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Effectiveness of handover guideline in prevention of nursing errors: A quantitative pre – test post – test research study

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Abstract
Introduction: Inadequate and inefficient handoffs can create important information gaps, omissions, errors, and patient harm. The study aim is to assess the effectiveness of Handover Guideline in prevention of nursing errors among the staff nurses of a selected hospital, Guwahati, Assam.
Material and Method: An experimental research approach and one pre-test post-test research design was used. Staff nurses working in Rahman Hospitals Pvt. Ltd., Guwahati, Assam were used to collect the data. A total sample of 40 staff nurses was selected by utilizing non – probability sampling technique. Self – Developed Handover Guideline and Self – Developed Nursing Errors Observational checklist were used to collect the data.
Results: The mean nursing errors among the staff nurses was reduced from 44.54% to 17.15% after the implementation of Self – Developed Handover Guideline. Majority of them 24 (60%) are under the age group of below 25 years. More than half of them 21 (52%) are GNM nursing. With regards to work experience, nearly half of them 18 (45%) are having work experience of less than one year. Majority of them 24 (60%) are working in the ICU ward.
Conclusion: The rate of nursing errors reduced after the implementation of Self – Developed Handover Guideline. There was a negatively significant correlation between nurses handover practice and nursing errors. There was no association nursing errors with age, gender, and educational qualification but have a significant association with working area.

Keywords: Assess, effectiveness, handover guideline, nursing errors and prevention

1. Introduction
Clinical handover refers to the "transfer of professional responsibility and accountability for some or all aspects of care for a patient, or groups of patients, to another person or professional group on a temporary or permanent basis" [1]
A handoff between health care providers is the key factor in fostering continuity of care and providing safe patient care. The handoff from one health care provider to another is recognized to be vulnerable to communication failures. Effective communication is therefore central to safe and effective patient care. The Joint Commission reviewed a total of 936 sentinel events during the year of 2015; communication was identified as the root cause in more than 70% of serious medical errors. The consequences of failed communication during handoff are medication errors, inaccurate patient plans, delay in transfer of a patient to critical care, delay in hospital [2]
Ideally, the aim of the handoff process is to achieve effective, safe, and high quality communication when the responsibility for the patient's care is transferred from one nurse to another. Unfortunately, it is becoming increasingly apparent that a breakdown in communication system, in hospitals, compromises the patient safety [3]. Furthermore, Ineffective handoff communication may lead to detrimental consequences; evidence indicates that ineffective handoff can lead to incorrect patient treatment, delays in diagnosis and treatment, unnecessary tests and treatments, increase the length of stay, patient complaints and malpractice claims [4].
The Joint Commission on Accreditation of Health Care Organization (JCAHO) defines handoff as "contemporaneous, interactive process of passing patient –specific information from one caregiver to another for the purpose of ensuring the continuity and safety of patient care" (JCAHO 2006) [5].

Athwal P, Fields W, Wagnell E made an important finding that nurses in a laboratory experiment had less accuracy on traditional written notes after handing off information five times. A combination of verbal report along with a typed sheet resulted in minimal information decrements. In recent years, bedside nursing handoffs have been popular in the literature, despite being some researchers concluded that no one type of handoffs was more effective than others because of differences in contexts, patients, and nurses [6].

According to Sandlin D (2007), the standardization in information communication process among the health care system is referred as the second national goal of patient safety by the American Committee of Safety (ACS). The communication of up-to-date and reliable credible information that minimally disrupts the shift handover process is emphasized by this goal. Numbers of shift handover guidelines are developed such as 'I PASS THE BATON' (I-Introduction, P-Patient, A-Assessment, S-Situation, S-Safety, THE, B-Background, A-Action, T-Timing, O-Ownership, N-Next), 'SHARQ' (S-Situation, H-History, A-Assessment, R-Recommendations, Q-Questions), '5Ps' (P-Patient, P-Precaution, P- Plan, P-Problem, P-Purpose) and 'SBAR' (S-Situation, B-Background, A-Assessment, R- Recommendation) were developed and used for worldwide to achieve this goal. In different hospital units of worldwide, the quality of inter shift information were improved by these guidelines [7].

SBAR is a communication concept that was developed to promote safety of the patient.8 The SBAR stands for; S-Situation; it is the information regarding the current situation of the patient (name, age, diagnosis, consultant, reason for admission, etc), B- Background; it is the information regarding the background of the patient (chief complaint, allergies, history of treatment, level of care, date of admission, current health status, etc), A- Assessment; it is the ongoing assessment of patient health condition. R-Recommendation; it refers to planning, information that need to be informed and requirement that recommend for the patient [9].

The studies conducted by the Joint Commission International (2010) found that communication of poor information is the main possible factor and the related risk factor for sentinel events. Communication of information occurs frequently between healthcare providers. In healthcare settings, the nursing shift handovers is a form of communication of information. The continuity of care and enhancement of patient safety is to be facilitated for effective handover [10].

The National Accreditation Board for Hospitals and Health care providers (NABH) describes that information about patient care and response to treatment is shared among medical and nursing care providers. The information is exchanged and documented during each shift, and during transfer between the units or departments [11]

2. Methodology

The objectives of the study is to compare the nursing errors before and after the implementation of Self – Developed Handover Guideline and to determine the correlation between nursing errors and handover practice after the implementation of Self Developed Handover Guideline and also to determine the acceptability of Self – Developed Handover Guideline among the staff nurses.

Research approach adopted for the study was quantitative research approach using quasi-experimental one group pretest posttest design with multiple post observations. The study was conducted in Rahman Hospitals Pvt. Ltd., Guwahati, Assam. A total of 40 staff nurses were enrolled into the study by using non – probability sampling technique. A formal approval was obtained from the authorities

and ethical consent was obtained from all subjects. The tools developed and used for data collection were Self – Developed Handover Guideline, Self – Developed Nursing Errors observational checklist and Self – Developed Acceptability Questionnaires on use of Self Developed Handover Guideline. The Self – Developed Handover Guideline is divided into three parts such as Part – A (Patient Data/Information), Part – B (Assessment) and Part – C (Focus and Recommendations) with items and sub – items in each part which has to be mark as (✓/□) or fill as necessary. And the Self – Developed Nursing Errors observational checklist is comprised of 16 items with 180 sub – items. Unobservable items are given/consider as Not Applicable and mark as NA. The highest score of the tool can be obtained 100% and 0% was the lowest score of the tool. The reliability for the Self – Developed Nursing Errors Observational Checklist, calculated using Karls Pearson Correlation Coefficient was found to be 0.92 which was found acceptable range of 0.7-1. The Self Developed Acceptability Questionnaires is a numeric rating scale and comprised of 10 positive statements. The reliability of Self Developed Acceptability Questionnaires was found to be 0.88 which was found in acceptable range of 0.7-1. Pilot study was conducted on 5 staff nurses of male ward. The data was analyzed using both descriptive and inferential statistics i.e. mean, mean percentage, median, standard deviation and t-test.

3. Results

The majority of them 24 (60%) are under the age group of below 25 years. It is seen that most of them 38 (95%) are female. In relation to educational qualification, more than half of them 21 (52%) are GNM nursing. With regards to work experience, nearly half of them 18 (45%) are having work experience of less than one year. Considering the area of working, majority of them 24 (60%) are working in the ICU ward.

Table 1: Frequency and percentage distribution of Demographic Variables of the Staff Nurses

n=40

Sl. No.	Demographic Variables	Frequency	Percentage
1.	**Age in year**		
1.1	< 25 years	24	60.0%
1.2	25 - 30 years	14	35.0%
1.3	> 30 years	2	5.0%
2.	**Gender**		
2.1	Female	38	95.0%
2.2	Male	2	5.0%
6.	**Educational Qualification**		
6.1	B. Sc nursing	16	40.0%
6.2	GNM nursing	21	52.5%
6.3	Post B. Sc nursing	3	7.5%
7.	**Work Experience**		
7.1	< 1 year	18	45.0%
7.2	1 - 3 years	16	40.0%
7.3	3 - 5 years	3	7.5%
7.4	> 5 years	3	7.5%
8.	**Working Area**		
8.1	Cabin ward	4	10.0%
8.2	ICU	24	60.0%
8.3	Semi – ICU	12	30.0%

Table 2: Frequency and Percentage distribution of Nursing Errors before and after the implementation of Self – Developed Handover Guideline

n=40

Level of Nursing Errors	Range of Score	Frequency & Percentage			
		Pre – test	Post – test 1st Day	Post – test 2nd Day	Post – test 3rd Day
High	>50%	10 (25%)	0 (0%)	0 (0%)	0 (0%)
Moderate	>25%-50%	30 (75%)	29 (72.5%)	12 (30%)	2 (5%)
Low	0 – 25%	0 (0%)	11 (27.5%)	28 (70%)	38 (95%)

Table 3: Mean, Median, and Standard Deviation of Pre - test scores and Post – test scores of occurrence of Nursing Errors among the Staff Nurses

n=40

Nursing Errors	Mean	Median	SD
Pre – test Nursing Errors	44.54	43.75	6.30
Post – test 1st Day Nursing Errors	29.58	30.03	5.34
Post – test 2nd Day Nursing Errors	23.24	22.85	3.32
Post – test 3rd Day Nursing Errors	17.15	16.88	3.94

Maximum score = 100 & Minimum score = 0

The calculated 't'-value between Pre – test Nursing Errors and Post – test 1st Day Nursing Errors (12.80), between Pre – test Nursing Errors and Post – test 2nd Day Nursing Errors (22.65), between Pre – test Nursing Errors and Post – test 3rd Day Nursing Errors (24.26), between Post – test 1st Day Nursing Errors and Post – test 2nd Day Nursing Errors (7.39) and between Post – test 2nd Day Nursing Errors and Post – test 3rd Day Nursing Errors (9.74) were found higher than the tabulated 't'– value (2.02, df = 39) which was statistically significant at 0.05 level of significances.

Table 4: Comparison (Paired 't' – Test) of Pre - test Nursing Errors and Post – test Nursing Errors among the Staff Nurses

n=40

Nursing Errors	Mean D	*df*	'*t*' - Value	P-value
Pre – test Nursing Errors Post – test 1st Day Nursing Errors	14.95	39	12.80	<0.001**
Pre – test Nursing Errors Post – test 2nd Day Nursing Errors	21.29	39	22.65	<0.001**
Pre – test Nursing Errors Post – test 3rd Day Nursing Errors	27.39	39	24.26	<0.001**
Post – test 1st Day Nursing Errors Post – test 2nd Day Nursing Errors	6.34	39	7.39	<0.001**
Post – test 2nd Day Nursing Errors Post – test 3rd Day Nursing Errors	6.09	39	9.74	<0.001**

(**Significant at P<0.05; tabulated 't' – Value = 2.02)

Table 5: Mean, Median and Standard Deviation of Handover Practices after the implementation of Self – Developed Handover Guideline n=40

Practice Scores	Mean	Median	SD
1st Day Handover Practice	88.44	88.6	4.67
2nd Day Handover Practice	94.49	94.85	2.00
3rd Day Handover Practice	95.86	96.32	1.31

Maximum score = 100 & Minimum score = 0

The correlation between mean Post – test 1st Day Nursing Errors and 1st Day Handover Practice (r = - 0.75), between mean Post – test 2nd Day Nursing Errors and 2nd Day Handover Practice (r = -0.72) and between Post – test 3rd Day Nursing Errors and 3rd Day Handover Practice (r = - 0.79) were found statistically negative significant correlation at 0.05 levels of significance.

Table 6: Pearson Correlation between Mean Post – test Nursing Errors and Handover Practices after the implementation of Self – Developed Handover Guideline among the Staff Nurse n=40

Nursing Errors & Practice Scores	Mean	'r' - Value	P – Value
Post – test 1st Day Nursing Errors	29.58	-0.75	<0.001**
1st Day Handover Practice	88.44		
Post – test 2nd Day Nursing Errors	23.24	-0.72	<0.001**
2nd Day Handover Practice	94.49		
Post – test 3rd Day Nursing Errors	17.15	-0.79	<0.001**
3rd Day Handover Practice	95.86		

(** - Significant at $P<0.05$)

Table 7: Mean, median and Standard Deviation of Acceptability Questionnaire n=40

	Mean	Median	SD
Acceptability score	42.25	42	1.94

Maximum score = 50 & Minimum score = 10

The majority of them 31 (77.5%) highly accepted on use of Self – Developed Handover Guideline.

Table 8: Frequency and Percentage distribution of Acceptability on use of Self – Developed Handover Guideline n=40

Levels of Acceptability	Range of Score	Frequency of Sample	Percentage
Low Acceptability	10 – 20	0	0%
Moderate Acceptability	21 – 40	9	22.5%
High Acceptability	41 – 50	31	77.5%

4. Discussion

The study reveals that Self – Developed Handover Guideline was found effective in reduction and Prevention of Nursing Errors. Similarly, finding is supported by prospective intervention study, using 1-group pretest-posttest quasi-experimental design conducted by Zou XJ, Zhang YP (2016) to determine the effectiveness of nursing handoff form on an inpatient medical unit, where the rates of nursing errors decreased from 9.2 to 5.7 per 100 admissions, comparing the pre- and post intervention period [12].

The study also reveals that there was a significant correlation between Handover Practices and Nursing Errors among the Staff Nurses. It means improvement in Handover Practices, increased the patient safety by reducing the rate of nursing errors. Similarly, the finding is supported by a prospective observational study conducted by Nagpal K *et al*. (2013) where there was a significant reduction in overall information omissions from 9 to 3 omissions per handover and task errors from 2.8 to 0.8 with the new handover protocol [13].

The study revealed that 31 (77.5%) Staff Nurses highly accepted the Self – Developed Handover Guideline and nine (22.5%) Staff Nurse moderately accepted the Self – Developed Handover Guideline. The finding is supported by a prospective study conducted by Achrekar MS, Murthy V, Kanan S, Shetty R, Nair M, Khattry N (2016), where most (76%) of nurses expressed that SBAR form was useful, but 24% nurses felt SBAR documentation was time-consuming [14].

5. Conclusion

The following conclusion drawn from the study findings:

- The rate of nursing errors reduced after the implementation of Self – Developed Handover Guideline among the staff nurses.
- An improvement in nurses' handover practice reduces the rate of nursing errors among the staff nurses.
- Majority of them highly accept the use of Self – Developed handover Guideline while transferring patient information among the staff nurses.

6. Recommendations

Based on experience gained during the study and the results obtained, the following recommendations are made.

- True experimental study can be done on the same study.
- A longitudinal study can be conducted to assess the effectiveness of handover guidelines on handing over practices and prevention of nursing errors among staff nurses.
- A study can be conducted in which the duration of the intervention can be increased.

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