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Risk Factors and Adverse Events During Intra Hospital Transportation Among Critically Ill with a View to Develop Patient Transport Checklist

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ABSTRACT

AIM: A study to assess the risk factors and adverse events during intra hospital transportation among critically ill with a view to develop patient transport checklist

OBJECTIVES:

1. To determine the risk factors associated with intra hospital transportation of critically ill patients.
2. To identify the adverse events that occurs during intra hospital transport of critically ill patients.
3. To correlate the risk factors of intra hospital patient transportation and selected baseline variables.
4. To find out the association between risk factors during intra hospital transport and selected baseline variables
5. To develop an intra-hospital patient transport checklist

METHODOLOGY: For this study, a descriptive research design was used and 100 critically ill patients were selected using convenient sampling technique. Baseline variables, were assessed using baseline proforma, risk factors and adverse events were identified by using the checklists. Formal written permission was obtained from the authorities prior to the data collection process. The data was analyzed by using both descriptive and inferential statistics on the basis of objectives and assumptions of the study.

RESULT: Positive correlation was found between the patients risk score of transportation with APACHE II (rs= 0.48) and FiO2(rs=0.58). APACHE II (p=0.001), GCS (p=0.001), heart rate during transport (p=0.007), MAP during transport (p=0.010),respiratory rate during transport (p=0.031), Fio2 during transport (p=0.001), airway (Z= -7.03,p =0.001), mode of transport (Z= -3.08, p=0.002), presence of central venous lines(Z= -7.08,p=0.001), arterial line (Z= -3.79,p=0.001), ionotropes (Z= -5.08,p=0.001), sedation(Z= -3.11 p=0.002), nasogastric tube (Z= -7.62, p=0.001) and Foleys catheter (Z= -4.55, p=0.001) have significant association with patients risk scores of transportation. Hence, the researcher concludes that identifying the patients risk scores before transportation can significantly reduce the adverse events during transport by strict adherence to hospital protocols and usage of checklists.

Keywords : Adverse events, Intra hospital transportation, Risk factors.

INTRODUCTION/BACKGROUND

Critical illness is a fatal condition that requires supreme care and is a menacing process that can result in significant morbidity and mortality. Population-based studies in the developed world suggest that the burden

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of critical illness is higher than generally appreciated and will increase as the population ages.[1]

In India around 5 million patients require ICU care and the demand for critical care is increasing day by day.[3] Intensive Care Units (ICUs) are complex areas in the hospital for the care of severely ill patients who require specific physical spaces, specialized human resources, and advanced technology and equipment.[4] Management of critically ill patients in the intensive care unit (ICU) requires investigations and therapeutic procedures leading to numerous transports outside the ICU.[5]

Despite the current sophistication of intensive care units, neither all the necessary care nor all appropriate investigations can be offered at the bed side. Hence intra hospital transportation is inevitable.[6] In recent years intra hospital transportation have been extensively studied and described as high-risk procedure among critically ill patients. In 1970 the first article was published related to the intra hospital transportation (IHT) which states that IHT is potentially dangerous during which arrhythmia occurred in 84% of patients, who were at high risk for cardiovascular diseases.[11]

Critical care transports either inter or intra hospital are performed by especially trained individuals. A multi-disciplinary team of physicians, nurses, respiratory therapists, hospital administrative and local emergency medical services is formed to plan and coordinate the process. In practice, it is observed that transportation of hospitalized patients is often carried out automatically, without prior planning. This lack of planning may impair the preparation of the team, materials, and equipment and may facilitate the occurrence of adverse events.[7]

Measures to reduce incidents include better pre-transport planning, the introduction of standardized procedures related to personnel, organization and equipment during transport and the use of checklists during the preparation phase. Indeed, some guidelines on optimal intra hospital transportation are available but they are not easily translated into practical measures to reduce incidents. As an alternative, checklists are practical and can provide tools to improve safety.[18]

MATERIALS AND METHODS

Assumptions

1. Intra hospital transportation of critically ill patients involves considerable risks and mishaps
2. Implementation of patient care checklist ensures standardization of nursing practice

Research Approach: Quantitative research approach

Research Design: Descriptive research design

VARIABLES

Independent variable is the intra hospital transportation.

Dependent variables in the present study are the risk factors and adverse events of intra hospital transportation.

Settings: This study was done in critical care units in a selected hospital at Pathanamthitta district.

Sample and sample size: Patients admitted in critical care units of a selected hospital at Pathanamthitta district. The sample size was 100 critically ill patients.

Sample technique: Convenient Sampling technique

Inclusion criteria

- Critically ill patients
- Patients transferred within medical intensive care units to isolation and respiratory intensive care unit.
- Patients undergoing diagnostic evaluations, transferred to other intensive care units and wards within the hospital

- Patients who are willing to participate in the study.

Exclusion criteria

- Patients those who are not willing to participate in the study.
- Patients who underwent more than one IHT were considered as multiple events and excluded from the study.

Data collection technique and tools

Tool 1: **Baseline proforma**: It includes age, gender, diagnosis, history of any co morbidities, APACHE II score, patient assessment pre-transport, pre transportation checklist, area to be transported, reason for transport, mode of transport, time of shifting, evaluation during intra hospital transportation and at destination, documents/records and time of return or at destination. The investigator will assess the patient before, during and after the procedures with this tool.

Tool 2: Structured intra hospital patient transport risk assessment checklist

The checklist consists of 12 items and each items are subdivided into 3with individual scores of 0, 1, 2 and the total score given is 24.

Score interpretations

Low risk : 0-12
Moderate risk : 13-18
High risk : 19-24

Tool 3: Structured intra hospital patient transport adverse events assessment checklist

The checklist consists of 3 parts, patient related major events, patient related minor events and equipment related events.

Data collection procedure

Data collection was done for a period of 6 weeks. Each day approximately 5-8 samples were collected and the researcher accompanied the samples during transportations and assessed the risk factors and adverse events with the structured checklists.

FINDINGS

The data collected were analyzed using Statistical Package for Social Sciences, (SPSS) software, IBM SPSS version 20.

The data were analyzed under the following headings

- **Section 1:** Sample characteristics
- Section 2: Risk factors associated with intra hospital transportation
- Section 3: Adverse events associated with intra hospital transportation
- Section 4: Correlation of risk factors with selected baseline variables
- Section 5: Association of risk factors and selected baseline variables
- Section 6: Development of patient transport checklist

SECTION I: Description of demographic characteristics of sample.

- Most patients 50(50%) belongs to 61-80 years of age, 67(67%) were male, and 82(82%) of patients had history of comorbidities. Among the transportations, 54(54%) of them were on room air, 89(89%) were not on any vasoactive drugs and only six(6%) of patients were on opioids.
- Majority of patients 82(82%) had indwelling foleys catheter and only 2(2%) patients had intercostal chest drainage tube during transport and majority of patients had more than one invasive catheters during transport.
- The mean heart rate prior to transport were 88.32 (SD±16.03)beats/minute, mean respiratory rate was 21.90 (SD±4.547)breaths/minute, the mean arterial pressure was 102.54 (SD±15.67) mm/Hg, the mean oxygen saturation was 95.12 (SD ± 2.72).The mean Fio2 prior to transport was 29.43 (SD ± 13.57), with mean PEEP of 5 cm H_2O(SD ± 0.00). Glasgow coma score had mean of 12.51(SD ± 3.54) with mean APACHE II score of 17.69 (SD ± 10.26).

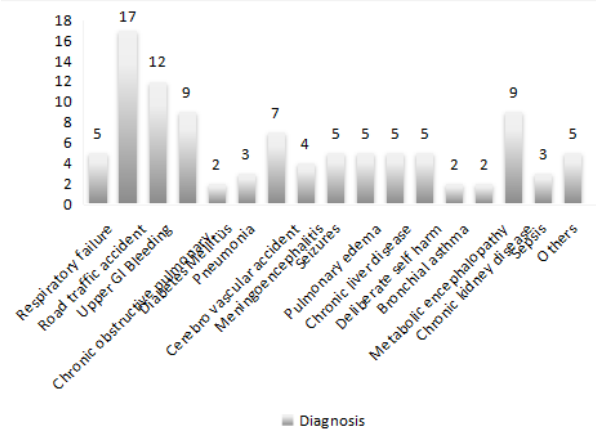

Fig 1: Frequency and Percentage distribution of patients according to their diagnosis

The figure 1 represents that 17(17%) of patients were admitted due to road traffic accident and 12(12%) with upper GI bleeding.

- Majority of the transfers were to wards 31(31%) and least patient transports were to the MRI 7(7%) department. 57(57%) of patients transports were done for urgent investigation and 12(12%) of patients were transferred to specialty. The majority of mode of transports were done by stretcher 89(89%) and 11(11%) of critically ill were transported with their ICU patients bed.

SECTION 2: Risk factors associated with intra hospital transportation

The figure 2 depicts that the majority of transports were under low risk category and only 10 (10%) had high risk for transportation.

- Majority 67(67%) of patients had heart rate between70-100beats/minute,52(52%) of patients were hemodynamically unstable, 61(61%) were not having infusion pumps during transport and 55(55%) of patients Glasgow coma score were in the range of 14-15.
- Majority of transports 60 (60%) were not associated with any utility factors and 59 (59%) of transports were not accompanied by any pharmacological support.

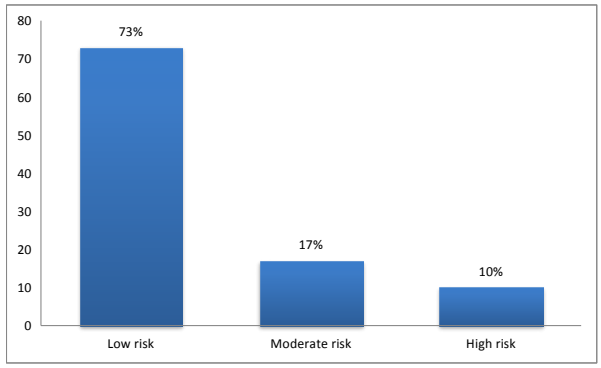

Fig 2: Percentage distribution of patients according to risk scores for intra hospital transportation

SECTION 3: Adverse events associated with intra hospital patient transportation (IHT)

- Majority of transports 72 (72%) were associated with adverse events and 28 (28%) of transports were not associated with any adverse events.

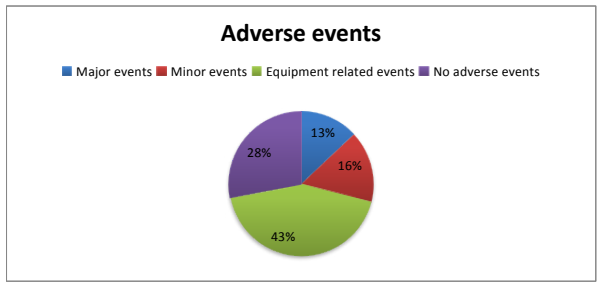

Fig 3: Percentage distribution of adverse events associated with intra hospital patient transportation

The figure 3 illustrates that majority of adverse events were related to equipment related events 43(43%) and 28(28%) of patient transports were not associated with any adverse events.

- Oxygen desaturation 9 (9%) was one among the major events and only 3 (3%) were due to increased vasopressor dose. 9 (9%) of minor events were related to disconnection of endotracheal tube and airway equipment and in events related to equipment, majority 17 (17%) were battery failure of the monitor.

SECTION 4: Correlation of risk factors with selected baseline variables

The table 1 depicts that there was significant moderately positive correlation between

APACHE II(r_s=0.48, p=0.001) and FiO_2 (r_s=0.58, p=0.001), with the patients risk score of transportation and the correlation is significant 0.001 level.

SECTION 5: Association of risk factors with selected baseline variables

The table 2 represents that there is statistically significant difference in risk factor score of intra hospital transportation with APACHE II, with a median (IQR) of 30.50 (25.75-41.50), (χ2(2)= 28.39, p=0.001), and Glasgow coma score with median(IQR)of 6 (4.75-7), (χ2(2)= 57.31, p=0.001).

- There is statistically significant difference in risk factor score of intra hospital transportation with heart rate during transport with median (IQR) of 111 (100-121.50), (χ2(2)=9.82, p=0.007) and MAP during transport with median (IQR) of 82.66 (69.16-96.16), (χ2(2)=9.15, p=0.010).
- There is significant association noted between risk factor score of intra hospital transportation with presence of central venous lines(Z= -7.08,p=0.001), arterial line(Z= -3.79,p=0.001), ionotropes(Z= -5.08,p=0.001), sedation(Z= -3.11 p=0.002), nasogastric tube(Z= -7.62, p=0.001), Foleys catheter(Z= -4.55, p=0.001).

Section 6: Development of patient transport checklist

The identified risk factors that can result in patient related adverse events were included in

Table 1: Correlation of patients risk score of intra hospital transportation with selected baseline variables

(Spearmann correlation)
(N=100 transports)

Variable	*Risk Factors of IHT*	
	Rs Value	*(P Value)*
Age	0.04	0.656
Apache II score	0.48*	0.001*
Fio2	0.58*	0.001*
Pre transport GCS	-0.73*	0.001*

** Level of significance at p< 0.01

Table 2: Association of patients APACHE II score and GCS on the day of transport with risk factors of intra hospital patient transportation

(Kruskal-Wallis test)
(N=100 transports)

Baseline Variable	*Median(25th-75th Percentile)*	*Mean Rank*	*df*	*χ2*	*p value*
APACHE II SCORE					
Low risk	15 (8.50- 19)	41.47			
Moderate risk	25 (17- 30.50)	68.68	2	28.39	0.001*
High risk	30.50 (25.75- 41.50)	85.55			
GLASGOW COMA SCALE					
On the day of transport					
Low risk	15 (14-15)	62.70			
Moderate risk	10 (6.50-13)	22.18	2	57.31	0.001*
High risk	6 (4.75-7)	9.60			

** Level of significance at p<0.05

the structured internal patient transfer nursing checklist.

CONCLUSION

The study findings revealed that intra hospital transportation is still a risky procedure and identifying the risk factors and grouping the patients according to their risk scores, strict adherence to hospital policies, protocols and checklists can significantly reduce the adverse events associated with the transport.

LIMITATIONS OF THE STUDY

- The study was limited to small sample size
- The study was limited to six weeks
- The study was limited to a selected hospital
- The study was limited to critical care patients
- Self-report was the technique adopted which could be over reporting or under reporting.
- The effectiveness of the nursing checklist was not assessed.

RECOMMENDATIONS

- A similar study could be performed with large samples.
- A study can be performed in other areas such as Emergency Department, Wards, and other specialized areas.
- Another study can be performed to assess the nurses knowledge regarding intra hospital transportation.
- Another study could be performed to assess the adherence and effectiveness of the checklist of intra hospital transportation.
- Abstract of the study could be published in various journals.

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SOURCE OF FUNDING

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CONFLICT OF INTEREST

The author declared no conflict of interest.

ETHICAL CLEARENCE

The ethical clearance of this study was obtained from institutional Ethical Committee (IEC).

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