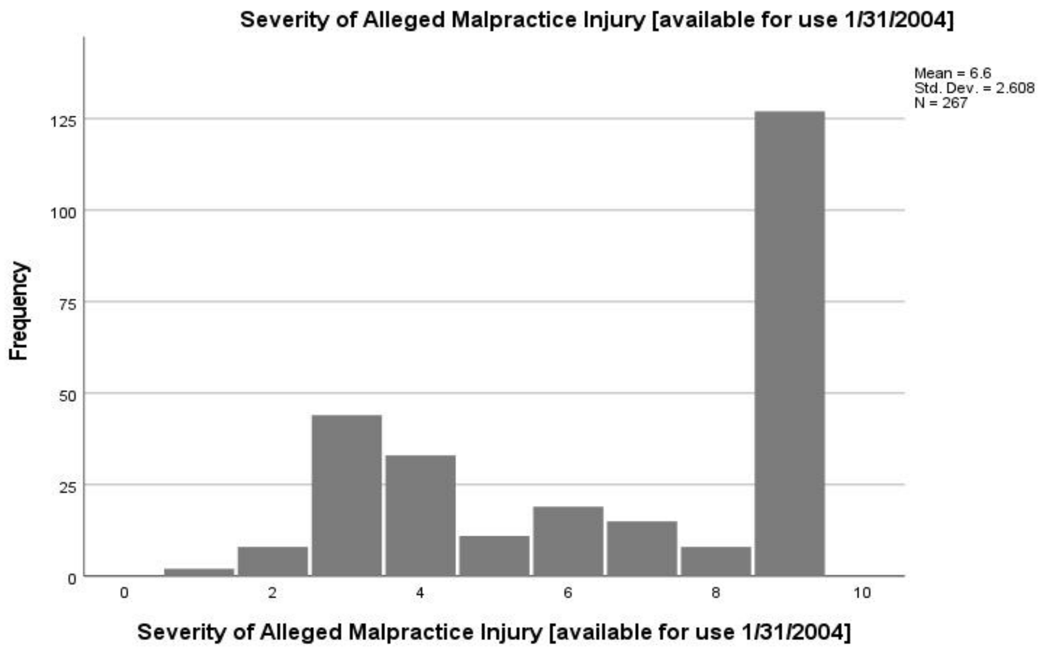

Figure 2

Histogram of Total Payment Frequencies

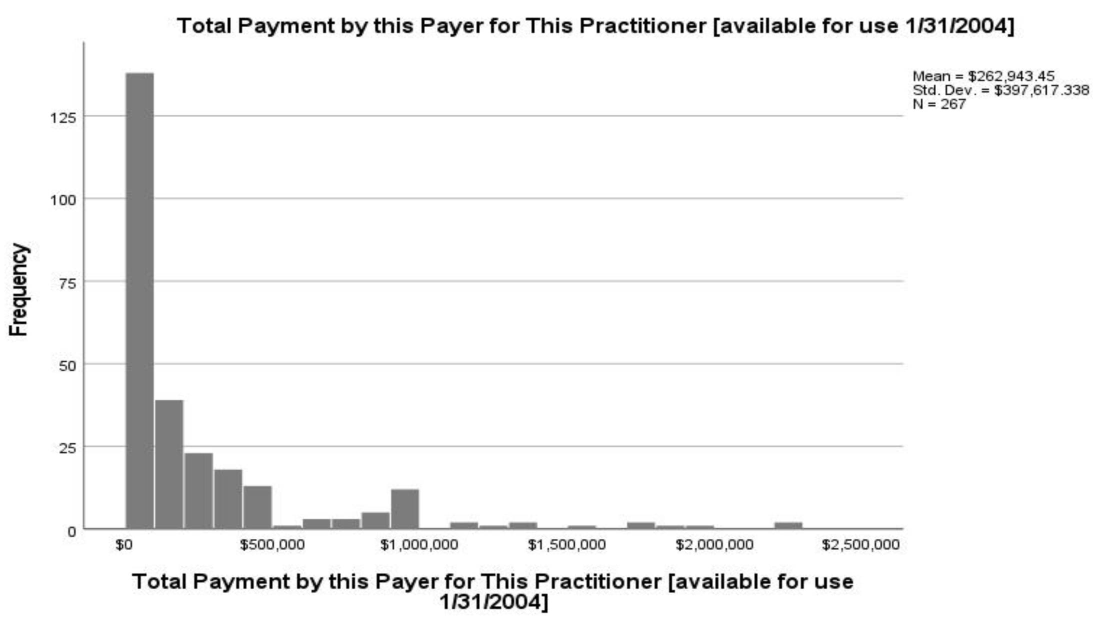

Table 4

Evaluation of Frequency and Descriptive Statistics

Specific Malpractice Allegation 1		Severity of Alleged Malpractice Injury	Total Payment by this Payer for This Practitioner
Medication Administered via Wrong Route	*M*	6.39	$375,000.00
	N	18	18
	SD	2.033	$466,755.069
	Mdn	6.00	$160,000.00
Wrong Dosage Administered	*M*	7.06	$262,839.69
	N	131	131
	SD	2.523	$413,829.166
	Mdn	9.00	$97,500.00
Wrong Medication Administered	*M*	6.13	$245,965.25
	N	118	118
	SD	2.707	$367,803.869
	Mdn	6.00	$77,500.00
Total	*M*	6.60	$262,943.45
	N	267	267
	SD	2.608	$397,617.338
	Mdn	8.0	$97,500.00

Table 5

Inter-Item Correlations

	M	Minimum	Maximum	Range	Maximum / Minimum	Variance	*N* of Items
Inter-Item Correlations	.033	-.076	.241	.317	-3.156	.026	3

Evaluation of Statistical Assumptions

The data were analyzed to address RQ1: “Is there a correlation between specific malpractice allegation related to medication administration errors committed in inpatient settings and severity of malpractice injury while controlling for age and gender reported to the NPDB within the last 10 years?” The variable ‘Wrong Dosage Administered’ was chosen as the reference. Table 6 depicts the model summary for the multiple linear regression. The *r* square indicates a low strength of effect of the independent variables on the dependent variables. The Durbin Watson diagnostic also indicates a slight positive autocorrelation. Table 7 demonstrates the significance of the model. Table 8 indicates a correlation between both Wrong Medication Administered and Wrong Dosage Administered and the severity of injury. The collinearity statistics indicate little correlation among most of the predictor variables, though significant collinearity may exist between the middle age group predictors and other predicting variables. Additionally, no Cook’s distance values exceeded 0.1 indicating no undue influence from any potentially influential outliers.

The statistical evidence rejected the null hypothesis, that is, there is a correlation between specific malpractice allegation related to medication administration errors committed in inpatient settings and severity of malpractice injury while controlling for age and gender. Gender, Wrong Dosage Administered, and Wrong Medication Administered were all statistically significant. Gender was the strongest predictor of severity of malpractice payment where men are more likely to have more severe injuries than females. Similarly, on average when the Wrong Dosage was administered the severity of the outcome increased by 27 ranks in level of harm. Alternatively, when the Wrong Medication was administered the severity of the outcome decreased by the same amount. Medication Administered via Wrong Route was not significantly associated with any increase or decrease in the severity of the outcome. Though there is some statistical significance among variables, results are limited in meaningfulness by the low effect strength indicated by the *r* square.

Table 6

RQ1 Model Summary

Model	*R*	*R* Square	Adjusted *R* Square	Std. Error of the Estimate	Durbin-Watson
1	.385[a]	.148	.104	68.773017	
2	.427[b]	.182	.134	67.634682	1.213

Note. The dependent variable is Rank of Severity of Alleged Malpractice Injury. The reference is Wrong Medication Administered.

[a] Predictors: (Constant), 90-99, Fetus, Under1, 20-29, 1-9, 10-19, 30-39, Female, 80-89, 40-49, 70-79, 50-59, 60-69.

[b] Predictors: (Constant), 90-99, Fetus, Under1, 20-29, 1-9, 10-19, 30-39, Female, 80-89, 40-49, 70-79, 50-59, 60-69, Wrong Dosage Administered, Medication Administered via Wrong Route.

Table 7

RQ1 Model Significance

Model		Sum of Squares	*df*	Mean Square	*F*	Sig.
1	Regression	207717.355	13	15978.258	3.378	<.001[a]
	Residual	1196621.145	253	4729.728		
	Total	1404338.500	266			
2	Regression	256151.491	15	17076.766	3.733	<.001[b]
	Residual	1148187.009	251	4574.450		
	Total	1404338.500	266			

Note. The dependent variable is Rank of Severity of Alleged Malpractice Injury. The reference is Wrong Medication Administered.

[a] Predictors: (Constant), 90-99, Fetus, Under1, 20-29, 1-9, 10-19, 30-39, Female, 80-89, 40-49, 70-79, 50-59, 60-69.

[b] Predictors: (Constant), 90-99, Fetus, Under1, 20-29, 1-9, 10-19, 30-39, Female, 80-89, 40-49, 70-79, 50-59, 60-69, Wrong Dosage Administered, Medication Administered via Wrong Route.

Table 8

RQ 1 Correlation Coefficients

		Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
Model		B	SE	Beta	t	Sig.	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	139.931	26.117		5.358	<.001					
	Female	-30.760	8.859	-.212	-3.472	<.001	-.147	-.213	-.202	.904	1.106
	Fetus	-68.931	73.565	-.058	-.937	.350	-.053	-.059	-.054	.877	1.140
	Under1	-40.854	36.848	-.090	-1.109	.269	-.119	-.070	-.064	.511	1.957
	1-9	-43.789	34.661	-.109	-1.263	.208	-.124	-.079	-.073	.453	2.209
	10-19	-30.224	33.252	-.083	-.909	.364	-.093	-.057	-.053	.406	2.466
	20-29	4.075	34.822	.010	.117	.907	-.027	.007	.007	.449	2.230
	30-39	-7.156	29.603	-.028	-.242	.809	-.072	-.015	-.014	.247	4.047
	40-49	-.070	28.955	.000	-.002	.998	-.070	.000	.000	.206	4.857
	50-59	-4.481	28.030	-.023	-.160	.873	-.047	-.010	-.009	.167	5.993
	60-69	14.494	27.860	.078	.520	.603	.021	.033	.030	.150	6.669
	70-79	44.144	28.387	.217	1.555	.121	.170	.097	.090	.173	5.794
	80-89	48.421	28.873	.214	1.677	.095	.187	.105	.097	.207	4.830
	90-99	27.954	43.568	.047	.642	.522	.005	.040	.037	.632	1.581
2	(Constant)	124.032	26.177		4.738	<.001					
	Female	-30.237	8.745	-.208	-3.458	<.001	-.147	-.213	-.197	.898	1.114
	Fetus	-53.032	72.524	-.045	-.731	.465	-.053	-.046	-.042	.873	1.145
	Under1	-41.004	36.238	-.090	-1.131	.259	-.119	-.071	-.065	.511	1.957
	1-9	-40.314	34.105	-.100	-1.182	.238	-.124	-.074	-.067	.452	2.211
	10-19	-32.288	32.752	-.088	-.986	.325	-.093	-.062	-.056	.404	2.473
	20-29	6.690	34.482	.017	.194	.846	-.027	.012	.011	.442	2.261
	30-39	-4.151	29.128	-.016	-.142	.887	-.072	-.009	-.008	.247	4.051
	40-49	4.424	28.593	.020	.155	.877	-.070	.010	.009	.204	4.897
	50-59	-4.482	27.641	-.023	-.162	.871	-.047	-.010	-.009	.166	6.025
	60-69	16.686	27.428	.090	.608	.544	.021	.038	.035	.150	6.683
	70-79	46.367	27.961	.228	1.658	.099	.170	.104	.095	.172	5.812
	80-89	49.808	28.399	.220	1.754	.081	.187	.110	.100	.207	4.831
	90-99	29.549	42.851	.049	.690	.491	.005	.043	.039	.632	1.582
	Wrong Routea	3.086	17.644	.011	.175	.861	-.035	.011	.010	.875	1.142
	Wrong Dosageb	27.562	8.683	.190	3.174	.002	.188	.196	.181	.909	1.100

Note. The dependent variable is Rank of Severity of Alleged Malpractice Injury. The reference is Wrong Medication Administered.

[a] Wrong route = Medication administered via Wrong Route.

[b] Wrong dosage = Wrong Dosage Administered.

The data were analyzed to address RQ2: “Is there a correlation between specific malpractice allegation related to medication administration errors committed in inpatient settings and total malpractice payment amount while controlling for age and gender reported to the NPDB within the last 10 years?” Table 9 depicts the model summary for this analysis where the *r* square indicates a low effect. Again, the Durbin Watson diagnostic suggests a modest positive autocorrelation. Table 10 demonstrates a strong statistical significance for the model. Table 11 indicates a correlation between the severity of the alleged malpractice injury and the total malpractice payment. The collinearity statistics indicate little correlation among most of the predictor variables, though significant collinearity may exist between the middle age group predictors and other predicting variables. Additionally, no Cook’s distance values exceeded 0.1 indicating no undue influence from any potentially influential outliers.

The statistical evidence rejected the null hypothesis, that is, there is no correlation between specific malpractice allegation related to medication administration errors committed in inpatient settings and total malpractice payment amount. Having a medication administered via the wrong route and being between the ages of 80-89 were both statistically significant. Being between the ages of 80-89 was a stronger predictor of total payment where patients in this age range compared to others dropped nearly 65 rankings in total payment. Though not as strong a predictor, if a medication was administered via the wrong route the total payment increased by around 39 ranks. Wrong Medication Administered and Wrong Dosage Administered were not significantly associated with any increase or decrease in the total payment amount. Though there is some statistical significance among variables, results are limited in meaningfulness by the low effect strength indicated by the *r* square.

Table 9

RQ2 Model Summary

Model	*R*	*R* Square	Adjusted *R* Square	Std. Error of the Estimate	Durbin-Watson
1	.324[a]	.105	.059	74.878602	
2	.345[b]	.119	.067	74.566192	1.363

Note. The dependent variable is Rank of Total Payment. The reference is Wrong Medication Administered.

a Predictors: (Constant), 90-99, Fetus, Under1, 20-29, 1-9, 10-19, 30-39, Female, 80-89, 40-49, 70-79, 50-59, 60-69.

b Predictors: (Constant), 90-99, Fetus, Under1, 20-29, 1-9, 10-19, 30-39, Female, 80-89, 40-49, 70-79, 50-59, 60-69, Wrong Dosage Administered, Medication Administered via Wrong Route.

Table 10

RQ2 Model Significance

Model		Sum of Squares	*df*	Mean Square	*F*	Sig.
1	Regression	166084.837	13	12775.757	2.279	.007[a]
	Residual	1418521.663	253	5606.805		
	Total	1584606.500	266			
2	Regression	189017.138	15	12601.143	2.266	.005[b]
	Residual	1395589.362	251	5560.117		
	Total	1584606.500	266			

Note. The dependent variable is Rank of Total Payment. The reference is Wrong Medication Administered.

[a] Predictors: (Constant), 90-99, Fetus, Under1, 20-29, 1-9, 10-19, 30-39, Female, 80-89, 40-49, 70-79, 50-59, 60-69.

[b] Predictors: (Constant), 90-99, Fetus, Under1, 20-29, 1-9, 10-19, 30-39, Female, 80-89, 40-49, 70-79, 50-59, 60-69, Wrong Dosage Administered, Medication Administered via Wrong Route.

Table 11

RQ2 Correlation Coefficients

Model		Unstandardized Coefficients B	Unstandardized Coefficients *SE*	Standardized Coefficients Beta	*t*	Sig.	Correlations Zero-order	Correlations Partial	Correlations Part	Collinearity Statistics Tolerance	Collinearity Statistics VIF
1	(Constant)	150.316	28.435		5.286	<.001					
	Female	-3.607	9.646	-.023	-.374	.709	.006	-.024	-.022	.904	1.106
	Fetus	-148.316	80.096	-.118	-1.852	.065	-.105	-.116	-.110	.877	1.140
	Under1	-37.612	40.119	-.078	-.938	.349	-.050	-.059	-.056	.511	1.957
	1-9	-47.225	37.738	-.111	-1.251	.212	-.078	-.078	-.074	.453	2.209
	10-19	-34.196	36.204	-.088	-.945	.346	-.051	-.059	-.056	.406	2.466
	20-29	-1.078	37.914	-.003	-.028	.977	.031	-.002	-.002	.449	2.230
	30-39	23.175	32.231	.086	.719	.473	.154	.045	.043	.247	4.047
	40-49	-7.538	31.526	-.031	-.239	.811	.030	-.015	-.014	.206	4.857
	50-59	-15.737	30.519	-.075	-.516	.607	-.003	-.032	-.031	.167	5.993
	60-69	-8.126	30.333	-.041	-.268	.789	.038	-.017	-.016	.150	6.669
	70-79	2.593	30.907	.012	.084	.933	.090	.005	.005	.173	5.794
	80-89	-64.548	31.437	-.268	-2.053	.041	-.236	-.128	-.122	.207	4.830
	90-99	6.291	47.436	.010	.133	.895	.030	.008	.008	.632	1.581
2	(Constant)	147.483	28.860		5.110	<.001					
	Female	-1.974	9.641	-.013	-.205	.838	.006	-.013	-.012	.898	1.114
	Fetus	-145.483	79.956	-.115	-1.820	.070	-.105	-.114	-.108	.873	1.145
	Under1	-38.079	39.952	-.079	-.953	.341	-.050	-.060	-.056	.511	1.957
	1-9	-46.777	37.600	-.110	-1.244	.215	-.078	-.078	-.074	.452	2.211
	10-19	-38.029	36.109	-.098	-1.053	.293	-.051	-.066	-.062	.404	2.473
	20-29	-9.937	38.016	-.023	-.261	.794	.031	-.016	-.015	.442	2.261
	30-39	23.293	32.113	.086	.725	.469	.154	.046	.043	.247	4.051
	40-49	-12.449	31.523	-.052	-.395	.693	.030	-.025	-.023	.204	4.897
	50-59	-20.295	30.474	-.097	-.666	.506	-.003	-.042	-.039	.166	6.025
	60-69	-10.561	30.239	-.053	-.349	.727	.038	-.022	-.021	.150	6.683
	70-79	-.600	30.827	-.003	-.019	.984	.090	-.001	-.001	.172	5.812
	80-89	-64.748	31.309	-.269	-2.068	.040	-.236	-.129	-.122	.207	4.831
	90-99	5.420	47.243	.009	.115	.909	.030	.007	.007	.632	1.582
	Wrong Route[a]	39.433	19.452	.128	2.027	.044	.135	.127	.120	.875	1.142
	Wrong Dosage[b]	4.143	9.572	.027	.433	.666	-.013	.027	.026	.909	1.100

Note. The dependent variable is Rank of Total Payment. The reference is Wrong Medication Administered.

[a] Wrong Route = Medication Administered via Wrong Route.

[b] Wrong Dosage = Wrong Dosage Administered.

The data were analyzed to address RQ3: "Is there a correlation between severity of malpractice injury and total malpractice payment amount while controlling for patient setting and specific malpractice allegation related to medication administration errors committed in inpatient settings while controlling for age and gender reported to the NPDB within the last 10 years?" Table 12 depicts the model summary with the *r* square demonstrating a low effect strength. The Durbin Watson suggests a slightly positive autocorrelation. Table 13 demonstrates the statistical significance of the model. Table 14 indicates a correlation between severity of malpractice injury and the total malpractice payment amount. The collinearity statistics indicate little correlation among most of the predictor variables, though significant collinearity may exist between the middle age group predictor and other predicting variables. Additionally, no Cooks Distance values exceeded 0.1 indicating no undue influence from any potentially influential outliers.

The statistical evidence rejected the null hypothesis, that is, there is a correlation between severity of malpractice injury and total malpractice payment amount while controlling for patient setting and specific malpractice allegation related to medication administration errors committed in inpatient settings while controlling for age and gender. The rank of outcome and age group of 80-89 were both statistically significant where rank of outcome is only slightly a stronger predictor of total payment. For each increase in rank of injury, the 80-89 age group could be expected to drop 84 ranks in total payment compared to other age groups. Comparatively, for each rank increase in outcome there is less than a one rank increase in total payment indicating far less variability and a more linear relationship. Though there is some statistical significance among variables, results are limited in meaningfulness by the low effect strength indicated by the *r* square.

Table 12

RQ3 Model Summary

Model	*R*	*R* Square	Adjusted *R* Square	Std. Error of the Estimate	Durbin-Watson
1	.324[a]	.105	.059	74.878602	
2	.476[b]	.227	.184	69.718601	1.102

Note. The dependent variable is Rank of Total Payment.

[a] Predictors: (Constant), 90-99, Fetus, Under1, 20-29, 1-9, 10-19, 30-39, Female, 80-89, 40-49, 70-79, 50-59, 60-69.

[b] Predictors: (Constant), 90-99, Fetus, Under1, 20-29, 1-9, 10-19, 30-39, Female, 80-89, 40-49, 70-79, 50-59, 60-69, Rank of outcome.

Table 13

RQ3 Model Significance

Model		Sum of Squares	*df*	Mean Square	*F*	Sig.
1	Regression	166084.837	13	12775.757	2.279	.007[a]
	Residual	1418521.663	253	5606.805		
	Total	1584606.500	266			
2	Regression	359714.288	14	25693.878	5.286	<.001[b]
	Residual	1224892.212	252	4860.683		
	Total	1584606.500	266			

Note. The dependent variable is Rank of Total Payment.

[a] Predictors: (Constant), 90-99, Fetus, Under1, 20-29, 1-9, 10-19, 30-39, Female, 80-89, 40-49, 70-79, 50-59, 60-69.

[b] Predictors: (Constant), 90-99, Fetus, Under1, 20-29, 1-9, 10-19, 30-39, Female, 80-89, 40-49, 70-79, 50-59, 60-69, Rank of outcome.

Table 14

RQ3 Correlation Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
		B	*SE*	Beta	*t*	Sig.	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	150.316	28.435		5.286	<.001					
	Female	-3.607	9.646	-.023	-.374	.709	.006	-.024	-.022	.904	1.106
	Fetus	-148.316	80.096	-.118	-1.852	.065	-.105	-.116	-.110	.877	1.140
	Under1	-37.612	40.119	-.078	-.938	.349	-.050	-.059	-.056	.511	1.957
	1-9	-47.225	37.738	-.111	-1.251	.212	-.078	-.078	-.074	.453	2.209
	10-19	-34.196	36.204	-.088	-.945	.346	-.051	-.059	-.056	.406	2.466
	20-29	-1.078	37.914	-.003	-.028	.977	.031	-.002	-.002	.449	2.230
	30-39	23.175	32.231	.086	.719	.473	.154	.045	.043	.247	4.047
	40-49	-7.538	31.526	-.031	-.239	.811	.030	-.015	-.014	.206	4.857
	50-59	-15.737	30.519	-.075	-.516	.607	-.003	-.032	-.031	.167	5.993
	60-69	-8.126	30.333	-.041	-.268	.789	.038	-.017	-.016	.150	6.669
	70-79	2.593	30.907	.012	.084	.933	.090	.005	.005	.173	5.794
	80-89	-64.548	31.437	-.268	-2.053	.041	-.236	-.128	-.122	.207	4.830
	90-99	6.291	47.436	.010	.133	.895	.030	.008	.008	.632	1.581
2	(Constant)	94.027	27.938		3.366	<.001					
	Female	8.767	9.192	.057	.954	.341	.006	.060	.053	.863	1.158
	Fetus	-120.588	74.706	-.096	-1.614	.108	-.105	-.101	-.089	.874	1.144
	Under1	-21.178	37.445	-.044	-.566	.572	-.050	-.036	-.031	.509	1.966
	1-9	-29.610	35.248	-.069	-.840	.402	-.078	-.053	-.047	.450	2.223
	10-19	-22.038	33.764	-.057	-.653	.515	-.051	-.041	-.036	.404	2.474
	20-29	-2.718	35.302	-.006	-.077	.939	.031	-.005	-.004	.448	2.230
	30-39	26.053	30.014	.097	.868	.386	.154	.055	.048	.247	4.048
	40-49	-7.509	29.353	-.031	-.256	.798	.030	-.016	-.014	.206	4.857
	50-59	-13.935	28.417	-.066	-.490	.624	-.003	-.031	-.027	.167	5.993
	60-69	-13.957	28.258	-.071	-.494	.622	.038	-.031	-.027	.150	6.676
	70-79	-15.164	28.914	-.070	-.524	.600	.090	-.033	-.029	.171	5.849
	80-89	-84.026	29.432	-.349	-2.855	.005	-.236	-.177	-.158	.205	4.883
	90-99	-4.954	44.203	-.008	-.112	.911	.030	-.007	-.006	.631	1.584
	Rank of outcome	.402	.064	.379	6.312	<.001	.314	.369	.350	.852	1.174

Note. The Dependent variable is Rank of Total Payments.

Summary

The sample consisted of data from 267 malpractice payment claim reports as published by the NPDB in the Public Use Data File. The variables (‘specific malpractice allegation’, ‘severity of alleged malpractice injury’ and ‘total payment’) were assessed using partial *R* to control for co-variates (‘patient gender’ and ‘patient age’) and multiple linear regression to test for correlation. The statistical analysis provided limited conclusions to the research questions, as follows:

RQ1: The statistical evidence rejected the null hypothesis: that is, there is a correlation between specific malpractice allegation related to medication administration errors committed in inpatient settings and severity of malpractice injury while controlling for age and gender. On average when the Wrong Dosage was administered the severity of the outcome increased by 27 ranks in level of harm. Alternatively, when the Wrong Medication was administered the severity of the outcome decreased by the same amount. Medication Administered via Wrong Route was not significantly associated with any increase or decrease in the severity of the outcome.

RQ2: The statistical evidence rejected the null hypothesis; that is, there is a correlation between specific malpractice allegation related to medication administration errors committed in inpatient settings and total malpractice payment amount. On average, if a medication was administered via the wrong route the total payment increased by around 39 ranks. Wrong Medication Administered and Wrong Dosage Administered were not significantly associated with any increase or decrease in the total payment amount. The lack of association for these may be due to variability within the legal processing of such claims among other factors such as patient quality of life or comorbidities.

RQ3: The statistical evidence rejected the null hypothesis; that is, there is a correlation between severity of malpractice injury and total malpractice payment amount while controlling for patient setting and specific malpractice allegation related to medication administration errors committed in inpatient settings while controlling for age and gender. On average when severity of harm increased, the total payment amount increased as well.

Section 4: Application to Professional Practice and Implications for Social Change

The purpose of this quantitative study was to identify trends in medication administration errors committed in inpatient settings such as acute care hospitals, intermediate care facilities, and skilled nursing facilities, specific to type of error, patient outcomes, and malpractice payment amounts. This doctoral study contributes to the body of literature regarding medication administration errors, patient harm, and malpractice payment amounts based on claims made by or on behalf of inpatients as reported to the National Practitioner Data Bank. The subsequent findings may be used to help develop additional preventative measures for the more prevalent types of medication administration errors. This research is distinct from prior studies due to its focus on the specific types of medication administration errors. Administration represents the final step within the medication administration process at which point an error can be caught and prevented. The results of this study provided additional understanding on the prevalence, associated harm, and malpractice payment amounts according to the type of error involved.

The principal findings in this research are promising as they demonstrate the most frequently cited and legally pursued medication administration errors. The findings also demonstrate some correlations between the types of error and the level of harm experienced by the patient within the healthcare setting where there is greater control over the process as a whole. Furthermore, the insights provided fall in line with the theoretical framework of the study. Data information and insights provided by this study help to demonstrate the distribution of harm across types of errors as well as the distribution of payment amounts according to level of harm, both of which may be used to target new interventions for the prevention of such errors.

Interpretation of the Findings

The findings of this research confirm and expand on the knowledge and information provided to us by the NPDB. As indicated by the descriptive statistics, the most frequently cited medication administration errors as reported by the NPDB are those of wrong dosage administered followed by wrong medication administered. Similarly, of the medication administration errors reported to the NPDB, the average level of harm is around 6.6 on a scale of 1-10 and the average malpractice payment amount is around $263,000 (see Table 4). This research suggests the need for improved processes surrounding medication administration errors in in-patient settings to reduce risk to the patient and organization.

In RQ1, the statistical evidence rejected the null hypothesis at the conventional 5% level ($p < .05$), meaning, there is a correlation between specific malpractice allegation related to medication administration errors committed in inpatient settings and severity of malpractice injury while controlling for age and gender. The Wrong Dosage Administered resulted in a higher degree of harm compared to the Wrong Medication Administered. Medication Administered via Wrong Route demonstrated no relationship with severity of patient harm. This indicates that despite the use of automatic dispensing cabinets and other interventions at the dispensing stage, there are still gaps in preparation of the medications similar to the findings of Shah et al. (2019). Failing to verify the correct medication or dosage prior to administration is a small oversight with irreparable outcomes.

In RQ2, the statistical evidence rejected the null hypothesis at the conventional 5% level ($p < .05$), meaning, there is a correlation between specific malpractice allegation related to medication administration errors committed in inpatient settings and total malpractice payment amount. The variable Medication Administered via Wrong Route resulted in a higher total payment amount despite indications that a Wrong Dosage Administered is more likely to result in greater harm (RQ1). This indicates that despite the level of harm there may still be a great deal of variability in payment amounts depending on less consistent outside influences such as legal proceedings, additional claims, or patient attributes.

In RQ3, the statistical evidence rejected the null hypothesis at the conventional 5% level ($p < .05$), meaning, there is a correlation between severity of malpractice injury and total malpractice payment amount while controlling for patient setting and specific malpractice allegation related to medication administration errors committed in inpatient settings while controlling for age and gender. On average when severity of harm increased one rank, the total malpractice payment increased by just under half a rank. This goes on to highlight the importance of risk management. Even seemingly small mistakes with minor injury can lead to massive liability and loss. Reducing all types of errors would then prove more effective than preventing a select few. Interventions therefore may be right to target more than one type of error at a time.

Analysis and Interpretation of the Findings in the Context of the Theoretical Framework

The theoretical framework for this research was Donabedian's model for healthcare quality (Donabedian, 2005). Given that this theory focuses on the three domains of structure, process, and outcomes where these categories represent the context, transactions, and effects of services and their influence on the quality of the healthcare system. The research corresponded similarly where the structure was defined within the in-patient environment wherein these errors took place, the process was defined by the act of administration of a medication through which five categorical error types come into play, and finally the outcomes were defined by the level of patient injury as well as the total malpractice payment amount. I quantitatively analyzed the impact of these categorical medication administration error types in an effort to determine those of the greatest negative outcomes. The interpretation of these findings is a recommendation to find or develop additional interventions specific to all or even the select few types analyzed within this study to reduce the number of medication administration errors. Those involved in the structure, process, and outcomes of the medication administration process should utilize this study in demonstrating the need for additional attention to this issue.

Limitations of the Study

Though there is some statistical significance to suggest that some forms of administration error are more harmful than others (RQ1) and more costly (RQ2), results are limited in meaningfulness by the low effect strength indicated by the *r* square of each model. This study fails to control for variation as medication administration errors may occur at differing frequencies depending on the specific healthcare setting and clinical differences in care, such as types of medications utilized, average quantity of medication utilized, and risk of serious injury due to these additional factors. Due to this, standardization of results should be considered carefully. Furthermore, while the NPDB public use file accounts for and categorizes errors of the wrong route, wrong dosage, wrong medication, wrong patient, and omission, it does not specifically identify errors of wrong time which have been recognized to result in reduced medication efficacy and potential incompatibility with other medications given at the appropriate times. Furthermore, the data lacked substantial case numbers for administration errors related to wrong patients and this error type was removed entirely. Given the preliminary case studies reviewed previously, we can also assume that a large number of medication administration errors go unreported within the organization itself. Additionally, due to inconsistencies among reporting entities across organizations, states, and regulatory officials, many instances of medication error claims may also go unreported to the NPDB. Therefore, this data set may not be representative of overall general population and results may lack generalizability.

Recommendations

Future studies should consider the following if seeking to build onto this area of research. First, it may be more beneficial to find data that includes a specified setting in which the error took place for reasons discussed previously relating to the clinical differences. For example, certain units within a hospital setting may use a greater number of medications, including more controlled substances with greater risk associated with use. Secondly, it may first be more beneficial to know at which stage in the medication administration process, the most errors occur. The same research questions may be applied to the phase prior to drilling down to the types of error within that phase. It is important to know where the error originated within the process to better understand the impact of current interventions and safeguards meant to prevent the error from reaching the later stages within the process. Thirdly, it may be useful to further evaluate which classification of medical professional was cited as the perpetrator or the source in these claims to determine where additional training and education would be most beneficial. In general, qualitative data collected by the researcher would help to eliminate the largest limitation of unreported incidents from which generalizability is compromised. It would also be interesting to know at what point the error was recognized after administration and if improved recognition lent itself to lesser associated harm. The interpretation of these findings is a recommendation to find or develop additional interventions specific to all or even the select few types of errors analyzed within this study to reduce the number of overall medication administration errors. Those involved in the structure, process, and outcomes of the medication administration process should utilize this study in demonstrating the need for additional attention to this issue.

Implications for Professional Practice and Social Change

Medication errors have been described as preventable, yet they continue to occur at alarming rates. Historically, when there are failures in a process, a new intervention or preventative measure may be developed to help offset the aspects that are human error related. The medication administration process begins with prescribing, at this stage the electronic medical record was developed and in turn errors related to transcribing illegible handwriting dissipated. Next, the medication is processed and dispensed, at which stage the automated dispensing cabinet was invented to address errors in dispensing. Now, if an intervention was initiated specific to the administration phase similar to those that have been developed for the other phases in the medication administration process, we may see a significant drop in medication administration errors overall. Furthermore, if this new intervention could similarly target the most commonly cited classifications of administration errors including wrong medication and wrong dosage simultaneously, the safety of the medication administration process itself would increase.

Professional Practice

The medication administration process is similar in most healthcare environments; however, it is the operational leaders of these establishments that are able to fine tune the best practices within their organizations to further promote quality, safety, and risk management. It would be in their best interest to facilitate a system complete with the right education, equipment, and interventions to effectively elicit improved outcomes for all involved. Knowing now that medication administration errors of the wrong dosage are likely to be more harmful, and therefore, more costly is a call to action to find additional interventions to prevent such errors from occurring altogether.

Methodological, Empirical, and Theoretical Implications

Given the quantitative approach, this study utilized secondary data which was analyzed through the evaluation of variables in order to obtain results. The secondary data was obtained from the NPDB, where hundreds of thousands of malpractice reports are housed. These reports are de-identified and categorized by payment reports or adverse action reports then made available via the Public Use Data File. The payment reports were utilized for the appropriate variables of medication administration error type, severity of malpractice injury, and total malpractice payment amount. These variables allowed me to measure the impact of the type of error on the harm or payment to identify potential correlations. The theory enabled me to determine the most prevalent, harmful, and costly type of medication administration error to demonstrate the need for improved interventions in preventing these errors. This theory is universal in the sense that data was obtained from all regions and types of inpatient facilities. The increase in awareness surrounding medication administration errors should demonstrate a reduction in error occurrence. The empirical methods of measurement of the secondary data were derived from assumptions on the prevalence, harm, and cost of medication administration errors which led to the formulation of the hypothesis and after data analysis, the subsequent rejection or non-rejection of that hypothesis.

Positive Social Change

The positive social change associated with this study may include the promotion of more progressive means of preventing medication administration errors beyond the tenured ‘5 Rights’ adage. The findings of this study demonstrate a clear gap in the development of technology or other tools needed to prevent excessive errors of the medication administration nature. Stakeholders in inpatient operations may be moved to push for these new developments sooner rather than later given the outcomes of this study. This research should give pause to professionals participating in the medication administration process to pay greater attention to these details as well. This study should also help to educate patients to advocate for themselves and ask their providers to verify medications, dosages, timing, etc. Administrators of inpatient care organizations may use this study to identify and correct for gaps in the risk management of medication administration errors. Ideally, administrators would attempt to find the appropriate interventions for their organization to better manage and prevent medication administration errors. Overall, this research will positively impact organizations and professionals caring for inpatient populations as they are provided a greater understanding of the impact of errors occurring within the medication administration process.

Conclusion

Given the preventable nature of medication administration errors, malpractice claims related to these events indicate an opportunity to further reduce medical errors of this nature. As medications continue to be developed and brought to market, it will be crucial to have the appropriate safeguards in place to allow medical professionals to utilize these new drugs effectively. With the continuous development and implementation of technology meant to improve the quality outcomes within healthcare settings, there remains an opportunity for additional interventions to be conceived to further reduce the risk to patients and organizations within the medication administration process.

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