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Analysis of the Impact of Handover Implementation on Healthcare Quality in Inpatient Units

Novriani Husna[*1], Faridah Binti Mohd Said[1], Nisha Nambiar[1], Adinda Muethia Refti[2]

[1] Lincoln University College, Malaysia

[2] Andalas University, West Sumatra, Indonesia

[*]**Corresponding author:**

Novriani Husna

Email ID: novrianihusnah@gmail.com

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ABSTRACT

Communication failures during the handover process are the cause of 80% of patient safety incidents in inpatient units. Analyze the impact of the implementation of the handover using the SBAR method on health service quality indicators in inpatient units. The quasi-experimental research with a pre-post test design approach involved 35 nurses for three months. Data were collected through structured questionnaires, observation sheets, and medical record documentation, then analyzed using paired t-tests and multiple regression analysis. The implementation of the SBAR protocol increased the implementation score from 45.71±2.41 to 87.46±2.03. Communication effectiveness increased from 2.46±0.51 to 4.43±0.50, patient satisfaction from 2.51±0.61 to 3.91±0.74, length of stay decreased from 5.89±0.29 days to 4.35±0.23 days, and adverse events decreased from 3.01±0.23 to 1.16±0.15 per 1000 days of treatment. All indicators showed significant differences ($p<0.001$) with large effect sizes. The SBAR protocol has proven to be effective in improving the quality of health services comprehensively. Permanent implementation with an ongoing training program and periodic monitoring system is recommended.

Keywords: *Handover, Quality of Health Services, Communication, Nursing, SBAR*

1. INTRODUCTION

Patient safety is a top priority in providing quality healthcare worldwide. One of the crucial aspects that contributes significantly to patient safety is the effectiveness of communication between health workers, especially in the handover process (*Handover*) nurses. An optimal handover process has been shown to be the main cause of medical errors (*Medical Error*) that may threaten patient safety.[1] Empirical data show that about 80% of patient safety incidents are caused by communication failures during the nurse shift turnover process, with the communication error rate reaching 65% in inpatient units. Previous research findings reveal that the implementation of structured communication protocols such as SBAR (*Situation, Background, Assessment, Recommendation*) in the weigh-in process can improve the accuracy of information transfer by up to 75% and reduce the incidence of patient safety incidents by 40% Ghosh et al.[2] However, there is still a significant gap between the implementation of the handover communication protocol and the achievement of optimal health service quality indicators. Studies conducted by Dwi Afrida indicates that although SBAR protocols have been implemented in various hospitals, nurses' job satisfaction levels and communication effectiveness have still not reached the expected standards.[3]

The research gap identified is the lack of comprehensive studies that analyze the direct impact of the implementation of the handover communication protocol on health service quality indicators quantitatively in the context of Indonesian inpatient units. Previous research focused more on protocol implementation aspects without measuring its impact on specific service quality indicators such as *length of stay*, patient satisfaction level, and adverse *events*. In addition, there has been no study that integrates multi-variable analysis to measure the effectiveness of handover communication protocols on various dimensions of health service quality simultaneously. The novelty of this research lies in a quantitative analysis approach that integrates multiple indicators to measure the impact of the implementation of the handover communication protocol on the quality of health services. This study uses a comprehensive evaluation framework by measuring not only patient safety aspects, but also service efficiency, patient satisfaction, and patient clinical outcomes. The methodological innovation applied

is the use of multiple regression analysis to identify the most significant predictor variables in improving health service quality indicators through the implementation of the handover communication protocol.

Based on the background that has been described, the formulation of the problem in this study includes an overview of the implementation of the nurse handover communication protocol in the inpatient unit, the level of achievement of health service quality indicators in the inpatient unit before and after the implementation of the handover communication protocol, the significant difference in the quality of health service indicators between before and after the implementation of the nurse handover communication protocol, and the magnitude of the impact of the implementation of the nurse weigh-in communication protocol on each indicator of health service quality in the inpatient unit. The general purpose of this study is to analyze the impact of the implementation of nurse handover communication protocols on health service quality indicators in inpatient units. In particular, this study aims to identify the overview of the implementation of the nurse handover communication protocol in the inpatient unit, measure the level of achievement of health service quality indicators in the inpatient unit before and after the implementation of the handover communication protocol, analyze the differences in health service quality indicators between before and after the implementation of the nurse handover communication protocol, and evaluate the impact of the implementation of the protocol Communication of nurses on each indicator of health service quality in the inpatient unit.

Theoretically, this research is expected to contribute to the development of nursing science, especially in the field of nursing management and patient safety. The results of the research will enrich the *body of knowledge* regarding the effectiveness of communication protocols in improving the quality of health services, as well as become a reference for future research related to the implementation of weigh-in communication protocols in various health service settings. Practically, the results of this research can be used by hospital management as a basis for policy-making in the implementation of effective handover communication protocols. For nurses, this research can be a guide in improving the quality of communication during the handover process to achieve optimal patient outcomes. For nursing education institutions, research results can be integrated into the educational curriculum to improve the communication competence of nursing students. From the policy aspect, the results of this research are expected to be an *evidence-based practice* for the government and professional organizations in compiling operational standards, procedures and regulations related to the communication protocol for nurses, as well as contributing to the development of national health service quality indicators that are more comprehensive and based on effective communication practices between health workers.

2. METHOD

This research uses a design *quasi-experimental* with the *Pre-post test design* to analyze the impact of the implementation of the nurse weigh-in communication protocol on health service quality indicators in inpatient units. This design was chosen because it allows researchers to compare conditions before and after the implementation of the intervention without randomizing that can interfere with the operation of health services in hospitals Berndt.[4] The research was conducted over a three-month period by measuring health service quality indicators before the implementation of the pre-test communication protocol for one month, the implementation of intervention for one month, and the measurement after implementation (post-test) for one month. The population in this study is all nurses who work in hospital inpatient units with inclusion criteria including nurses with a minimum working period of one year, actively involved in the handover process, and willing to participate in the research. Exclusion criteria include nurses who were on leave or absent during the study period. The sampling techniques used are *purposive sampling* with a sample of 35 nurses determined based on the Lemeshow formula for a limited population with a 95% confidence level and a margin of error of 5%. Samples were divided into equal groups for pre-test and post-test measurements to ensure the internal validity of the study.

The data collection technique used a triangulation approach with three main instruments, namely a structured questionnaire to measure nurses' perception of the effectiveness of the handover communication protocol, an observation sheet to assess the implementation of communication protocols during the handover process, and documentation of medical records to measure health service quality indicators such as *length of stay*, patient satisfaction levels, and incidence *adverse events*. The questionnaire used has gone through a validity and reliability test with a Cronbach's alpha value of >0.7. The data is collected by a research team that has been trained on data collection procedures to ensure consistency and accuracy. The data analysis technique uses descriptive statistical analysis to describe the characteristics of respondents and research variables, as well as inferential analysis to test research hypotheses Melender et al.[5] The data normality test used the Shapiro-Wilk test, followed by the paired t-test to analyze differences in health service quality indicators before and after the implementation of the handover communication protocol if the data was distributed normally, or the Wilcoxon signed-rank test if the data was not distributed normally. Multiple linear regression analysis was used to identify the factors that had the most influence on the improvement of health service quality indicators with a significance level of $p<0.05$.

Table 1. Variable Operational Definition

Variable	Operational Definition	Parameters	Scale of Measurement	Instruments
Implementation of Handover Communication Protocol	The application of the SBAR protocol in the nurse shift change process which includes the patient's situation, condition background, current assessment, and action recommendations	Protocol implementation score (0-100) based on the completeness of the SBAR component	Ratio	Protocol implementation observation sheet
Length of Stay	Length of patient care from admission to hospital discharge	Number of days of patient care	Ratio	Patient medical records
Patient Satisfaction Rate	Patients' perception of the quality of service received during treatment	Satisfaction score (1-5) based on the Likert scale	Ordinal	Patient satisfaction questionnaire
Kejadian Adverse Events	Incidents that result in injury or loss to the patient due to medical procedures	Number of adverse events per 1000 days of treatment	Ratio	Patient safety incident reports
Communication Effectiveness	Ability of nurses to convey patient information accurately and completely	Communication effectiveness score (1-5) based on nurses' perceptions	Ordinal	Communication effectiveness questionnaire

3. RESULTS

Overview of the Implementation of the Nurse Handover Communication Protocol in the Inpatient Unit

The results showed that the implementation of the handover communication protocol using the SBAR method has increased significantly. In the pre-test phase, the average protocol implementation score reached 45.71 ± 2.41 with a score range of 42-50. After the implementation of the intervention for one month, the protocol implementation score increased substantially to 87.46 ± 2.03 with a score range of 84-91. This improvement shows that nurses are able to adopt and implement SBAR protocols well in daily practice. Analysis per SBAR component showed that the Situation and Background components had the highest implementation rates (92.3% and 89.7%), followed by Assessment (87.1%) and Recommendation (83.4%). These findings indicate that nurses are more likely to convey factual information about a patient's condition than to make recommendations for actions that require more complex clinical judgments.

Achievement Rate of Health Service Quality Indicators

Communication Effectiveness

The effectiveness of nurses' communication increased significantly from 2.46 ± 0.51 in the pre-test to 4.43 ± 0.50 in the post-test. The score distribution showed that on the pre-test, 54.3% of nurses had a low communication effectiveness score (2), 40% had a medium score (3), and only 5.7% had a high score. After the implementation of the protocol, the distribution changed drastically with 57.1% of nurses achieving a high score (4-5) and 42.9% achieving a very high score.

Patient Satisfaction Rate

Patient satisfaction showed a consistent upward trend from an average of 2.51 ± 0.61 in the pre-test to 3.91 ± 0.74 in the post-test. Further analysis showed that the percentage of patients with high satisfaction levels (score 4-5) increased from 20% to 68.6%. The most significant improvement in satisfaction was nurse-patient communication (85.7% increase), followed by the accuracy of the information provided (78.3% increase).

Length of Stay

The length of stay data showed a significant decrease from an average of 5.89 ± 0.29 days in the pre-test to 4.35 ± 0.23 days in the post-test. This average decrease of 1.54 days is equivalent to service efficiency of 26.1%. Distribution analysis showed that 82.9% of patients had a length of stay ≤5 days after protocol implementation, compared to only 31.4% in the period before implementation.

Events Adverse Events

The incidence of adverse events decreased substantially from an average of 3.01 ± 0.23 per 1000 days of treatment in the pre-test to 1.16 ± 0.15 per 1000 days of treatment in the post-test. This 61.5% decrease indicates a significant increase in patient safety. The type of adverse events that experienced the most significant decrease was medication error (70% decrease), followed by patient fall (55% decrease) and hospital-acquired infection (48% decrease).

Analysis of Differences in Health Service Quality Indicators

Table 2. Comparison of Health Service Quality Indicators Pre-Post Test

Variable	Pre-Test (Red ± SD)	Post-Test (Red ± SD)	Difference	p-value	Effect Size (Cohen's d)
Protocol Implementation	45.71 ± 2.41	87.46 ± 2.03	41,75	<0.001*	18,92
Communication Effectiveness	2.46 ± 0.51	4.43 ± 0.50	2	<0.001*	3,94
Patient Satisfaction	2.51 ± 0.61	3.91 ± 0.74	1	<0.001*	2,05
Length of Stay	5.89 ± 0.29	4.35 ± 0.23	-1,54	<0.001*	5,93
Adverse Events	3.01 ± 0.23	1.16 ± 0.15	-1,85	<0.001*	9,25

*Significant at α = 0.05

The paired t-test showed a very significant difference ($p<0.001$) in all health service quality indicators between pre-test and post-test. The resulting effect size showed the large effect category (Cohen's $d > 0.8$) for all variables, with the protocol implementation having the highest effect size (18.92), followed by adverse events (9.25) and length of stay (5.93).

Evaluation of the Impact of Handover Protocol Implementation

Multiple linear regression analysis with protocol implementation as an independent variable showed a significant model for all indicators of healthcare quality. The implementation of the hand over communication protocol was able to explain 89.3% of the variance in communication effectiveness ($R^2 = 0.893$, $F = 267.45$, $p<0.001$), 76.8% of the variance in patient satisfaction ($R^2 = 0.768$, $F = 109.36$, $p<0.001$), 91.2% variance in length of stay ($R^2 = 0.912$, $F = 341.82$, $p<0.001$), and 94.7% variance in adverse events ($R^2 = 0.947$, $F = 590.14$, $p<0.001$).

Table 3. Regression Analysis of Protocol Implementation on Quality Indicators

Dependent Variable	B (Unstandardized)	ONE	β (Standardized)	t	p-value	R^2
Communication Effectiveness	0	0	0,945	16	<0.001	0,893
Patient Satisfaction	0	0	1	10	<0.001	0,768
Length of Stay	0	0	-1	-18	<0.001	0,912
Adverse Events	0	0	-0,973	-24	<0.001	0,947

The regression coefficient showed that every 1-point increase in the protocol implementation score had an impact on increasing communication effectiveness by 0.047 points, increasing patient satisfaction by 0.034 points, decreasing length of stay by 0.037 days, and decreasing adverse events by 0.044 per 1000 days of treatment. Pearson's correlation analysis showed a very strong relationship between protocol implementation and communication effectiveness ($r = 0.945$), patient satisfaction ($r = 0.876$), length of stay ($r = -0.955$), and adverse events ($r = -0.973$). These findings confirm that the implementation of the handover communication protocol has a direct and significant impact on all aspects of health service quality measured in this study.

4. DISCUSSION

Overview of the Implementation of the Handover Communication Protocol in the Inpatient Unit

Implementation of the handover communication protocol using the *SBAR* (*Situation, Background, Assessment, Recommendation*) in the inpatient unit shows a significant transformation in nursing practice. The study revealed a dramatic improvement from an initial implementation score of 45.71 ± 2.41 to 87.46 ± 2.03 after a one-month intervention, reflecting successful adoption of the protocol in a clinical setting. These findings are in line with research Galli dkk that demonstrates that the implementation of a standardized pay-as-you-go framework is model-based *ISBAR* can significantly increase nursing weigh-in scores Galli et al. [6] Analysis by component *SBAR* indicates that the nurse shows the highest mastery of the *Location*

(92.3%) and *Background* (89.7%), which represents superior ability to convey factual information about the patient's condition. Component *Assessment* achieved an implementation rate of 87.1%, while *Recommendation* obtained the lowest percentage of 83.4%, indicating the challenge in applying *clinical judgment* complex. Dumbala, Belay, Yimam, & Abebe emphasizing that inconsistencies in the clinical weigh-in process can negatively impact the quality of holistic nursing care.[7] Implementation disparity between components *SBAR* Indicates the need for special reinforcement on aspects of clinical recommendations that require advanced analytical and decision-making skills. Schmidt underlining that technology-enabled virtual nurses are able to integrate clinical expertise with technological skills to provide more personalized and efficient care.[8] The successful implementation of this protocol reflects the capacity of nurses to adapt to structured communication standards that can improve the safety and quality of patient services. This transformation also indicates the potential for the development of sustainable clinical communication competencies in inpatient care settings.

Achievement Rate of Health Service Quality Indicators Before and After Implementation

A comprehensive evaluation of health service quality indicators revealed a substantial improvement in all parameters measured after the implementation of communication protocols. The effectiveness of nurse communication underwent a significant transformation from a value of 2.46 ± 0.51 in *Pre-test* to 4.43 ± 0.50 on *Post-test*, with a drastic redistribution where 57.1% of nurses achieved high scores and 42.9% achieved very high scores. These findings resonate with research Amarneh & Al Nobani which shows a positive and significant correlation between doctor-nurse collaboration and all aspects of patient safety culture Amarneh & Al Nobani .[9] Patient satisfaction showed a consistent upward trend from 2.51 ± 0.61 to 3.91 ± 0.74, with the percentage of patients with high satisfaction jumping from 20% to 68.6%, especially in the nurse-patient communication aspect which increased by 85.7%. Gerbasi, Kosinski, & Meltzer-Brody asserts that the achievement of rapid and sustained clinical responses correlates with significant improvements in health-related quality of life (*health-related quality of life*) Gerbasi et al.[10] Parameters *length of stay* showed service efficiency with a decrease from 5.89 ± 0.29 days to 4.35 ± 0.23 days, equivalent to an efficiency of 26.1% and an increase in the proportion of patients with *length of stay* ≤5 days from 31.4% to 82.9%. Event *adverse events* experienced a substantial reduction from 3.01 ± 0.23 per 1000 days of treatment to 1.16 ± 0.15 per 1000 days of treatment, achieving a decrease of 61.5% which signifies a significant improvement in patient safety. Kadakia dkk demonstrate that disease severity correlates with the utilization of health resources and the patient's quality of life.[11] Identifies that ineffective clinical weigh-ins contribute to approximately 80% of the causes of serious but preventable adverse health events. The transformation of this quality indicator reflects the systemic impact of protocol implementation on all aspects of health services in inpatient units.

Significance of Differences and Impact of Protocol Implementation on Quality Indicators

Statistical analysis using Paired T-Test confirm very significant differences ($p<0.001$) across all indicators of health service quality, with effect size large categories (Cohen's $d > 0.8$) that showed a clinically meaningful impact. Implementation of the acquired protocol effect size highest (18.92), followed by adverse events (9.25) and length of stay (5,93), indicating the transformative impact of the protocol on the health service system. Chavez dkk emphasizes that the clinical leadership of the implementing nurse at the forefront of patient care includes the characteristics of optimism, confidence, and ability Speaking Up that contribute to the quality of care.[12] Multiple linear regression analysis demonstrated that the implementation of the protocol was able to explain 89.3% variance of communication effectiveness, 76.8% variance of patient satisfaction, 91.2% variance length of stay, and 94.7% variance adverse events. Piwowar-Sulej dkk underscore that effective internal communication correlates with greener environmental strategies and organizational culture in the context of proactive organizations.[13] The regression coefficient indicated that every 1-point increase in the protocol implementation score contributed to an increase in communication effectiveness by 0.047 points, an increase in patient satisfaction by 0.034 points, a decrease in length of stay by 0.037 days, and a reduction in adverse events by 0.044 per 1000 days of treatment. Maruszczyk dkk emphasizing the importance of multistakeholder collaboration to maximize implementation patient-reported outcomes in generations real-world evidence.[14] Pearson's correlation analysis showed a very strong relationship between protocol implementation and communication effectiveness ($r = 0.945$), patient satisfaction ($r = 0.876$), length of stay ($r = -0.955$), and adverse events ($r = -0.973$). Bialkova & Paske explained that optimizing communication through social media can increase campaign participation and consumer purchase intention.(Bialkova & Paske, 2021) These findings confirm that the implementation of weigh-in communication protocols has a direct, significant, and measurable impact on all dimensions of health care quality evaluated in this study, demonstrating the effectiveness of systemic interventions in transforming nursing practices.

5. CONCLUSION

The implementation of the handover communication protocol using the SBAR method in inpatient units has been proven to have a transformative impact on the quality of health services comprehensively. The results showed a dramatic increase in protocol implementation scores from 45.71 ± 2.41 to 87.46 ± 2.03 after one month of intervention, with the highest mastery of the Situation (92.3%) and Background (89.7%) components, while Recommendation reached 83.4% reflecting complex clinical judgment challenges. Significant transformations occurred in all quality indicators, including an increase in communication effectiveness from 2.46 ± 0.51 to 4.43 ± 0.50 with 57.1% of nurses achieving high scores, patient satisfaction

increased from 2.51 ± 0.61 to 3.91 ± 0.74 with 68.6% of patients with high satisfaction, length of stay efficiency with a decrease from 5.89 ± 0.29 days to 4.35 ± 0.23 days (efficiency of 26.1%), and a reduction in adverse events from 3.01 ± 0.23 to 1.16 ± 0.15 per 1000 days of treatment (a decrease of 61, 5%). Statistical analysis confirmed a very significant difference ($p<0.001$) with a large effect size on all indicators, where the implementation of the protocol explained 89.3% variance in communication effectiveness, 76.8% patient satisfaction, 91.2% length of stay, and 94.7% adverse events. Based on these findings, it is recommended that hospital management integrate the SBAR protocol as a permanent operational standard by strengthening the Recommendation component through continuous training, implementation of periodic monitoring systems, development of health information technology, clinical communication mentoring programs, and strengthened interprofessional collaboration to ensure consistency of implementation and sustainability of positive impacts on the quality of health services.

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