# Effectiveness of Transport Guidelines on Intra Hospital Transport Practices of Nurses and Occurrence of Mishaps among Critically ill Patients

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## Abstract

**Background:** Intrahospital transport means transporting ill patients for diagnostic and therapeutic procedures with in the hospital. Implementation of intrahospital transfer demands a well organized meticulous planning and prompt application of well designed plan.

**Objectives**: To compare intrahospital transportation practices and occurrence of mishaps during intrahospital transport before and after administration of hospital transport guidelines and to determine the association with situational variables (level of floors and distance of destination)

**Methods:** Quasi experimental one group pre test post test design was used in the study by event sampling. 55 pre test transport and 62 post test events were selected. IHT guidelines was given to nurses working in operation theater by using demonstration cum lecture technique, one on one teaching provided to individual nurse consecutively. Observational technique was used for data collection **Result** showed that the mean percentage of intrahospital practice were higher(89.37%) then pre test (40.03) with a mean difference of 49.33. Computed t value (t=37.46,p=0.000) was statistically significant .Chi square value of occurrence of mishaps regarding intrahospital transport is($X^2$ =53.9,p=0.001) statistically significant F value between transportation practices with distance from OT were(f=1.68,p=0.16) and Computed t value practices with level of floor were (t=1.60,p=0.39) statistically not significant at 0.05 level of significance. **Conclusion** Intrahospital transportation guidelines are effective in reducing mishaps and increases transportation practices.

***Key Words:*** *Intra hospital transport practices, mishaps, transport guidelines*

## Introduction

Intrahospital transport (IHT) means transporting ill patients for diagnostic and therapeutic procedures with in the hospital. An assured quality of IHT can be maintained through the ground formula of a significant quality of intra hospital transfer which provides degree of care before, during and after transportation. A close intermediate and continuing communication are required for smooth transfer till the destination department for transfer[1]. The care of acutely ill patients includes constant monitoring and adequate intervention to protect client from harms or prevent mishaps, it is an integral responsibility of nurses[2]. Several studies have shown that transporting critically ill patients can lead to alteration in their physiological status and they are at acute risk of increased morbidity and mortality[3] .Researcher could only locate one study related to effect of transport guidelines on mishaps and none of the studies on transport practices moreover located studies are concerning intrahospital transport focused on I.C.U and emergency rather than Operation theatre's (O.T) patients, also most of the studies are not recent. However OT patients are under anesthesia and have limited physiological reserves. Hence effect of intervention on reducing the mishaps for OT patients has received little attention. Therefore present study has been conducted to improve the IHT practices and reduction of mishaps in O.T patients (patients who had undergone surgery and are being shifted to destination department from OT's recovery room). The purpose of

the study was to evaluate the effectiveness of transport guidelines on Intra Hospital Transport Practices of Nurses and Occurrence of Mishaps among Critically ill Patients which miscellaneous causes 64% was highest including oxygen probes(27.33%), ECG leads displacement (19.42), oxygen saturation was dropped in 10.79 patients, 3.59% and 4.31 were reported of altered mental status and arrhythmia respectively, 3 patients out of 64 have been terminated from the transport due to serious adverse effects[4].

## METHOD AND MATERIAL

Quantitative research approach and Quasi experimental one group pre test post test study design was used to assess the effectiveness of transport guidelines on IHT practices of nurses and occurrence of mishaps among critically ill patients, Rosswrum and larrabee conceptual frame work was used and figure 1 shows schematic representation of research. Study was conducted in 950 bedded multispecialty teaching hospital which consist of 8 operating theaters consist of three general OT, one neurosurgery OT, one gynae surgery OT, one Cardio thorax OT, one eye OT, one ENT OT and 3 minor OT. Duration of data collection was three months from December 2015 to January 2016. Sample size was calculated using power analysis with 5% significance and 80% power, standard deviation of the transport being studied ($\sigma$=7.74) based on previously published study, where as the size of the effect, mean difference (d=3.06) was calculated from annual census of surgery occurred at OT. Event sampling was used to observe the events of transportation and total enumerative sampling method was used to select nurses for checking acceptability of transport guidelines. 55 transport events before administration of transport guidelines 62 transport events after administration of transport guidelines.

Data was collected using three tools for the study tool one: Observational Checklist for Assessment of Intra Hospital Transport Practice first section consist of situational variables which include 2 items place of transport :distance from OT to designated ward (measurement was taken from university architectural department) and level of floors. Section 2 consist of observation checklist for assessment of intra hospital transport practices it comprises of three areas before, during and after transportation with total items 17,10,8 and weightage 48.5,28.5,22.85 respectively, also the level of practice in terms of intrahospital transport were very good (>85%), good (66-85%), average (51-65%), below average (<50%).

Second tool was checklist for assessing occurrence of mishaps, it contains 13 items disconnection of urinary catheter, backflow of urine, disconnection of surgical, displacement of oxygen supply , displacement of saturation probe etc with individual score range of checklist (0-13) .Third tool was acceptability scale it was prepared to assess the acceptability of transport guidelines among nurses it contains 5 semantic differential scale consist of 7 items easy, valuable, time saving, practical, beneficial, effective on reducing mishaps , 5 point scale has rating from 1-7, individual score ranges from 7-35.

To ensure content validity of the tool it was submitted to 7 experts from nursing field of medical surgical department and child health nursing department also 2 experts from medical ICU, and surgical ICU were asked to mark one response out of 3 responses like “fully met” “mostly met” “ to some extent” and requested to give suggestions and remarks, all three tools were validated after incorporating the suggestions and modifications given by experts, scale content validity index by averaging item content validity was 0.80. Consensus measure of inter rater reliability for observational coding by asking experts from neurosurgery ,emergency department and researcher to mark each tool items against response of dichotomous “yes” or “no” , later cohen’s kappa coefficient was 0.70 for transport practices and 0.72 for occurrence of mishaps was established . Development and validation of guidelines was modified with contribution of health professional from various area, later organization of content, language, practicability and feasibility was established in pilot study, all corrections were incorporated in final intervention. Occurrence of events of transportation of patients who has surgery under general/spinal anesthesia from OT (general, gyne, ortho, ENT, neuro ) to destination wards (recovery ICU, surgical ICU, surgery ward A,B,C) under presence of researcher, also staff nurses who were available during the time of data collection were included into the study, where as events of transportation occurred in absence of researcher or patient who had surgery under local anesthesia or events from pediatric OT and staff nurses

who were not available at the time of data collection were excluded from the study.

Ethical approval from university communication of decision of ethics committee (IEC) project no. 371 was obtained from medical superintendent, written informed consent was obtained from study subject after explaining about the research project and assurance of confidentiality was given. In order to develop rapport , introduction to self and study was given to the nurses working in OT. After obtaining informed consent, from day one to day 14 before intervention 55 events of intra transport practices and occurrence of mishaps were assessed, from day 15 to 19 a transport guidelines through group teaching (45min) was administered including demonstration of two transport events and return demonstration of two events by individual staff nurse. From day 20 to 34 after administration of guidelines 62 events were assessed.

For statistical analysis, using SPSS version 17 both descriptive and inferential statistics were used to compare continuous variable student't' test was used and chi square to compare percentage $p<0.05$ was considered statistically significant. Data were expressed as mean% ± standard deviation (SD) the association between mishaps and situational variables were also studied using ANOVA (in the present study the dependent variable (D.V) i.e. intrahospital practices were assessed through checklist, each correct transport practices was scored 01 and incorrect 00 .And a total practices score was obtained, therefore to seek association of D.V i.e. IHT practices with situational variables (independent variable (I.V)), ANOVA was used. For ANOVA to be applied D.V should be in interval/ratio scale and I.V should be in nominal/ categorical scale, as practices were measured interval scale by assigning score to them, therefore, D.V in the study was meeting eligibility of ANOVA)

## Result

Analysis and interpretation of data were based on the objectives and hypothesis to be tested. The objectives of the study were to compare intrahospital transport practices before and after administration of transport guidelines. To compare occurrence of mishaps during intrahospital transport before and after administration of hospital transport guidelines. To determine the association of transport practices with situational variables.To determine the acceptability of transport guidelines among nurses. The following hypotheses were tested at 0.05 level of significance:

$H_1$: There will be significant difference in the mean practice score regarding intrahospital transport before and after administration of transport guidelines.

$H_2$: There will be significant difference in the occurrence of mishaps during intrahospital transport before and after administration of transport guidelines.

$H_3$: There will be significant association of transport practices with situational variables.

In null hypothesis there is no relationship between variables and that any observed relationship are results of chance or sample fluctuations

In terms of comparison of situational variables, in per test the majority of events were from OT to ICU(34.5%) followed by surgery B (18.2%) surgery A (18.2%), surgery C(16.4%) and RICU(12.7%). 57.2% events of transport occurred on other floor than the OT , about 47.3% events of transport occurred on same floor at OT, where as in post test majority of events of transport were from OT to ICU i.e. 33.9% surgery B(21%) surgery A (17.7%) surgery C (16.1%), RICU (11.3%). 54.8% events of transport occurred on other floor then the OT and 45.2% occurred on same floor. Chi square was applied to compare pre test and post events with respect to place of transport ($\chi^2$=0.09, p=0.24) level of floor ($\chi^2$=2.00, p=0.50) compute chi value was found to be not significant at 0.05 level of significance hence events of transportation were homogenous and comparable in terms of situational variables. Bar graph (figure: 2) shows frequency percentage distribution of transport events and concludes that level of practices were improved.

In pre test range of IHT practice score was 21.87 to 70.58 with mean % and SD 40.03±9.11, median 37 whereas in post test range was 78.12 to 93.75 with mean% and SD 89.37±4.67, median 90, (Table no. 1 ) computed 't' value (t=37.46, p=0.001) was found to be statistically significant at 0.05 level of significance which shows that mean difference obtained was true difference and not by chance , Hence intra hospital guideline were

effective in improving IHT practices also in area wise i.e. before, during and after transport (Table no.2) was found to be highly significant at 0.05 level of significance in each area which shows true mean difference and not by chance hence improved IHT practices, therefore $H_1$ accepted, while assessing effectiveness of transport guidelines in terms of occurrence of mishaps (Table no.3) chi square value regarding intrahospital transport was statistically significant at 0.05 level of significance with disconnection of urinary catheters ($\chi^2$= 2.72, p=0.03) backflow of urine ($\chi^2$=40.01, p=0.001), disconnection of surgical drain ($\chi^2$=21.59, p=0.001), showing significance difference obtained of occurrence of mishaps whereas disconnection of oxygen supply , dislodgment of oxygen probe , disconnection of intravenous line ($\chi^2$= 0.09, p=0.75) in pre test 94 times out of 473 (total applicable mishaps)i.e. 19.87% and 25 times out of 542 (4.77%) mishaps occurred in post test and chi square ($\chi^2$ = 53.94, p=0.001) was found to be statically significant at 0.05 level of significance. Table no. 4 shows t value was significant and inferred that significant difference in occurrence of mishaps in before and after administration of IHT guidelines was effective on reducing occurrence of mishaps,(in this table all values are calculated in % as the no. of practices were varying , denominators are different in pre and post test, level of ) hence hypothesis $H_2$ accepted .Also, level of acceptability (n=22) regarding IHT guidelines in figure 3 concludes the guidelines were acceptable by nurses in-terms of easy, valuable, time , saving, acceptable and practical. In terms of association of transport practices with situational variables (table no. 5) , findings reveals that the transportation practices was not associated with place of transport and level of floor were independent with respond to situational variables hence research hypothesis $H_3$ was rejected.

| | | |
|---|---|---|
| $O_{P_1,M_1}$ | X | $O_{P_2,M_2}$ |

**Fig:1 Schematic representation of study design**

**$O_{P_1}$** = Intrahospital transport practices before administration of transport guidelines

**$M_1$** = Occurrences of mishaps during intrahospital transport before administration of transport guidelines.

**X** = Administration of Transport Guidelines

**$O_{P_2}$** = Intrahospital transport practices after administration of transport guidelines

**$M_2$** = Occurrences of mishaps during intrahospital transport after administration of transport guidelines

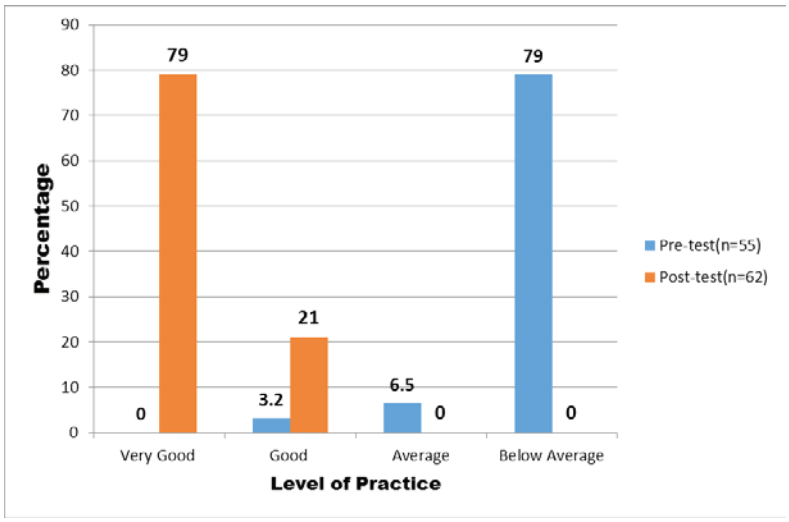


**Figure: 2 Transport events in terms of intra hospital transport practices**

N=22

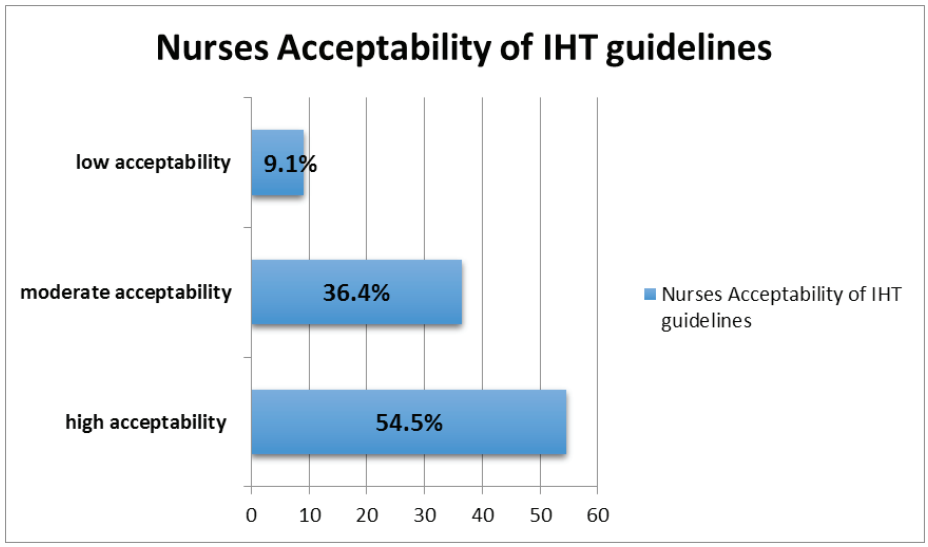


**Figure 3: Acceptability of IHT guidelines by nurses**

**Table : 1 Mean, Mean Difference, Standard Error of Mean Difference and 't' value of Transport Event's Practice Scores**

| Practice Score | Mean | $M_D$ | $SE_{MD}$ | df | t | p value |
|---|---|---|---|---|---|---|
| Pre test (n-55) | 40.03 | 49.33 | 1.31 | 115 | 37.46* | 0.00* |
| Post test (n-62) | 89.37 | | | | | |

t (115)= 1.98 *significant (p≤ 0.05)

**Table 2: Area wise Mean, Mean deviation and standard error of mean deviation and t value of transport event's practice score in terms of percentage of before and after administration of intrahospital transport guidelines.**

Pretest n=55

Post test n=62

| Area | Mean | MD | SEMD | t value | p value |
|---|---|---|---|---|---|
| Before transport<br>Pre test<br>Post test | <br>67.95<br>92.23 | 24.27 | 1.60 | 15.16 | 0.00* |
| During transport<br>Pre test<br>Post test | <br>26<br>86.31 | 60.30 | 1.72 | 34.93 | 0.00* |
| After transport<br>Pre test<br>Post test | <br>3.18<br>87.50 | 84.31 | 1.98 | 42.49 | 0.00* |

t(115)= 1.98 ***significant (p≤ 0.05)**

**Table no: 3 Chi Value of Occurrence of Mishaps Regarding Intra Hospital Transport**

| | Pre test (n=55) | | | Post test(n=62) | | | df | chi | P value |
|---|---|---|---|---|---|---|---|---|---|
| **Mishaps** | **Applicable** | **occurred** | **Not occurred** | **Applicable** | **occurred** | **Not occurred** | | | |
| Disconnection of oxygen supply | 12 | 6 | 6 | 13 | 9 | 4 | 1 | 0.327 | 0.567 |
| Displacement of O2 saturation probe | 4 | 2 | 2 | 2 | 0 | 2 | 1 | 0.094 | 0.759 |
| Disconnection of intravenous line | 55 | 3 | 52 | 62 | 1 | 61 | 1 | 0.399 | 0.528 |
| Obstruction of intravenous line | 55 | 6 | 49 | 62 | 2 | 60 | 1 | 1.629 | 0.202 |
| Backflow of blood in intravenous lines | 55 | 7 | 48 | 62 | 2 | 60 | 1 | 2.488 | 0.115 |
| Disconnection of central venous catheter line | 3 | 0 | 3 | 5 | 1 | 4 | 1 | 0.000 | 1.000 |
| Disconnection of urinary catheter | 55 | 4 | 51 | 62 | 0 | 62 | 1 | 2.726 | 0.031* |
| Backflow of urine | 55 | 32 | 23 | 62 | 2 | 60 | 1 | 40.07 | 0.000* |
| Disconnection/ obstruction of surgical drains | 55 | 20 | 35 | 62 | 1 | 61 | 1 | 21.59 | 0.001* |
| Accidental falling of patient from stretcher | 55 | 2 | 53 | 62 | 2 | 60 | 1 | 0.00 | 1.00 |
| Falling of monitor and devices from stretcher | 9 | 4 | 5 | 4 | 2 | 2 | 1 | 0.00 | 1.00 |
| Pricks /injury from uneven surface of stretcher | 55 | 6 | 49 | 62 | 2 | 60 | 1 | 1.629 | 0.202 |
| Dislocation of oral airway | 5 | 2 | 3 | 4 | 1 | 3 | 1 | 0.00 | 1.00 |
| Total | 473 | 94 | 379 | 524 | 25 | 499 | 1 | 53.94 | 0.001* |

**TABLE : 4 Mean, Mean Difference, Standard Error of Mean Difference and 't' value of Occurrence of Mishaps Regarding Intra Hospital Transport**

| **Practice score** | **Mean** | **MD** | **SEMD** | **df** | **t** | **p value** |
|---|---|---|---|---|---|---|
| Pre test (n-55) | 19.85 | 14.89 | 2.26 | 115 | 6.57* | 0.00* |
| Post test (n-62) | 4.96 | | | | | |

t (115)= 1.98 *significant ($p \leq 0.05$)

**Table : 5 ANOVA /t test Value Showing Association of Transport Practice With situational Variables**

| Situational variables | Mean score | F/t value | df1 /df2 | p value |
|---|---|---|---|---|
| Place of transport (distance from OT)<br>RICU (78.9m)<br>ICU (97.5m)<br>Surgery C (125.4m)<br>Surgery B (164.4m)<br>Surgery A (203.4m) | <br>85.83<br>89.17<br>90.00<br>89.34<br>91.48 | 1.682 | 4/57 | 0.167NS |
| Level of floor t<br>Same floor<br>Other floor | <br>88.34<br>90.22 | 1.601 | 60 | 0.393NS |

**t: t value** NS- Not Significant(p>0.05)

## Discussion

In respect to aim of the study the intrahospital guidelines were effective in reducing mishaps and increase in level of practice, In the present study pre test depict, the level of practice regarding IHT was below average (79%) in the majority of events whereas in post test, it was very good (79%) in the majority of events followed by good (21%) practices. Also chi valve showing comparison between occurrence of mishaps in pre and post test depicts that after administration of guidelines occurrence of mishaps decreased in post (94 to 25, p-0.001)the findings of the study was consistent with the study conducted by H.K Choi.et.al[5], in which unexpected events decreased significantly (36% -22.1%, p-0.001) and after administration of guidelines disconnection of oxygen supply has increased in (50% to 69.23%,p-0.567) findings of the study was inconsistent with the study conducted by Choi,et al, in which line disconnected for oxygen supply decreased (10.1% -2.6%,p-0.19) was also observed that transportation practices were independent of distance of transport's designation, (p-0.167) finding of the study were consistent with the study conducted by Despoina G.A, & Brokalaki H.[6], that distance from destination did not appear to affect the interruption frequency of patient's treatment(0.190). Another finding the displacement of oxygen probe in pre test events was 50% whereas in a study conducted by Rao S, Mutkule D, Taggu A, & Venkategowda P[4], shows 27.83% of oxygen probe unexpected events has occurred. In present study, out of 55 pre test events 18.18% of doctors, 5.45% of nurses and 100% attendants were present while transporting patients(data collected from one of the item in IHT practices tool), a similar findings shown by Silmara M[7] in which 77.3% of the team were composed of physician, nurse and nurse technician. 50% of oxygen desaturation occurs in 55 pre test events, where as in study done by Kue R, Brown P, Ness C, & Scheulen J[8] reported 8.8% of oxygen desaturation occurred during intra hospital transport. In present study pre test events, 98.19% had poor communication whereas in a study conducted by Beckmann U. Et.al[9], 61% of the incidence reflected to staff management issue including poor communication and inadequate monitoring. The study was confined to small group and lack control group also hawthorn effect was not controlled in the study and extraneous variables like age and severity of illness of the patients were not assessed.

## Recommendation

Based on findings of study a replica on large sample can be done to make generalization, randomized control

trial cab be conducted also experimental study can be done to evaluate the knowledge and attitude of nurse regarding use of transport guidelines. A standardized transportation, further research can be conducted to explore physiological changes and emotional experiences of patients.

## Conclusion

Intrahospital transport guidelines were effective in reducing mishaps and increases transportation practices. Common mishaps identified were backflow of urine, disconnection of I.V lines, and there was no association found in between situational variables and intrahospital transport guidelines.

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