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Resaerch Article

Reducing Falls in TBIs with the Use of Implementing Baby Monitors

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Abstract

Background: Falls are a significant concern in hospitals due to the potential for adverse outcomes, including injuries, and increased healthcare costs. Continuous video monitoring allows staff to watch high fall risk patients via a 2-way camera and permit additional time for team members to arrive before a fall occurs Implementation of baby monitors for patients with TBIs has been proposed to reduce the incidence of falls. **Purpose:** Using the PET model to guide decision-making, this project aims to determine whether implementation of baby monitors for patients with TBIs reduces the incidence of falls in an acute care unit. **Method:** A literature search was conducted using ProQuest Summon aggregated search service accessed through Randall Library. This included five meta-analyses. **Results:** Despite limitations in the studies, the reviewed literature indicates that implementation of baby monitors for patients with TBIs significantly reduces the incidence of falls. **Conclusion:** Based upon the literature review, a change in practice to routine, implementation of baby monitors for TBI patients is recommended in the proposed EBP implementation unit to prevent falls. **Implications:** A change in practice to implementing baby monitors is feasible given the cost decrease of a 1 to 1 sitter, availability of monitoring equipment, and nurse and patient education at the unit and facility level. A change to the practice would involve several levels of the organization, including healthcare professionals, IT experts, nursing, ethics committee, and legal.

Introduction

The focus of patient falls in hospital settings refers to the occurrence of patients dropping to the ground while under the care of a healthcare facility. Falls are a significant concern in hospitals due to the potential for adverse outcomes, including injuries, and increased healthcare costs. Patients in hospitals are often vulnerable due to illness or other factors that may affect their mobility and balance including Traumatic Brain Injuries (TBIs). A TBI is a patient that receives a Glasgow Coma Scale of 13 or less. TBI patients have demonstrated a higher incidence of mortality and increased recovery time when due to a ground level fall [1]. Despite preventive measures, patient falls remain a challenge in healthcare settings, and addressing this problem requires improvement in fall prevention strategies.

The proposed intervention is the implementation of baby camera monitors in patients' rooms with a Traumatic Brain Injury to prevent falls. Many methods for video monitoring have been utilized, including use of hardwired versus mobile cameras and placement of monitoring systems, and staff to observe the monitor screens [2]. Continuous video monitoring allows staff to watch high fall risk patients via a 2-way camera. If patients display at risk behaviours, staff can provide redirection via the camera and permit additional time for team members to arrive before a fall occurs [3]. This intervention's goal is to reduce falls in patients with a TBI thus preventing injury.

Using the PET model, this project aims to determine whether the implementation of baby monitors for patients with TBIs reduces the incidence of falls in an acute care unit. The focus of this paper

is to evaluate the following PICO (T) question: In TBI patients (P), how does implementing baby monitors (I) when compared to those who receive no fall prevention methods (C) reduce the incidence of falls (O)?

Synthesis of Evidence

Selection of the Articles

The literature search was conducted using electronic databases available through Randall Library, accessed via the Find Scholarly Articles on a Topic search service. The advanced search option used the key terms continuous video monitoring, fall prevention methods, brain injury patients, hospital setting, and appropriate abbreviations. The Boolean operator "and" was used to include the keyword reducing; the Boolean "not" excluded the terms pediatric or nursing homes. The search was limited using the following inclusion criteria: English language, scholarly and peer-reviewed, along with published in the last five years. In manually searching the reference lists of each selected article, a few of the articles were found by reversing the search process. The finalized five articles were picked by reviewing the titles and abstracts to include studies most pertinent to the TBI patient population, video monitoring intervention, additional comparisons, and results in this literature review.

The final five articles selected for the literature review included five meta-analyses [2-6]. The level of evidence of each article was analysed using the Johns Hopkins Nursing Evidence-Based Practice Evidence Level. The final group of articles was comprised of one Level III quasi-experimental cohort study [6], three Level III quasi-experimental non-equivalent control group pretest-post designs [3-5], and one Level III non-experimental descriptive study [2]. Overall, the reviewed research delivered the necessary data to analyse the results of implementing baby monitors among TBI patients to reduce falls. The selected literature is summarized in Table 1, which lists the evidence level and each study's title, authors, methods, findings, and conclusions.

Title	First Author's Last Name (Year of Publication)	Purpose	Methods	Findings/ Conclusion	Level of Evidence*
Augmenting an Inpatient Fall Program With Video Observation	Davis (2021)	To evaluate the effectiveness of implementing video monitoring among high fall risk patients, who scored 13 or higher on the JHFRAT.	A quasi-experimental, before-and-after design was used to compare the number of falls between a six-week control period which used implementing video monitoring in 34 high fall risk patients' rooms to prevent falls.	No incidents of patient falls occurred throughout the data collection period, spanning 768 patient-days. The fall rate exhibited a decline from 2.6 falls per 1000 patient-days in the month preceding the commencement of the intervention to zero during the data collection period, representing a complete 100% decrease.	Level III: quasi-experimental nonequivalent control group pretest-post designs
The Effectiveness of Remote Video Monitoring on Fall Prevention and Nurses' Acceptance	Ergai (2024)	To assess the efficacy of remote video monitoring in reducing patient falls and explore the acceptance and perceived utility of video technology among nurses.	A quasi-experimental, before-and-after design was used to compare the number of falls between a six-month control period which used implementing remote video monitoring in 41 units across 4 hospitals.	During the half-year period preceding the introduction of RVM, the incidence of falls resulting in injuries stood at 0.648 per 1000 patient days. After the implementation over the following six months, there was a noteworthy 39.15% decrease, bringing the rate down to 0.394 falls with injury. This reduction was statistically significant.	Level III: quasi-experimental nonequivalent control group pretest-post designs

Title	First Author's Last Name (Year of Publication)	Purpose	Methods	Findings/ Conclusion	Level of Evidence*
Fall Prevention and Injury Reduction Utilizing Continuous Video Monitoring	Hogan (2022)	To evaluate the effectiveness of implementing video monitoring among high fall risk patients.	A quasi-experimental, before-and-after design was used to compare the number of falls between a six-month control period which used implementing continuous video monitoring in a magnet designated hospital.	The introduction of continuous video monitoring with virtual sitters resulted in a 14% reduction in fall rates and a 6% decrease in injury rates among the 93 patients who experienced falls.	Level III: quasi-experimental nonequivalent control group pretest-post designs
Video Monitoring for Fall Prevention and Patient Safety: Process Evaluation and Improvement Trial	Sand-Jecklin (2019)	This study aimed to assess the monitoring procedures within a large teaching hospital, with the objective of implementing enhancements and establishing standardized monitoring practices.	A descriptive study utilized surveys to gather the perspectives of both patients and nursing staff regarding the video monitoring process, while structured interviews were conducted to obtain the opinions of monitor technicians.	All participant groups acknowledged the efficacy of video monitoring in enhancing patient safety. Additionally, nursing staff and monitor technicians expressed that monitoring serves to safeguard patients in various high-risk scenarios. Study participants provided recommendations for enhancing and standardizing the monitoring process.	Level III: non-experimental descriptive study
Preventing Patient Falls Overnight Using Video Monitoring: A Clinical Evaluation	Woltsche (2022)	The objective of this cohort study was to assess the effectiveness of utilizing overnight portable video monitoring as an additional fall prevention strategy for patients at a high risk of falls in inpatient clinical units.	A quasi-experimental cohort study, was used to count the number of falls in a three-month study after implementing portable video monitors or baby monitors.	There was a statistically significant reduction in inpatient falls with only 4 recorded out of 494 patients.	Level III: quasi-experimental cohort study

Table 1: Summary of Selected Literature with Level of Evidence Rating.

Article Critiques

A strong research article clearly outlines a well-designed and appropriate research methodology. This includes a clear research question, appropriate study design, sampling methods, data collection procedures, and statistical analysis. This study observed 15 video monitoring units that were deployed in high-risk units within a 115-bed inpatient rehabilitation facility, conducting their monitoring over a span of 21 months. Following a year of employing video monitoring, there was a statistically significant decrease in falls [6]. This article research was conducted over a longer period which can account for variances and other factors. This study enrolled a total of 34 participants who were placed on video observation due to their elevated risk of falling. The participants, on average, scored 22.9 on the JHFRAT (Johns Hopkins Fall Risk Assessment Tool), with scores ranging from 15 to 34 with the standard deviation score ranging between 5-6. Notably, this average score exceeded 13, the minimum threshold indicating a high risk of falling [4].

The research works with an appropriate sampling strategy, ensuring that the sample size is adequate for the study's objectives and that participants are representative of the target population. The quality improvement team analyzed data from three months before the implementation of continuous video monitoring and three months after implementation. The calculation of fall rates considered the daily bed census for each unit, and information on nurse management staffing was also gathered for the analysis [3]. The research uses a reliable and valid data collection method, such as the hospital's fall report to gather relevant information to create a baseline. A collaborative effort involving operations, IT, human resources, finance, and business intelligence resulted in the development of a telesitter dashboard. This dashboard is designed to monitor occurrences of patient falls, both with and without injuries, along with tracking sitter and telesitter hours and wages. Additionally, the dashboard keeps tabs on the fulfillment of telesitter electronic health record orders [5]. This study collaborated with experts from various disciplines which can strengthen the research by bringing diverse perspectives and expertise to the study. This descriptive study follows the steps in the Larrabee Model for Evidence-Based Practice, which serves as the guiding framework for nursing-led initiatives aiming at practice change within the facility [2]. The research addresses the presented issue within the field of nursing, offering practical implications for improving fall preventions by implementing baby monitors is TBI patients. Recognizing and evaluating these strengths is essential for nursing professionals in research to critically evaluate the literature.

Weaknesses in research studies in nursing refer to the limitations that may compromise the validity, reliability, or generalizability of the study. Identifying and understanding these weaknesses is crucial for critically evaluating the research and understanding its findings properly. The study conducted by Rebecca Woltsche is constrained by its limited sample size and the utilization of video monitoring restricted to only three inpatient units. Consequently, the findings lack generalizability to the broader population [6]. The limitation to this article is the small sample size as it cannot represent a high-risk fall population. The next article showcased a complete elimination of patient falls, indicating that the use of video monitoring in conjunction with other fall prevention methods effectively prevents falls and aligns with existing literature on the subject [4]. The article also suggested the video intervention was added in addition to current fall prevention strategies such as non-skid socks, bed alarms, and fall armbands. Inadequate reporting of methods and results can hinder the validity of the study and limit the ability of other researchers to assess its quality. Originally intended for implementation on a designated unit, the project's scope was broadened to the entire hospital due to the influence of the COVID-19 pandemic [1].

The units were random and held vastly different patients of ages, diagnoses, and staffing levels as there was not a specialty designated for the study, so the subjects were not fairly comparable to one another. The use of non-representative samples may limit the generalizability of the findings to the broader population, undermining the external validity of the study. "Inclusion criteria for tele sitter services included patients deemed a high fall risk (evaluation via the organization's fall risk screening tool), low/moderate risk of suicide, and patients with a brain injury, delirium, dementia, and other conditions who often need frequent redirection. Nurses place an order for an in-person sitter or tele sitter utilizing a decision tree" [5]. A weakness of this study is that is relied on staff to initiate or determine if a patient needs the video monitoring services based on diagnoses or a decision-making tool. It leaves room for error because many patients could be an outlier due to other circumstances. A patient could also meet certain requirements but still be low risk in behaviour and go without a fall thus giving falsely higher numbers on results. Following the implementation of video monitoring on each unit for a minimum of 6 months, an initial assessment of patient falls rates and the utilization of bedside sitters was conducted. The results revealed noteworthy decreases of 28.5% in patient fall rates and 23.2% in the use of bedside sitters after the video monitoring implementation [2]. This data is misleading because later in the article it suggests that only one-third of the beds on the 4 units involved in the study were able to have a camera installed. The sampling method is not randomized because it is solely based on the lack of technological capabilities in the rooms, which can introduce selection bias and compromise the study's ability to draw accurate conclusions about cause-and-effect relationships. Awareness of these weaknesses allows nursing professionals completing research to interpret these study findings cautiously.

In conclusion, the critical examination of methodological strengths and weaknesses in research articles serves as a foundation in the search of credible scientific inquiry for the PICO question. The studies resulted in substantial and immaterial data findings. During the three-month duration, there were 494 instances of portable video monitoring, and clinical areas reported a total of four inpatient falls among the monitored participants, representing 0.8% of the overall episodes of portable video monitoring [2]. The introduction of CVM along with virtual sitters resulted in a 14% reduction in fall rates and a 6% decrease in fall-related injury rates, demonstrating favourable budgetary outcomes [3]. A notable decrease of 39.15% in falls resulting in injury was observed (P=.006), and the redirections using RVM were successful in 70.6% of cases [5]. Patient falls on the inpatient unit witnessed a complete elimination, with a 100% reduction following the implementation of video observation [4]. This study's constraints involve relying on a convenience sample of nursing staff, video monitoring technicians, and patients/family members. Furthermore, the data are descriptive and subjective, representing the perceptions of the study participants [2]. All in all, the findings in these studies support the implementation of baby monitors in TBI patient's rooms to prevent falls. The process of comparing and contrasting these aspects not only improves the analytical skills of researchers but also enhances the overall quality and reliability of the research findings. This is done by identifying the strengths, such as ensuring adequate amounts of time to analyze data pre and post implementation and confirming the validity of their results. Simultaneously, addressing weaknesses mentioned above such as limiting data and random variables that skew results helps improve research studies. Through this process, researchers contributed to the advancement of knowledge, building a foundation of evidence-based practices that can inform decision-making in whether implementing baby monitors prevents falls in Traumatic Brain Injury patients.

Translation- Fit and Feasibility

This review aims to determine if implementation of baby monitors for TBI patients reduces the incidence of falls compared to those who receive no fall prevention methods. The samples of patients and the clinical practice environments studied in the literature will be compared to the proposed site of practice change to evaluate the implications of the findings for the implementation of EBP. The needed resources and stakeholders required for practice implementation will be discussed.

Comparisons

Samples

Each of the studies selected for this literature review included a selection of hospitalized acute care patients. A Geriatric Evaluation and Management unit, an Acute Aged Care Medical ward, an Acute Aged Care unit [6] or a Medical-Surgical unit [3] or Emergency Department, Intensive Care Units (ICU), Step-Down, Telemetry, Acute Care, and Inpatient Rehabilitation units [5] or Surgical, Nephrology, Oncology, Neurology, and Orthopedic units [4] comprised each study's research population. The proposed practice area for this EPB implementation project is a Trauma Step-Down Surgical unit whose patient population includes trauma, orthopedic, and acute care neurological patients with a high population of TBI patients.

Environment

All the studies included in this review incorporated acute care and inpatient clinical practice settings. Women services and outpatient clinical settings were excluded. The studies included large and small hospitals with ICU and medical-surgical or orthopaedic units. Various units of varying sizes, types, and complexity levels were included in the reviewed literature, which encompasses the setting of the proposed implementation unit as trauma can indicate differing injuries or diagnoses and increases the applicability of the results.

Ideal Recommendations

Stakeholders

A change to the current fall prevention practice would necessitate the involvement of several levels of the organization. Neurologists, Trauma doctors, and other healthcare providers are crucial in assessing the specific needs of TBI patients and determining the most effective monitoring strategies. They can provide input on patient conditions, fall risks, and the appropriate use of technology in individual cases. Nurses play a central role in the day-to-day care of TBI patients. Their input is essential for understanding the practical aspects of patient care, including the integration of baby monitors into daily routines. Administrators are responsible for allocating resources, including budget and staff, for implementing the monitoring system. IT professionals are involved in the selection, installation, and maintenance of the monitoring system. They ensure the technology complies with privacy and security standards and works seamlessly with the hospital's existing IT infrastructure. A quality improvement team may be involved in assessing the impact of the monitoring system on patient outcomes and continuously improving the process. The ethics committee may be consulted to ensure that the implementation of monitoring systems aligns with ethical considerations, particularly concerning patient privacy and autonomy. Including the patient and family representatives in the decision-making process ensures that their perspectives, concerns, and preferences are considered. Legal and compliance professionals ensure that the implementation of baby monitors adheres to local and national regulations, protecting patient rights and privacy. By involving these stakeholders, a comprehensive and collaborative approach can be taken to

implement baby monitors in TBI patient rooms, addressing various aspects such as technology, patient care, ethics, and compliance.

Resources

Resources to make this change would require baby monitors which is less expensive than the current fall prevention methods of a 1 to 1 sitter. Implementing baby monitors in TBI patient's rooms to prevent falls requires a thoughtful allocation of resources to ensure a seamless integration of technology into the caregiving process. Financial resources are essential to acquire the necessary monitoring systems, cameras, and sensors, as well as to cover installation costs and potential upgrades. Collaboration with external vendors may be necessary for ongoing technical support and system updates. Additionally, time and effort are required for the development and implementation of protocols and procedures related to the use of baby monitors, involving input from multiple stakeholders such as healthcare providers, nursing staff, and patient safety committees discussed above. This cost related to education should be minimal. Furthermore, there should be no change in the expenses or resources needed for measuring falls which is already conducted on the unit. However, high-cost savings could be distinguished from the expected reduction in falls related to the practice change thus reducing length of hospital stays and additional injuries acquired from the fall.

Translation Path Recommendation

The Rationale for Implementation or Need for Further Research

Five articles were reviewed in this project to determine the impact of implementing baby monitors for TBI patients to prevent falls in hospitalized inpatient clinical settings. Based on the literature review, a change in practice to routine, implementing baby monitors as a fall prevention method is recommended in the proposed evidence-based practice (EPB) implementation unit.

Rationale

In the reviewed literature, a significant reduction in falls were noted whether video monitoring was provided as a fall prevention method [3-6] or traditional fall prevention methods such as sitters and whether comparison number of falls were reported with each fall prevention method. The literature supports the theory that implementation of video monitoring significantly reduces the number of patient falls [2]. Therefore, the current practice of nurses in the Trauma Step-Down unit of not implementing baby monitors in TBI patients as a fall prevention method is likely harmful to patient results and should be discontinued.

Change Steps

Kotter's 8-Step Model of Change provides a framework for effectively implementing and managing change within an organization. First step is to create urgency by emphasizing the importance of preventing falls in TBI patients and highlight the potential positive impact of baby monitors on patient safety. The next step is to build a coalition to form a multidisciplinary team involving nurses, physicians, administrators, and IT specialists to collectively support and drive the implementation. The third step is to form a strategic vision by clearly articulating the image of enhanced patient safety through the use of baby monitors. The fourth step is to communicate the vision by developing a consistent and compelling message about the benefits of the intervention. The next step would be to empower others to act in providing the necessary resources, training, and support to healthcare professionals while encouraging open communication during the decision-making process. The following step is to generate short-term wins by highlighting and celebrating early successes from the pilot program to build confidence and energy in the first three months. Step seven is to consolidate gains and build on successes of reducing the number of falls while institutionalizing the use of baby monitors by integrating them into standard operating procedures and policies. Our final step will be to anchor changes in corporate culture by ensuring that the use of baby monitors becomes a standard practice embedded in the organizational culture of the hospital if reduction of falls in TBI patients is sustained throughout the pilot program. "Articulate the connections between new behaviors and organizational success, making sure they continue until they become strong enough to replace old habits. Evaluate systems and processes to ensure management practices reinforce the new behaviors, mindsets, and ways of working you invested in" [7]. By incorporating Kotter's model, the implementation process becomes more structured, addresses potential resistance, and fosters a collaborative approach among stakeholders, increasing the likelihood of successful integration of the nursing intervention into practice.

Conclusion

In conclusion, inpatient falls contribute to increases in recovery time, longer lengths of stay, and higher care costs for hospitalized patients. A high level of evidence indicates that implementing video monitoring reduces the incidence of falls in medical-surgical units and high fall risk patients. Based on the reviewed literature, a practice changes to routine, implanting baby monitors as a fall prevention method in TBI patients is recommended for the proposed EBP implementation site. Ongoing evaluation of compliance with ethical practices and rates of falls will be needed to anchor the practice change and ensure continued improvement.

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