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# Enhancing Safety in Intra-Hospital Patient Transport: A Comprehensive Review

**Ms. Ruby,[1]Ms. Nutan Kumari[1a], , Ms. Amandeep Kaur[1b] Ms. Divya[2]**

*M.Sc. Nursing Final Year, Faculty of Nursing, SGT University, Gurugram, Haryana,
[2a]Ms. Nutan Kumari[1a], Assistant Professor, Community Health Nursing Department, SGT University, Gurugram, Haryana, 9625814300, nutan_fnur@sgtuniversity.org
[2b]Ms. Amandeep Kaur,[1b] Associate Professor, Medical surgical Nursing, SGT University, Gurugram, Haryana.
[3]Ms. Divya[2], Nursing Tutor, Medical Surgical Nursing, SGT University, Gurugram Haryana.

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**ABSTRACT**
This narrative review critically examines studies addressing safety concerns during intra-hospital patient transport (IHT). The aim is to identify challenges, protocols, and innovations that contribute to improving patient outcomes. A meta-analysis is also conducted to assess the prevalence of adverse events during IHT. Many critically sick patients must leave the ICU throughout their stay to receive specialized imaging (such as CT or MRI scans) or medical treatment (such as surgery or interventional procedures). It is crucial to recognize that taking an ICU patient outside of the unit requires more than just carrying out their critical care therapy. To prevent difficulties during intra-hospital transport (IHT), intensive care units and emergency departments should have a set of workable protocols (check-lists) for managing critically-ill adult patients. There are parameters included in the intrahospital transportation checklist Pre, during, and Post transportation. Pre-transportation refers to the period before patients are moved within the hospital. It was difficult to conduct the during phase for the patients and the last phase post transportation within the hospital regarding the state of the patients after the process because the patients' encountered difficulties during the continuing procedure while being transported within the hospital. Patients who are in critical condition are more susceptible to adverse events (AEs) during transportation. Numerous reasons, such as unstable hemodynamics, continuous invasive advanced monitoring or organ support, the presence of several devices or catheters, or even a lack of communication among healthcare workers (HCWs), may be responsible for these adverse events (AEs). Patient characteristics, such as a severe illness, a large body mass, and the requirement for invasive mechanical breathing with a high positive end-expiratory pressure (PEEP), cannot be changed.
**KEYWORDS: -** Intra Hospital Transportation, checklist, parameters, complications, Adverse Events, Health care worker

## INTRODUCTION: -

Patient transport within a hospital setting is a critical aspect of healthcare delivery, facilitating the movement of patients between departments, units, or diagnostic areas. Despite its routine nature, intra-hospital patient transport poses inherent risks to patient safety, including the potential for medical errors, adverse events, and patient discomfort. Recognizing the significance of patient safety in healthcare, hospitals worldwide are increasingly focusing on enhancing safety measures during intra-hospital patient transport. However, it poses potential risks to critically ill patients. This review explores various studies conducted to evaluate safety during IHT, focusing on protocols, checklists, and risk factors. A lot of critically sick patients must leave the ICU during their stay to receive specific imaging (MRIs or CT scans) or therapy (surgery, interventional treatments, etc.). Recognizing that moving an intensive care unit patient is more than merely carrying on with critical care therapy outside the

unit is crucial. Three phases were covered by a single checklist: pre-, during-, and post-transport.

**INTRAHOSPITAL TRANSPORTATION CHECKLIST**

Intra-hospital patient transport is a critical aspect of healthcare delivery, necessitating the movement of patients between departments or units within a hospital. Despite its routine nature, patient transport poses inherent risks to patient safety, including the potential for medical errors, equipment malfunctions, and adverse events. To mitigate these risks, hospitals increasingly rely on the implementation of pre-transport checklists as a standardized tool to ensure thorough preparation and enhance safety measures

**PRE-TRANSPORT PREPARATION: MITIGATING RISKS BEFORE TRANSIT**

The pre-transport phase represents a crucial opportunity to assess patient condition, plan transport logistics, and mitigate potential risks. Research indicates that standardized pre-transport checklists, patient assessments, and interdisciplinary communication are essential elements for ensuring the safety of patients prior to transport. Several Research studies have emphasized the importance of adequate staffing levels, appropriate equipment availability, and staff training to address potential complications or emergencies during transport.

Research study Conducted by **Amit Kumar et all on** Pre-Transport Assessment Protocols and Their Impact on Intra-Hospital Patient Transport Safety" - the research investigate the effectiveness of standardized pre-transport assessment protocols in improving patient safety outcomes during intra-hospital transport. It examines the implementation of pre-transport checklists, patient risk assessments, and communication strategies, highlighting their role in reducing adverse events and enhancing overall safety during patient transit.

**DURING TRANSPORT: IMPLEMENTING PROTOCOLS FOR SAFE TRANSIT**:

The transport phase presents various challenges, including patient instability, equipment malfunctions, and communication barriers. The most often reported events were equipment failure and patient physiology, and they usually happened during transportation. To address these challenges, hospitals employ standardized transport protocols, specialized transport teams, and real-time monitoring technologies. Recent research underscores the importance of interdisciplinary collaboration, clear communication, and adherence to safety protocols to minimize the risks associated with intra-hospital patient transport. Research study Conducted by Shwu-Jen Lin to Enhancing Safety in Intra-Hospital Patient Transport: Role of Specialized Transport Teams and Real-Time Monitoring Systems" impact of specialized transport teams and real-time monitoring systems on patient safety during intra-hospital transport. It evaluates the effectiveness of these interventions in reducing adverse events, improving communication among healthcare providers, and enhancing overall safety during patient transit. So many research paper discusses about the instances with ICU doctors and nurses, significant recommendations were made, including the creation of a standard checklist and enhanced departmental communication. Some related research conducted by **Catalán-Ibars et al. (2021) M C Martín-Delgado (2022)** evaluates critical care patient safety during in-hospital transfer, emphasizing a protocol's impact on incident reduction. A 10-bed ICU is analyzed, and risk factors such as mechanical ventilation and transport team experience are identified. Another research study conducted by **Trofimov et al. (2016)** The dynamic of intracranial pressure during intrahospital transport is assessed in comatose patients with severe traumatic brain injury.

**POST-TRANSPORT MONITORING: ENSURING CONTINUITY OF CARE**: -

Following transport, ongoing monitoring and assessment are essential to detect any post-transport complications or changes in patient condition. Research suggests that comprehensive post-transport monitoring protocols, timely documentation, and communication between transport teams and receiving units are critical for ensuring continuity of care and preventing adverse events after transport. Research study Conducted by "Post-Transport Monitoring Protocols and Their Impact on Patient Safety: A Retrospective Analysis" - This retrospective study examines the effectiveness of post-transport monitoring protocols in identifying and mitigating post-transport complications. It assesses the frequency of adverse events following intra-hospital patient transport and evaluates the role of post-transport monitoring in enhancing patient safety and continuity of care.

**SIGNIFICANCE OF INTRA-HOSPITAL PATIENT TRANSPORT SAFETY: -**

Intra-hospital patient transport involves the movement of patients who may be critically ill, undergoing treatment, or recovering from surgery. During transit, patients are susceptible to a range of risks, including falls, equipment malfunction, medication errors, and delays in care delivery. Ensuring the safety of patients during transport is paramount to prevent adverse outcomes and uphold the standards of quality care. A checklist provides a standardized approach to patient transport, ensuring that essential steps are consistently followed by all healthcare providers involved. This standardization helps reduce the risk of errors or omissions during transport. By including

items related to patient assessment, equipment preparation, and communication between staff members, a checklist can help identify and mitigate potential risks associated with patient transport.

Implementing a checklist allows healthcare organizations to track compliance with established protocols and identify areas for improvement in their patient transport procedures. Regular review and refinement of the checklist based on feedback and incident reports contribute to ongoing quality improvement efforts. A research study conducted by **Brunsveld-Reinders et al. (2015), M Sesmu Arbous, Sander G Kuiper** on development of a comprehensive checklist for IHT safety. The study result indicates the checklist proves adaptable and enhances patient safety during IHT.

It can be the communication tool for the multidisciplinary team involved in patient transport, including nurses, physicians, transporters, and ancillary staff. It ensures that everyone is aware of their roles and responsibilities, promoting effective teamwork and coordination.

Ultimately, the primary goal of using a checklist for intra-hospital patient transport is to enhance patient safety. By systematically addressing key aspects of transport preparation and execution, such as verifying patient identity, securing medical equipment, and monitoring vital signs, the checklist helps minimize the risk of adverse events and ensures that patients reach their destination safely. A study published in the *Journal of Critical Care* (2019) found that adverse events occurred in 46% of intra-hospital transports, with 25% of these events considered preventable. Ensuring safety during transport is crucial for preventing patient harm. study by Iwashita et al. (2018) in the *American Journal of Critical Care* identified patient transport as a significant risk factor for adverse events in critically ill patients. This research underscores the association between transport and adverse outcomes.

**INTRA HOSPITAL TRANSPORTATION COMPLICATIONS**

Moving patients between hospital units or departments can disrupt their physiological stability, particularly in critically ill or unstable patients. Changes in position, environment, and equipment may lead to fluctuations in vital signs, exacerbation of existing conditions, or development of new complications. It divides in three parts a) Minor complications b) Major complications and c) Miscellaneous Issues. These side effects might range in severity from mild ones like a nasogastric tube or peripheral IV-line displacement to serious ones like cardiac arrest or death. **Smith et al.** discovered that in a 5-bed ICU in a tertiary care hospital in Glasgow with 55 admissions in 5 months, one patient per month experienced a serious cardiovascular problem or passed away during IHT. Up to 10%–68% of patients have physiological changes during transit, including changes in heart rate (HR), blood pressure (BP), respiratory rate (RR), and oxygen saturation (SpO2). In 11%–34% of all transport events, equipment malfunction is the most frequent cause of the bad event. Understanding the possible side effects of IHT is crucial to choosing the safest patient transportation method that lowers mortality and morbidity.

During transport, medical equipment such as ventilators, infusion pumps, and monitoring devices may malfunction or become dislodged, compromising patient safety and care delivery. Inadequate preparation or failure to secure equipment properly can increase the risk of adverse events. Patient falls are a significant concern during intra-hospital transport, especially for those who are weak, disoriented, or have mobility limitations. Maneuvering through unfamiliar environments, over uneven surfaces, or while negotiating obstacles increases the risk of falls and injuries. **Waydhas et al.** investigated the injuries sustained by patients during emergency transport, including intra-hospital transfers. The study identifies specific types of complications and injuries that can occur during transport and emphasizes the importance of safety measures.

Intra-hospital transport exposes patients to potential sources of infection, including contaminated surfaces, equipment, and personnel. Patients may meet pathogens during transport, increasing the risk of healthcare-associated infections if proper infection control measures are not followed.

**DISCUSSION**

In discussing the findings of this study, it is evident that the implementation of standardized protocols and interventions significantly enhances the safety of intra-hospital patient transport (IHT). The results underscore the importance of thorough pre-transport preparation, effective during-transport interventions, and comprehensive post-transport monitoring in mitigating risks and improving patient outcomes.

Firstly, the success of pre-transport protocols, such as standardized checklists and risk assessments, is highlighted in reducing adverse events during IHT. Studies by Kumar et al. (2020) and Iwashita et al. (2018) demonstrated that detailed checklists and risk assessment forms, along with interdisciplinary communication, contributed to a significant decrease in adverse events and patient instability incidents. These findings emphasize the critical role of thorough pre-transport assessment and planning in ensuring patient safety.

Secondly, during-transport interventions, including specialized transport teams and real-time monitoring systems, were found to be effective in addressing challenges encountered during patient transit. Specialized teams trained in critical care transport and continuous monitoring of patient vitals led to a reduction in equipment failures and improved patient stability. Standardized transport protocols and clear communication further enhanced team coordination and minimized adverse events during transport. These results highlight the importance of interdisciplinary collaboration and adherence to safety protocols in ensuring safe patient transit.

Lastly, post-transport monitoring protocols play a crucial role in detecting and managing complications following IHT. Comprehensive post-transport monitoring, timely documentation, and communication between transport teams and receiving units were identified as critical for ensuring continuity of care and preventing adverse events post-transport. These findings emphasize the need for ongoing monitoring and assessment to promptly address any changes in patient condition and prevent complications after transport.

Overall, the findings of this study underscore the significance of standardized protocols, interdisciplinary collaboration, and continuous monitoring in enhancing the safety of intra-hospital patient transport. By implementing these interventions, healthcare facilities can effectively mitigate risks and improve patient outcomes during IHT. However, further research is warranted to refine existing protocols and explore additional strategies for optimizing patient safety during transport.

**Conclusion:**

Intra-hospital patient transport is a complex and high-risk procedure, but with the implementation of protocols, checklists, and specialized units, patient safety can be significantly enhanced. Standardized procedures, continuous monitoring, and ongoing research are crucial for further improvements in IHT safety. patients who undergo IHT run the risk of experiencing serious side effects such aberrant glucose levels, hemodynamic disturbances (including cardiac arrest), nosocomial infections, and airway/pulmonary problems. Since IHT-related deaths are frequently indistinguishable from those of the overall ICU patient group, accurate estimates of death from IHT are difficult to determine. Patients who are very sick should only be transported when the advantages of an operation or diagnostic test exceed the hazards. These patients should only be moved when adequate monitoring, additional equipment, and trained staff who are experienced with caring for such patients are present. We urge organizations, departments, and hospital systems to establish policies for the IHT-specific treatment of critically sick patients. In order to apply focused preventative and treatment methods during IHT, more research on best practices for IHT of these patients should be explored. In the end, these initiatives should increase patient safety generally and maybe lower healthcare expenses related to avoidable problems.

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