Conference Paper

How to Improve Patient Handoff Quality for Ensuring Patient Safety: A Systematic Review

Ronaningtyas Maharani and Hasbullah Thabrany

Study of Hospital Administration, Faculty of Public Health, Universitas Indonesia, Depok, West Java, Indonesia

Abstract

Patient handoff is defined as a transfer and acceptance of responsibility for patient care that is achieved through effective communication. Communication breakdown in handoff procedures can lead to serious impacts in the patient's care, inappropriate treatment, and potential harm to the patient. The aim of this systematic review is to know barriers in handoff process and find strategies to improve patient handoff quality for ensuring patient safety. The current study is systemic review with PRISMA method, retrieved from online databases such as ProQuest and PubMed using keywords 'patient handoff' OR 'patient handover' AND 'patient safety'. The period of the study that has been reviewed is three years backwards. Based on this review, potential barriers that can lead to handoff failure are lack of standardized handoff tool, lack of chances for face-to-face communication and the ability to interactive discussion, and lack of staff training and handoff supervision. Several improvement strategies to increase patient handoff quality based on this review are: implementation of standardized verbal and written handoff protocols, face-to-face interaction with active discussion opportunities, minimal interruptions, accurate and up-to-date information with critical issues highlighted, staff education and training, handoff process supervision, leadership and regulation support. Improvements or impacts on patient safety were only stated in three journals. Barriers in handoff process must be addressed to find recommendation for handoff process improvement. By addressing barriers, patient handoff quality can be increased by several improvement strategies. Further studies are needed to prove the impact of effective patient handoff in reducing sentinel and adverse events.

Keywords: patient handoff, patient safety, handoff barrier

Corresponding Author:
Hasbullah Thabrany
hasbullah.thabrany@yahoo.com

Received: 17 October 2018
Accepted: 5 November 2018
Published: 5 December 2018

Publishing services provided by Knowledge E

Selection and Peer-review under the responsibility of the 2nd ICHA Conference Committee.

1. Introduction

Between the year 1995 and 2006, The Joint Commission in The United States of America reported that breakdown in communication was the leading root cause of sentinel events. Same result were also declared in an analysis of root cause of sentinel events from 2012 through 2014. Problems in patient handoff were also being the most common root cause factor leading to claims in one of USA malpractice insurance agency.

In Australia, from 25.000 to 30.000 preventable adverse events that led to permanent disability, 11% were due to communication failure. This issue was in contrast to 6% due to inadequate skill levels of practitioner [1]. Because of the major impact of the communication failure to patient safety, the Joint Commission decided that patient handoff should be identified as a National Patient Safety Goals. National Patient Safety Goals consist of six goals, which one of them was the effective communication. The goal states that: "the primary objective of a handoff is to provide accurate information about patient's care, treatment, and services; current condition; and any recent or anticipated changes." [2].

A systematic literature review cited that the definition of a successful handoff by The Joint Commission Centre for Transforming Healthcare as:

> a transfer and acceptance of responsibility for patient care that is achieved through effective communication. Information communicated during handoff process is time-sensitive [3]. It means it is a real-time process of passing patient-specific information from one caregiver or team to another to ensure the continuity and safety of that patient's care.

Patient care hand-overs exist in many settings and contexts across the continuum of care, including admission from primary care, inter-unit handoff (handoff between specialities, nursing handoff report), nursing change-of-shift reporting, anaesthesiology reports to post-anaesthesia recovery room staff, emergency department communication with staff at a receiving facility during a patient's transfer, and transition after hospitalization to discharge [1].

Sometimes handoff process occurred in a high risk and high volume environment of patients with highly complex care needs. This intricate process provide much room to error that could potentially lead to life-threatening medical errors. Thus, problems related to patient handoff are an international concern. Many studies have been conducted to find strategy to improve the handoff process. This systematic review was conducted to know barriers in handoff process and find strategies to improve patient handoff quality for ensuring patient safety.

2. Methods

This systematic review used the advanced search features of ProQuest and PubMed electronic database. Journals identified by ProQuest with keywords: patient handoff OR patient handover AND patient safety were 13.865 journals. In the other hand, additional

journals that identified by PubMed with keywords: patient handoff were 829 journals. Thus, there were 14.694 journals that had been identified in the identification phase.

In the next step, searches were restricted to full-text articles in the English or Indonesian language, published from 2012 to 2016. There were also additional phrase or keywords such as 'handoff-related failure' OR 'handoff-related barrier'. From this process, journals were selected from 14.694 to 199 journals. After screened by year, language, and phrase addition, journals were screened by title and abstract reading. This phase resulted 157 journals were excluded because their title and abstract didn't fit to the topic (from 199 to 42 journals). The 42 free full-text articles were assessed to eligibility, 20 articles were excluded because some articles hadn't been published (author's manuscript) and others were not conducted in hospital setting.

The next step was included phase, which from 22 journals has been selected, only 14 articles were included to this systematic review based on the inclusion criteria. The inclusion criteria are:

1. The articles explained about strategy to improve handoff process
2. The articles explained about barriers or challenges during handoff process and how to deal with those barriers
3. The articles explained about handoff process between medical staff (residents, nurses, physicians)
4. The articles contained the impact of handoff process to patient safety (sentinels, adverse invents, near misses or omission events)

Because of this systematic review objective was to find improvements in handoff process quality, so journals that didn't contain about the process' improvements were excluded. The systematic review steps are shown in the Figure 1.

3. Results

From 14 included journals, four journals were conducted by review (systematic literature review, clinical evidence review), three journals were cross-sectional study, six journals were experimental (pre and post interventional) study, and one journal was mixed experimental and cross sectional study. According to the unit or department settings, this review represent multi departments such as paediatric, intensive care, anaesthesia, surgery, internal medicine, nephrology, and neurosurgery. Thus, this review can represent many conditions and complexity in hospital. According to the

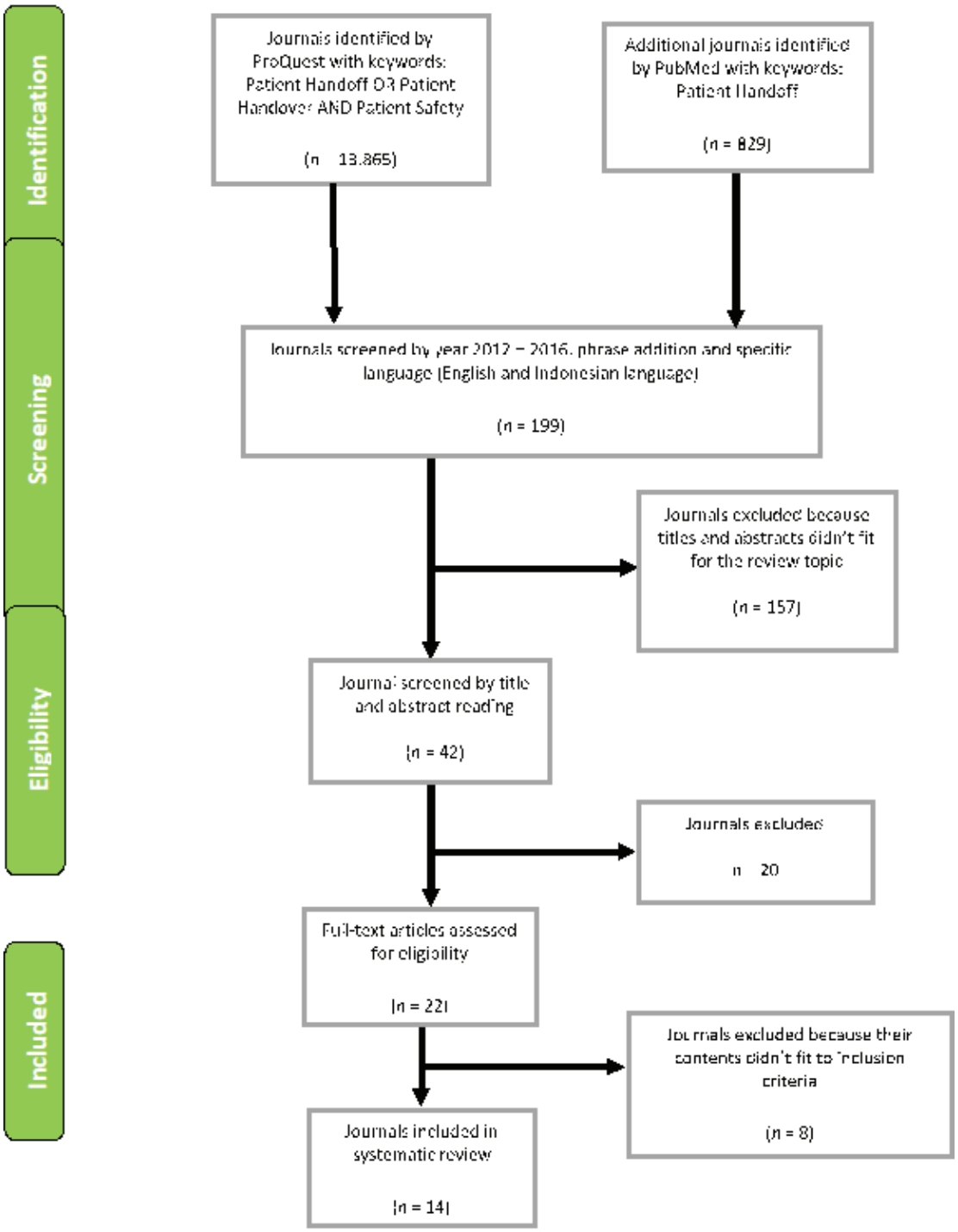

Figure 1: PRISMA flow diagram.

handoff participants, this review contain handoff practices among nurses, residents, and multidisciplinary participants.

Improvements or impacts on patient safety were only stated in three journals. Others were described about barriers in handoff process and interventions that can be

implemented to improve handoff quality and participants' satisfaction on handoff process.

4. Discussion

During a period of hospital care, a patient can receive treatment by several health-care practitioners in multiple settings, including outpatient and inpatient care, emergency care, surgical care, intensive care, and rehabilitation. Patients will have some potentially risks which related to communication or handoff procedures. These potentially risks occurred because patient often move between areas of diagnosis, treatment, and care, and may deal with three shifts of staff each day. Communication's breakdown in handoff procedures between units and between and amongst care teams can lead to serious impacts in the patient's care, inappropriate treatment, and potential harm to the patient [1].

In 2006, The Joint Commission declared National Patient Safety Goals, where effective communication is one of the goals. A successful handoff defined as "a transfer and acceptance of responsibility for patient care achieved through effective communication. It is a real-time process of passing relevant patient information from one caregiver or team to another to ensure continuity and safe patient care." Patient handoff was a critical issue that required further investigation due to risks associated with communication failures of patient information [4]. A well designed and organized handoff process can ensure the safe passage of information to improve the effectiveness of the actions of the receiving participants, thereby enhancing continuity of care [5].

4.1. Barriers in handoff process

Errors in handoff process can lead to communication failure that can impact to missing transfer information and resulted in patient's harm. Barriers in handoff process must be addressed to improve the quality of the process.

The most common reason for incomplete patient handoff that resulted in minor and major harm was that the verbal handoff received didn't contain the most current information about the patient [6]. Inaccurate information in handoff process can be resulted from human factors (knowledge, culture, fatigue), organization culture (lack of teamwork and leadership, blaming culture), lack of training, no standardized tools, patient-related factors, and environment (chaotic environment, noise, high risk and high volume environment, numerous of comorbid conditions) [4, 5]. Other study

stated barriers in handoff process that can prevent successful handoff are lack of staff training, lack of standardization of verbal and written handoff, lack of face to face communication, passive transfer (no chance of interactive discussion), interruptions, time constraints, and failure to identify the sickest patient on the list [6].

No standardized mnemonic verbal and written handoff is the most common barrier in safety passage information. Nine journals from 14 journals reported that standardized handoff can improve the handoff process quality and also improve participant satisfactions on handoff process. A study about perioperative handoff protocol between surgery and anaesthesia residents reported that the standardized handoff protocol have on the dynamics of teamwork. Post-intervention handoff survey showed the mean number of defects per handoff decreased from 9.92 to 3.68. The mean number of missed information items decreased from 7.57 to 1.2 items per handoff for the surgery report and from 2.02 to 0.94 for the anaesthesia report. Nursing technical defects decreased from 0.34 to 0.10. Verbal reports delivery increased from 21.2% to 83.3%. Satisfaction with the handoff improved significantly. This intervention need leadership support and education [7].

Other potential barriers that can lead to handoff failure are lack of chance for face to face communication and ability to interactive discussion [8] reported that after the implementation of shift model that facilitate face to face verbal communication, overall satisfaction with handoff quality measures improved, both verbal and written. Improved satisfaction on verbal handoff process was measured by ability to face-to-face communication, minimal interruptions, and chances to discussion during handoff, identifying the sickest patient and the latest issues. Improved satisfaction on written handoff process was measured by the completion of written handoff content, number of missing information, and identifying the clinical priorities. Significant fewer reported data omissions but non-significant reduction in near misses and no significant difference in adverse events were also reported.

Lack of staff training and handoff supervision and monitoring are also potential barriers to a consistent handoff process [6]. Leadership and regulation support are needed to provide the consistency of handoff training and supervision and to improve the continuity of handoff process [7].

4.2. Recommendation for improvements

There were some commonalities between 14 included journals in this systematic reviews. Several strategy improvements to increase the handoff process quality are:

4.2.1. Implementation of standardized verbal and written handoff protocols

The implementation of standardized mnemonics and tools provide a systematic and consistent handoff process. These are several examples of standardized handoff tools:

1. SBAR - Situation, Background, Assessment, Recommendation
2. I PASS THE BATON – Introduction, Patient, Assessment, Situation, Safety Concerns, Background, Actions, Timing, Ownership, Next
3. Five Ps (option 1) – Patient, Plan, Purpose of plan, Problem, Precaution
4. Five Ps (option 2) – Patient, Precaution, Plan of care, Problems, Purpose
5. SOAP – Subjective, Objective, Assessment, Plan
6. HAND IT – A body system-oriented format and summarization using a patient-case narrative format

In the handoff process, mnemonic tools are very popular methods of communication to ensure that all patient information is transferred [2]. The most commonly mnemonic tools that have been used is SBAR. [9] in their study, compared the implementation of SOAP and HAND-IT as a handoff tools and their impact to handoff efficiency. The handoff efficiency was measured by number of information breakdowns, decision-making breakdowns, and expertise of the clinicians. The study reported that HAND-IT tool support for error detection and recovery (avoiding information and decision-making breakdowns), resilience to breakdowns and support for education and learning. HAND-IT tools fit to junior participants who had lesser experience and expertise, while the SOAP tool led to fewer number of missed problems list items within the senior participants.

Although these mnemonic tools are frequently used among healthcare providers, there is a lack of study or scientific research to investigate the impact of these tools to increase the efficiency of patient handoff [2].

4.2.2. Face-to-face interaction with active discussion opportunities

It has been found that face-to-face communication provide the best form of communication. It provide more opportunity for full interactions, including subconscious verbal cues and body language, and also interactive discussions [2]. Five journals from 14

included journals reported that face-to-face communication is important and needed to ensure the effectiveness and efficacy of patient handoff process. The more direct the handoff, the better. Same perceptions about patient's clinical concerns between the sender and receiver are also important to ensure the continuity of care. This situations occurred when an interactive discussion is allowed. The opportunity of read back and repeat back were needed to support the effective patient handoff, though it may be potentially increase the duration of handoff process [7].

4.2.3. Minimal interruptions during patient handoff

External interruptions and distractions can lead to poor patient information transfer during handoff process. Six journals from 14 included journals stated that interruptions and distractions are the most common barriers that healthcare providers must encounter. [8] also reported that improved satisfaction on verbal handoff process was measured by minimal interruptions. Allocation of sufficient time for communicating important patient information without interruptions wherever possible [1]. This can be implemented if all of the healthcare providers (multidisciplinary participants) have same perceptions about the importance of patient handoff [10].

4.2.4. Accurate and up-to-date information with highlights at some important or critical issues

There are 3 key factors for highly reliable handoff: face to face (2 ways communication), structured written forms, templates, or check list, captures intention content (share specific problems, highlight issue) [5]. To ensure the continuity of clinical decision, the healthcare providers must transfer the information about highlight issue. Issue highlighted prevent patient care delayed because we too busy fulfilled another tasks which is not urgent. Issue highlighted help us to determined patient care priorities [2, 8].

4.2.5. Staff education and handoff training

The success rate of handoff process depend on the perceptions among healthcare providers about the importance of handoff procedures. Thus, staff education and handoff training is a must for ensuring better handoff implementation. Eight journals from

14 included journals reported that lack of education or handoff training was a potential barrier to effective handoff process. An experimental study about training and simulated handoff between anaesthesia residents reported that after the simulated handoff, the communication failure decreased from 29.7% to 16.8%, and decreased further to 13.2% one year after the course. The residents' perceptions about handoff are also improved after the simulation [11]. Thus, handoff training program must be continually conducted to perform a consistent patient handoff [1].

4.2.6. Handoff process supervision

[6] reported that handoff process supervision can improved handoff consistency. Supervisor needed to monitor and evaluate handoff implementation. The existence of supervisor was also increase staff satisfaction in implementation handoff procedures.

4.2.7. Leadership and regulation/policies support

The continuity of the program cannot be established without a firm leadership and clear regulation/policy support [7]. The patient handoff must be conducted in hospital regulation, as the accreditation required by The Joint Commission International. Leadership is the fundamental elements that support effective systems for providing quality care, treatment, and services; the organization culture; systems and policy development; availability of resources; availability of competent staff; and ongoing evaluation of and improvement in performance [12].

The aforementioned strategies of patient handoff improvement, are similar to five elements that identified by The Joint Commission that should be included in every handoff:

1. Interactive communication that allows for the opportunity for questioning between the giver and receiver of patient information
2. Up-to-date information regarding the patient's condition, care, treatment, medications, services, and any recent or anticipated changes
3. A method to verify the received information, including repeat-back or read-back techniques
4. An opportunity for the receiver of the handoff information to review relevant patient historical data, which may include previous care, treatment, and services

5. Interruptions during handoff are limited to minimize the possibility that information fails to be conveyed or is forgotten

Improvements or impacts on patient safety were only stated in three journals. [13] reported rate of overall medical errors decreased 23%, rate of preventable adverse events decreased 30%, rate of near misses and non-harmful medical errors decreased 21%, significant decreases in rates of specific type of medical errors including diagnostic errors, non-preventable adverse events didn't change significantly. This errors reduction occurred without an increase in the time required to complete handoff or a decrease in resident's direct contact time with patient. Table 1 described number of medical errors incidence, preventable adverse events, and medical-error subtypes before and after implementation of standardized verbal and written handoff procedures (I-PASS Handoff Bundle).

Table 1: Incidence of medical errors, preventable adverse events, and medical-error subtypes before and after implementation of the I-PASS Handoff Bundle (Starmer, Spector et al. 2014) [13].

Variable	Before Implementation (N=5516)	After Implementation (N=5224)	P Value
	total no. (no./100 admissions)		
Overall medical errors	1349 (24.5)	981 (18.8)	<0.001
Preventable adverse events	261 (4.7)	173 (3.3)	<0.001
Near misses and nonharmful medical errors	1088 (19.7)	808 (15.5)	<0.001
Medical-error subtype			
Errors related to diagnosis (incorrect, delayed, omitted)	184 (3.3)	111 (2.1)	<0.001
Errors related to therapy other than medication or procedure	112 (2.0)	77 (1.5)	0.04
Errors related to history and physical examination	43 (0.8)	0	< 0.001
Other and multifactorial errors	239 (4.3)	106 (2.0)	<0.001
Medication-related errors	660 (12.0)	580 (11.1)	0.28
Procedure-related errors	83 (1.5)	85 (1.6)	0.49
Falls	13 (0.2)	8 (0.2)	0.37
Nosocomial infections	15 (0.3)	14 (0.3)	0.79

Starmer, Spector et al. (2014) [13] also reported that implementation of standardized handoff tools, such as the I-PASS Handoff Bundle can improve the quality of written and oral handoff. The improvement of written and oral/verbal handoff quality was measured by the percentage of written and verbal handoff that included key data elements related to patient's information and action plans that should be taken. Figure 1 (Figures 2 and 3) and 2 described the increasement of percentage of written and verbal handoff that included key data elements after implementation I-PASS Handoff

Bundle. The improvement of collected key data elements can lead to improvement of patient safety. **After Implementation of the I-PASS Handoff Bundle** [13].

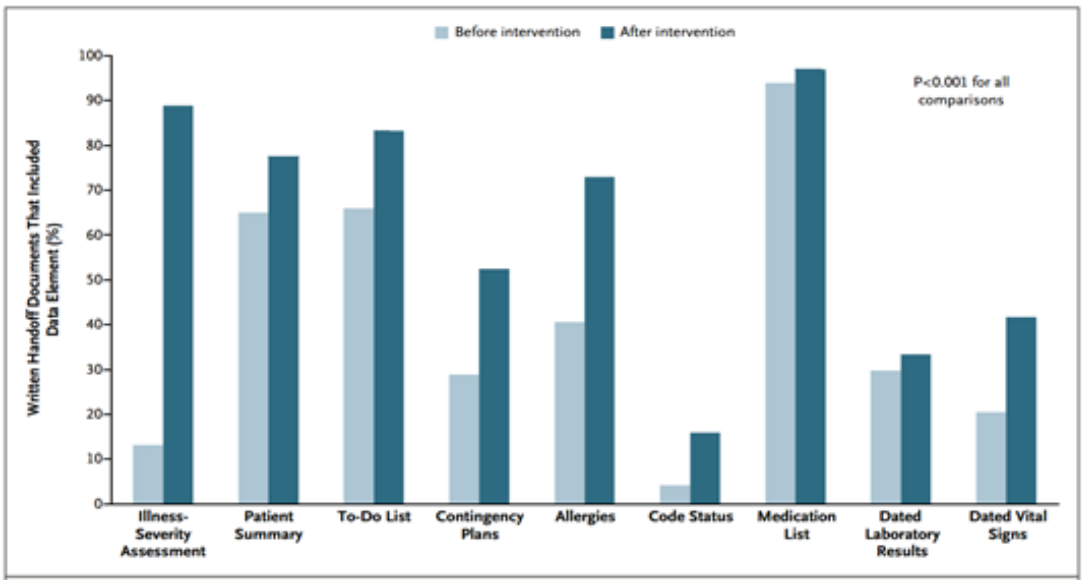

Figure 2: Percentage of written handoff documents that included key data elements before and after implementation of the I-PASS handoff bundle (Starmer, Spector et al., 2014) [13].

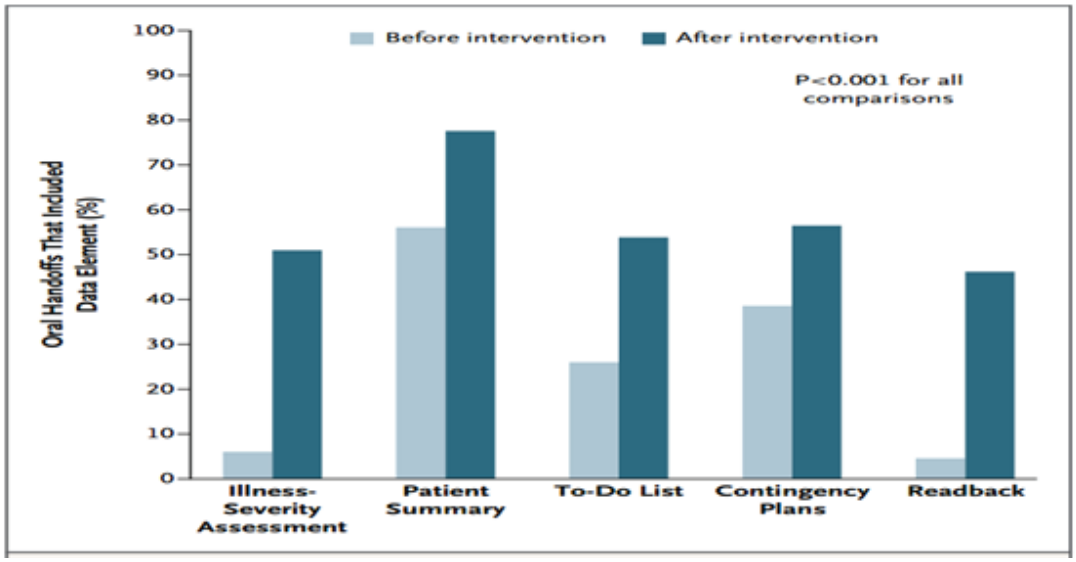

Figure 3: Percentage of oral handoffs that included key data elements before and after.

5. Conclusion

Patient handoff defined as a transfer and acceptance of responsibility for patient care that is achieved through effective communication. Sometimes handoff process occurred in a high risk and high volume environment of patients with highly complex care needs. This intricate process provide much room to error that could potentially

lead to life-threatening medical errors. Barriers in handoff process must be addressed to find recommendation for handoff process improvement.

Some potential barriers that can lead to handoff failure are lack of standardised handoff tool, lack of chances for face to face communication and ability to interactive discussion, and lack of staff training and handoff supervision. Based on the systematic study review, suggested strategies to improve the patient handoff quality are:

1. Implementation of standardized verbal and written handoff protocols
2. Face-to-face interaction with active discussion opportunities
3. Minimal interruptions during patient handoff
4. Accurate and up-to-date information with highlights at some important or critical issues
5. Staff education and handoff training
6. Handoff process supervision
7. Leadership and regulation/policies support

6. Limitation

There are some potential drawbacks although there are countless advantages to standardizing processes. False sense of security can occur following the standardized process. The false sense of security is the sense that they will have successfully completed the process if they simply follow the algorithmic steps. Furthermore, the user may become so focused on completing all the steps of the process, providing useless or irrelevant information in a thorough and organized way, than realize what is most important becomes lost. Standardization should never replace the role of critical thinking and analysis [7, 9].

There is a lack of study or scientific research to investigate the impact of patient handoff in improving patient safety. Further studies are needed to prove the impact of effective patient handoff in reducing sentinel and adverse events.

References

[1] World Health Organization (WHO). (2007). Communication during patient handovers. Patient Safety Solutions, vol. 1, no. 3, pp. 1–4.

[2] Cook, R., Christ, C., Rivera, A. J., et al. (2014). Opportunities for Process improvements in patient handoffs. Proceedings of the Institution of Mechanical Engineers.

[3] Kear, T. M. (2016). Patient handoffs: What they are and how they contribute to patient safety. Nephrology Nursing Journal, vol. 43, no. 4, pp. 339–342.

[4] Kear, T. M. (2016). Continuing nursing education. Patient handoffs in nephrology nurse practice settings: A safety study. Nephrology Nursing Journal, vol. 43, no. 5, pp. 379–400.

[5] Halm, M. A. (2013). Nursing handoffs: Ensuring safe passage for patients. American Journal of Critical Care, vol. 22, no. 2, pp. 158–162.

[6] Saleem, A. M., Paulus, J. K., Vassiliou, M. C., et al. (2015). Initial assessment of patient handoff in accredited general surgery residency programs in the United States and Canada: A cross-sectional survey. Canadian Journal of Surgery, vol. 58, no. 4. pp. 269–277.

[7] Petrovic, M. A., et al. (2015). The perioperative handoff protocol: Evaluating impacts on handoff defects and provider satisfaction in adult perianesthesia care units. Journal of Clinical Anesthesia, vol. 27, no. 2, pp. 111–119.

[8] Graham, K. L., Marcantonio, E. R., Huang, G. C., et al. (2013). Effect of a Systems intervention on the quality and safety of patient handoffs in an internal medicine residency program. Journal of General Internal Medicine, no. 2, pp. 986–993.

[9] Abraham, J., Kannampallil, T., Patel, B., et al. (2012). Ensuring patient safety in care transitions: An empirical evaluation of a Handoff Intervention Tool. Annual Symposium Proceedings, vol. 2012, pp. 17–26.

[10] Solan, L. G., et al. (2014). Multidisciplinary handoffs improve perceptions of communication. Journal of the American Academy of Pediatrics.

[11] Pukenas, E. W., Dodson, G., Edward, R. D., et al. (2014). Simulation-based education with deliberate practice may improve intraoperative handoff skills: A pilot study. Journal of Clinical Anesthesia, vol. 26, no. 7, pp. 530–538.

[12] The Joint Commission. (2010). Advancing effective communication, cultural competence, and patient- and family-centered care: A roadmap for hospitals. Organization, p. 94.

[13] Starmer, A. J., et al. (2014). Changes in medical errors after implementation of a handoff program. The New England Journal of Medicine, vol. 371, no. 19, pp. 1803–1812.