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Nursing Outcomes related to Purposeful Interprofessional Team Interventions

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**Abstract**

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**Objectives.** Effective interprofessional (IP) teamwork and communication are critical to improve quality of patient care and nursing outcomes. IP team interventions are recommended as a strategy to achieve effective teamwork and better work environments. Given the importance of effective IP team functioning, this dissertation consists of three papers aimed to review and investigate the effectiveness of purposeful IP team interventions on nursing outcomes. The first paper is a systematic review of current IP team intervention studies that examined the effects of IP team interventions on outcomes related to nursing and IP team including nurses. The other two papers are part of a larger study that involved the implementation and evaluation of a purposeful IP team intervention at an academic medical center in the Pacific Northwest. Specifically, the aim of the second paper is to explore nurses' experiences and perceptions following the purposeful IP team intervention. The third paper aims to examine the effectiveness

of the purposeful IP team intervention focused specifically on nurse job satisfaction and retention pre-and post-intervention.

**Methods.** In the first paper, a systematic search of PubMed, CINAHL, PsycINFO, and Embase was conducted using Boolean searching techniques and key search terms; 41 articles published between 2011 and 2016 were included for the final review. The second paper conducted a qualitative methods analysis of three focus group interviews among registered nurses. The third paper conducted a comparative cross-sectional study design using quantitative job satisfaction data and turnover data pre-and post-intervention.

**Results.** The first paper provided a broad overview of various types of IP team interventions, and assessment methods commonly used, and included outcomes related to nursing, IP team, and patients. The findings revealed that the majority of the included studies were rated as low methodological quality. In the second paper, six interrelated themes were emerged from focus group interviews: (1) interprofessional team building, (2) psychological safety and cultural change, (3) efficiency in delivery of care, (4) quality of patient care, (5) job outcomes, and (6) team challenges. The third paper revealed that nurse job satisfaction was significantly improved, and nurse turnover was slightly decreased following the IP team intervention.

**Conclusions.** Results from the first paper indicate that there needs to be improvement in methodological approaches to effectively evaluate effects of IP team interventions on team performance and nursing outcomes. Results from the other two papers suggest that ongoing coaching and team strategies need to be considered to maintain improved changes and to overcome the barriers to the implementation of the IP team intervention. In addition, efforts of organizational leadership to promote nurse job satisfaction and retention through improved

interprofessional team functioning need to be considered to directly and indirectly promote patient delivery of care and patient outcomes in healthcare.

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## **DEDICATION**

To my loving husband, Jonathan Bok, and my family in South Korea  
giving me endless love, trust, and encouragement

To my God who is my shepherd and always leads me beside quiet waters  
I want to live in His love and grace forever.

## **General Introduction**

The importance of a highly functioning healthcare team has garnered attention over the past decade as a strategy to enhance the delivery of efficient care, reduce healthcare costs, and improve patient safety and outcomes (Grumbach & Bodenheimer, 2004; Young, et al., 2011). Yet, a high-performing team that consists of two or more professionals from different disciplines is not a natural or an automatic result of team members working together (Salas et al., 2005; Alonso, et. al., 2006). Rather, interprofessional (IP) teams require intentional effort to enhance collaborative relationships and pursue shared goals (Alonso, et. al., 2006). Moreover, in order to achieve effective teamwork, overcome professional silos, and resolve conflicts at the workplace, IP team interventions including IP team training and team strategies are recommended to be considered (Joint commission, 2004).

Effective IP teamwork and communication have been considered as significant factors in improving nurse outcomes and quality of care in clinical settings (Chang et al., 2009; Ma, Shang, & Bott, 2015). Nurses play a pivotal role as the main patient caregivers at the bedside and collaborate with other healthcare professionals, patients, and families across the continuum of care (Miller & Apker, 2002). When IP healthcare teams have good relationships and communicate effectively with each other, nurses working in this environment experience efficient workflow for patient care (Ma, Shang, & Bott, 2015). As a result, high-performing teams allow nurses to deliver better patient care and to be more satisfied with their job, and are more likely to stay at their job (Sharma & Klocke, 2014).

However, although nurses have an important role in an IP team for patient care and directly help improve the delivery of care and patient outcomes, there has been little research that focuses specifically on examining outcomes of bedside nurses following IP team interventions.

To fill this gap, this dissertation included three papers that reviewed and investigated the effectiveness of a purposeful IP team intervention on nursing outcomes. To achieve a broad perspective on characteristics of IP team interventions and their outcomes specific to nursing and/or IP team (including nurses), the first paper of this dissertation aimed to systematically review current team intervention studies that examined the effects of IP team interventions on outcomes related to nursing and/or IP team. A search of PubMed, CINAHL, PsycINFO, and Embase databases was conducted; a total of 41 articles published from 2011 to 2016 were included for the final review. This review study provided a broad overview of various types of IP team interventions, and assessment methods commonly used, and included outcomes related to the IP team (including nurses) and patients. The results of this study revealed that the quality assessment of the included studies was generally low and that there needs to be improvements in methodological approaches.

Based on the overview of current IP team interventions and their outcomes related to nursing and/or IP team in the first paper, we chose to focus specifically on exploring nurses' experiences and perceptions following a purposeful IP team intervention for the second paper. This study was part of a larger study that involved the implementation and evaluation of the purposeful IP team intervention (a 4-hour TeamSTEPPS® training and structured interprofessional bedside rounds - SIBR) at an academic medical center in the Pacific Northwest. This study conducted a qualitative methods analysis of three focus groups among registered nurses (RNs = 10) working in the cardiothoracic surgery-telemetry unit. We identified six interrelated themes: (1) interprofessional team building, (2) psychological safety and cultural change, (3) efficiency in delivery of care, (4) quality of patient care, (5) job outcomes, and (6) team challenges. Notably, RN participants reported that they could better understand the

patient's care plan of the day because every team member was "*on the same page at the same time*". Participants also reported that they were more satisfied with their job because of improved IP team performance, enhanced psychological safety and cultural change, efficient workflow, and better quality of patient care.

Based on nurses' improved perceptual and behavioral changes following the IP team intervention in the second paper, we chose to focus specifically on examining changes in nurse job outcomes such as job satisfaction and retention pre-and post-intervention for the third paper. This study was part of a larger study that implemented and evaluated a purposeful IP team intervention (a 4-hour TeamSTEPPS® training and SIBR process). This study conducted comparative cross-sectional study design, and the sample population was RNs who care for patients with cardiovascular diseases in the cardiothoracic surgery-telemetry unit. This study indicated that nurse job satisfaction was significantly improved, and nurse turnover was slightly decreased following the IP team intervention. This study also revealed that the implementation of the SIBR process was more beneficial to increasing nurse job satisfaction than the TeamSTEPPS® part of the training.

Overall, results from these papers indicated that the purposeful IP team intervention had a positive effect on IP team functioning, delivery of care, and nursing outcomes. To sustain the improved perceptual and behavioral changes, team strategies to improve workflow and communication need to be considered. Moreover, efforts by individuals within the organization and by organizational leadership that values IP teamwork and supports a culture of safety need to be considered to improve interprofessional collaborative practice and patient outcomes.

## References

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## PAPER ONE

### **Effect of interprofessional team interventions on nursing and team outcomes: A systematic literature review**

#### **Abstract**

**Objectives.** Effective interprofessional (IP) team-based care is critical to enhance the delivery of efficient care and improve nursing and IP team outcomes. This study aims to systematically review current IP team intervention studies that utilized quantitative, qualitative, or mixed methods approach and examined the effect of IP team training or team strategies on nursing and IP team outcomes.

**Methods.** A systematic search of PubMed, CINAHL, PsycINFO, and Embase was conducted using key search terms: inter-and multi-professional/disciplinary, team training, team strategy, and nursing or IP team outcomes. Based on inclusion and exclusion criteria developed by an iterative process, 41 articles were included for the final review. We extracted data on the characteristics of the included studies, IP team interventions, assessment methods, and their outcomes related to nursing and/or IP team (including nurses). The quality of the included articles was assessed using a reliable quality appraisal tool.

**Results.** We found that the majority of the included studies conducted IP team training using TeamSTEPPS® training and CRM training, followed by the implementation of IP team strategies using IP rounding, team meetings or huddles. The most common outcomes measured were attitudes or perceptions about IP teamwork or communication, followed by patient related outcomes. Our findings also revealed that the quality assessment of the included studies was generally low and that there needs to be improvements in methodological approaches.

**Conclusion.** This study provided a broad overview of various types of current IP team interventions, assessment methods commonly used, and included outcomes related to the IP team (including nurses) and patients. The findings from this study will contribute to the accumulating attributes of current IP intervention studies and the supporting evidence for better interprofessional collaborative practice.

## **Introduction**

Effective interprofessional (IP) team-based care is critical to enhance the delivery of efficient care, reduce healthcare costs, and improve patient safety and outcomes (Institute of Medicine {IOM}, 2015). Yet, a high-performing IP team that consists of two or more professionals from different disciplines is not a natural or an automatic result of team members working together (Salas et al., 2005; Alonso, et. al., 2006). Rather, IP teams require intentional effort to enhance collaborative relationships and pursue shared goals (Alonso, et. al., 2006). Effective IP teamwork requires mutual respect, trusting relationships, effective communication, and a shared understanding of each team member's roles and responsibilities within and across team members (Baker, Gustafson, Beaubien, & Salas, 2005).

Given the importance of effective team functioning, IP team interventions are recommended as a strategy to overcome professional silos, resolve conflicts at the workplace, and enhance patient safety (Joint commission, 2004). In accordance with this recommendation, numerous studies have investigated various types of IP team training such as Team Strategies and Tools to Enhance Performance and Patient Safety (TeamSTEPPS<sup>®</sup>) (James, et al., 2016) and crew resource management (CRM) (Bunnell, et al., 2013), as well as the implementation of team strategies such as IP rounds (Bahr, et al., 2016), huddles (Newman, et al., 2015), debriefing (Berg, et al., 2014), and team meetings (Jones, et al., 2011). The IP team intervention studies have measured outcomes such as IP teamwork (Bunnell, et al., 2013), collaboration (Newman, et al., 2015), communication (Bunnell, et al., 2013; James, et al., 2016; Bahr, et al., 2016), quality of patient care (Jones, et al., 2011; Bunnell, et al., 2013), efficiency (Bunnell, et al., 2013), team culture (James, et al., 2016), and job related outcomes (Jones, et al., 2011).

Nurses as bedside caregivers are considered important members of an IP team in integrating other healthcare providers and patients and families across the care continuum (Miller & Apker, 2002). Effective care practices of nurses include enhancing efficiency in care delivery and improving team and patient outcomes (Chang, et al., 2009). Improved team functioning has a significant and positive effect on nursing outcomes such as job satisfaction, retention, and nurse-reported quality of care (Chang et al., 2009; Ma, Shang, & Bott, 2015). Thus, it is essential to examine IP team training and team strategies on improving outcomes specific to nurses or IP teams that include nurses.

A review of a number of IP team intervention studies is needed to draw evidence of the impact of purposeful IP team training and team strategies in healthcare settings on nursing and IP team outcomes. There have been review studies that synthesized the effects of IP team interventions on IP team and patient related outcomes (Reeves, et al., 2010; Reeves, et al., 2011; Broyles, et al., 2013; Reeves, et al., 2013; Körner, et al., 2016). Reeves, et al. (2013) reviewed 15 IP intervention studies including randomized controlled trial studies, controlled before and after studies, and interrupted time series studies to assess the effectiveness of IP team interventions compared to no intervention on team behavior and patient outcomes. These authors found that most included studies produced positive outcomes related to IP team functioning and patients. Körner, et al. (2016) also reviewed 23 studies published between 2002 and 2014 by analyzing key features of IP teamwork from 9 descriptive studies, and synthesizing characteristics of IP team interventions and their outcomes from 14 intervention studies. These authors found that the intervention programs of the included studies were complex, but had positive effects on teamwork, patients, and organizations. However, there have been few systematic reviews synthesizing IP team intervention studies that: a) utilized quantitative, qualitative, or mixed

methods approach, b) were published between 2011 and 2016, and c) focused on outcomes specific to nursing and IP teams in clinical settings. Moreover, few reviews of IP team intervention studies evaluated the quality of the included studies (Reeves, Palaganas, & Zierler, 2017). Therefore, this systematic review will synthesize and analyze IP team intervention studies published between 2011 and 2016 that used quantitative, qualitative or mixed methods approach, and examined the effect of IP team training or team strategies (e.g., rounding, huddles, debriefing, team structure changes, etc.) on nursing and IP team outcomes. In addition, this study will evaluate the quality of the final included studies in order to understand current knowledge and suggest future directions.

## **Methods**

### ***Search Strategy***

A search of the literature utilizing the following electronic databases: PubMed, Cumulative Index to Nursing and Allied Health Literature (CINAHL), PsycINFO, and Embase was conducted. The search strategies were developed in consultation with a health science's librarian at University of Washington (UW) and the searches used MeSH terms, thesaurus, and free text terms. Boolean searching techniques using "AND" and "OR" included the following search terms: inter-and multi-professional/disciplinary, team training, team strategy, and nursing or team outcomes. More detailed search terms used for each database are outlined in Appendix A.

### ***Inclusion/Exclusion Criteria***

Studies were included if they met the following criteria: (1) published between January 2011 to December 2016, (2) written in English, and (3) published in peer-reviewed journals. In addition, studies were also included if all of the following statements below were true:

- (a) the study described a post-licensure healthcare team consisting of nurses and other healthcare providers who participated in an IP team intervention;
- (b) the IP post-licensure healthcare team worked together as a team on the same unit, service line or clinical area, or health system;
- (c) the study included an IP team intervention, such as purposeful team training, introduction of new team processes or changes in team structures (e.g., TeamSTEPPS training and CRM training, IP rounds, briefs, huddles, debrief, and team meetings, use of checklist of it involved how the team communicated/functioned); and
- (d) the study included nursing and/or IP team outcomes (e.g., teamwork, communication, collaboration, team performance, psychological safety, team culture, efficiency, quality of patient care, satisfaction, retention).

Discussion papers, literature reviews, editorials or dissertations were excluded in this review study. Studies were also excluded if any of the below statements were true:

- (a) the study included only pre-licensure students or trainees for an educational purpose (e.g., interprofessional education activity);
- (b) participants were random healthcare providers who trained together at a conference but not as a team (e.g., continuing medical education activity);
- (c) the team intervention only included a single profession; or
- (e) the study described perceptions, attitudes, mutual agreement, or quality of team training, a team strategy or process but not nursing or IP team outcomes (e.g., perceptions or effectiveness of tools, perceptions about quality use of a checklist, levels of interest/attention in the intervention).

Our research team developed a checklist of the inclusion and exclusion criteria and used an iterative process to review and score abstracts and then full-text articles (See Appendix B).

### ***Search Process and Outcomes***

The initial search yielded 1,096 articles from four electronic databases (See Figure 1). Of the 1,096 articles, 451 articles were duplicates and removed. Titles of the remaining 645 articles were screened for relevance by the PI (DB) based on the inclusion/exclusion criteria. During this process, 581 articles were excluded; thus, a total of 64 articles were included. To improve inter-rater reliability, abstracts of the 64 articles were reviewed by four researchers (DB, BZ, MW, and EB). All four researchers met and discussed abstracts to reach an agreement when there were different opinions about included/excluded articles. The agreement after reconciliation was 100%. During this abstract review process, 8 articles were excluded leaving 56 articles for further examination. Out of the 56 included articles, 8 articles were labeled “questionable” by several of the reviewers because the abstracts of the 8 articles did not provide enough information to make a decision (include or exclude); therefore, they required a full-text review to explicitly assess whether they should be included or not (See Figure 1).

Following the abstract screening, all 56 full text articles were reviewed by the PI using the checklist describing the inclusion/exclusion criteria (Appendix B). For inter-rater reliability, four research team members (BZ, MW, EB, and NW) were divided into two teams, and then each of the two teams independently reviewed 12 articles (4 out of the 8 questionable articles and 8 randomly selected unique articles) using the checklist (See Figure 2). Thus, 40 of the 56 full text articles (71%) were commonly reviewed by five research team members, including the PI. When there were different opinions or uncertainty about included/excluded articles, the research teams discussed immediately; and agreement after reconciliation was 100%. After the full text

review, additional 15 articles were excluded leaving 41 articles for inclusion in the final review (See Figure 1).

### ***Quality Appraisal***

All identified studies were evaluated for quality utilizing the Mixed Methods Appraisal Tool (MMAT) developed at McGill University (Pluye, et al., 2011; See Appendix C), which is a reliable tool used via an iterative process (Pace, et al., 2012). The MMAT provides a useful set of guidelines for concomitantly appraising methodological quality of qualitative, quantitative, and mixed methods studies (Pluye, et al., 2011). This tool includes three components for each type of studies and consists of four criteria for qualitative and quantitative components and three criteria for a mixed methods component. This tool gives a score for each study using descriptors such as \*, \*\*, \*\*\*, \*\*\*\*, and ranging from 25% scores (\*) to 100% scores (\*\*\*\*). For qualitative and quantitative studies, for example, if one criterion is met, the score is 25%. If all four criteria are met, the score is 100%. When a mixed methods component is used, if one criterion is met, the score is 50%. If two criteria are met, the score is 75%, and if all three criteria are met, the score is 100%. Specifically, the quality of a mixed methods study is assessed using qualitative, quantitative, and mixed methods components. The quality score for a mixed methods study is decided by the lowest score obtained among the three-scored components. To effectively describe the quality appraisal of the included studies, the studies rated with 25% to 50% scores will be deemed “low quality” and studies with 75% to 100% scores as “high quality.”

### ***Data Extraction and Synthesis***

A data abstraction tool was developed using an iterative process to document the key elements in the reviewed studies (see Appendix D). The following data were extracted from 41 articles in the final review: (1) author, (2) study aim, (3) year of publication, (4) country, (5) study design, (6) type and number of participants, (7) study setting, (8) characteristics of IP team

training or team strategies described, (9) assessment methods, and (10) outcomes related to nursing, IP team, or patients. For inter-rater reliability, the PI of this study extracted data from all 41 articles, and a trained coder (MV) independently extracted data from a random sample of 20% of the articles (8 articles). The two coders compared data extracted from 8 articles and agreement was reached prior to final analysis.

## **Results**

### ***Study Information***

The publication years of the included studies were evenly distributed between 2011 to 2016. Many studies (n = 9, 22%) were published in 2016, followed by studies published in 2011 and 2015 (n = 8, 20%, respectively; See Table 1). The majority of the studies were conducted in the US (n = 31, 76%) followed by European countries such as UK, Denmark, Netherlands, and Sweden (n = 7, 17%). Quantitative studies (n = 33, 81%) were the most common methodological approach of the included studies, followed by mixed methods studies (n = 5, 12%) and qualitative studies (n = 3, 7%). All quantitative studies utilized a quasi-experimental study design. Specifically, the majority of the studies utilized a one group pretest and posttest design (n = 22, 67%), followed by other study designs such as posttest-only comparison group design and interrupted time series studies (n = 6, 18%), and one group posttest only design (n = 5, 15%). The majority of the included studies were conducted on an inpatient unit (n = 35, 85%); in particular, the studies were implemented at acute care settings, such as intensive care units (ICU), emergency rooms (ER), operating rooms (OR), and oncology units (n = 33, 94%).

### ***Description of Participants***

The number of participants in the included studies varied widely, ranging from 23 to 670. Two studies did not report a specific number of participants. Based on the inclusion criteria of

this review study, all reviewed studies were required to involve more than two professions including nursing at a minimum. All included studies involved participants from nursing and medicine. Most studies included participants from four or more professions (n = 16, 39%), followed by two professions (n = 14, 34%) and three professions (n = 11, 27%; see Table 2). Participant demographic information (e.g., age, gender, education) was reported in 14 studies (34%).

### ***IP Team Interventions***

More than half of the included studies (n = 25, 61%; See Table 3) reported employing conceptual frameworks or team functioning related theories (e.g., TeamSTEPPS, CRM, Kotter's change theory) to guide their IP team interventions. The included studies reported multiple IP team interventions including team training and team strategies. The majority of the studies (n = 29, 71%) conducted IP team training, followed by the implementation of IP team strategies (n = 12, 29%). Of the 29 studies conducting IP team training, 14 (48%) implemented TeamSTEPPS training, followed by CRM training (n = 9, 31%); however, these studies were conducted modifying the TeamSTEPPS training or CRM training. In order to improve IP team structures and team processes leading to efficient care delivery and improved patient outcomes, 12 studies implemented various team strategies using IP rounding (n = 4, 33%), IP rounding and rounding checklist (n = 4, 33%), rounding checklist (n = 1, 8%), IP rounding and team meetings (n = 1, 8%), debriefing (n = 1, 8%), and huddles (n = 1, 8%).

The majority of the included studies provided participants with IP team interventions as a one-time event (n = 27, 66%) such as TeamSTEPPS training, followed by the implementation of daily team strategy practices such as IP rounding and huddles (n = 11, 27%). The most common duration of the one-time activity training ranged from 1 hour to 6 hours (n = 18, 62%).

### ***Outcomes and Assessment Methods***

The most common outcomes measured were attitude or perceptions about IP teamwork or communication from IP team interventions (n = 37, 90%; Table 4), followed by patient related outcomes such as patient satisfaction, length of stay and mortality (n = 11, 27%), and knowledge or skills about IP competencies or communication (n = 11, 27%). Behavioral changes (n = 8, 20%) such as changes in IP team communication and teamwork were ranked as the fourth most frequent outcome, followed by the change in organizational practice such as organizational learning and improved hospital safety culture (n = 7, 17%).

To measure nursing or IP team outcomes, surveys of individuals were most commonly employed (n = 34, 83%; See Table 4), followed by observations of IP teams (n = 13, 32%), administration data from the health organization (n = 7, 17%), interviews and focus groups (n = 6, 15%), and debriefing (n = 2, 5%). Patient outcomes were most commonly assessed using administration data (n = 9, 22%) from the health organization, followed by survey questionnaires (n = 2, 5%) and interviews (n = 1, 2%).

More than one-quarter of the included studies (n = 11, 27%) reported evidence on both reliability and validity of the quantitative instruments or qualitative methodologies utilized. Of the 41 included studies, 15 (37%) reported evidence on reliability (e.g., Cronbach's alpha, Cohen's kappa, member checking) and 12 (30%) provided validity evidence (e.g., content validity, face validity, convergent validity). Specifically, none of the mixed methods studies completely provided information on the reliability and validity of both quantitative instruments and qualitative methods because the studies did not report evidence on reliability and/or validity of the qualitative methodologies.

### ***Quality of Appraisal***

In this review, more than three-fourths of the included studies (n = 31, 76%) were rated as “low quality” and only 10 studies (24%) were rated as “high quality” (Table 5). Most studies had methodological quality scores of 25% (n = 16, 39%), followed by 50% quality score (n = 15, 37%), 75% quality score (n = 9, 22%) and 100% quality score (n = 1, 2%).

The thirty-three quantitative studies had a broad range of quality scores between 25% and 100%; most quantitative studies (n=13, 39%) had a score of 50%, followed by a score of 25% (n=12, 36%, Table 5). Moreover, the majority of the quantitative studies (n = 29, 88%) had a problem with selection bias because the studies were conducted in a certain unit or health organization for the purpose of quality improvement and were therefore, not generalizable. Although measurements of most quantitative studies (n = 32, 97%) were justified and appropriate for answering the research question, only nine studies (27%) reported both reliability and validity of the instruments used. Approximately, three-fourths of the quantitative studies (n = 24, 73%) reported response rates to the questionnaires/surveys; and 20 of the 24 studies had a response rate of 60% or higher.

With regards to the quality assessment of the mixed methods studies, four of five studies had scores of 25% and one had a score of 50% (Table 5). Specifically, three out of four studies with low (25% scores) resulted from low scores in the qualitative score sheet among the three score sheets (mixed methods scoring included a score for each method - quantitative, qualitative and mixed methods overall). Out of three qualitative studies, two studies had 75% scores and one study had 50% scores.

## **Discussion**

In this review, we synthesized and analyzed the 41 included studies published between 2011 and 2016 that examined effects of IP team training or team strategies on nursing and IP

team outcomes. We focused on studies that involved more than two professions including nursing at a minimum, and that used qualitative, quantitative or mixed research methods approaches. This review provides a broad overview of various types of IP team interventions, assessment methods commonly used, and included outcomes related to nursing and IP teams.

The results of this review found that most study settings where the IP intervention took place occurred at an inpatient setting, such as an ICU, OR, and ED. This finding is not surprising because healthcare providers who work in acute care settings often face emergent medical situations that require timely communication and effective teamwork. Moreover, IP teamwork in acute care settings is required for effective leadership and mutual support to promptly achieve a shared mental model (Salas, Sims, & Burke, 2005; Powell, 2010). In addition to the importance of effective teamwork processes in acute care settings, it is also essential to achieve improved team functioning and efficient delivery of care in all areas to enhance patient health outcomes across the care continuum. Historically, researchers have concentrated on examining IP team interventions and their outcomes in acute care settings because that is where they have first noticed the importance of effective team performance (Salas, Sims, & Burke, 2005). However, it is necessary to investigate IP team functioning and delivery of patient care in other equally important care settings, particularly in light of Accountable Care Organizations (ACOs) managing chronic illness outside the hospital. Thus, future studies need to examine the effectiveness of IP team interventions on nursing and IP team outcomes across diverse care settings such as community healthcare settings, primary care clinics, and long term care facilities to better understand how IP team interventions affect nursing and IP team outcomes.

The results of this study revealed that the quality assessment of the included studies was generally low and that there needs to be improvements in methodological approaches. The lack

of descriptive details and methodological rigor weakened the effectiveness of measuring the impact of IP team interventions on IP team and patient outcomes. We found three main methodological limitations in the current IP team intervention literature: (1) lack of consistency in describing methodological details; (2) few longitudinal study designs and no randomized controlled trial (RCT) designs to detect the effectiveness of the IP team interventions; and (3) minimal examination of methodological rigor such as the reliability and/or validity of evaluation instruments and qualitative methodology. First, studies of this review inconsistently reported descriptive details in their methods section. This finding was supported by previous review studies that noted the same methodological weakness (Abu-Rish, et al., 2012; Brashers, et al., 2015; Reeves, Palaganas, & Zierler, 2017). Through this current review, we found that this limitation has not been improved. Specifically, this review study revealed insufficient details about population samples, settings, response rates to the questionnaire surveys, and durations and frequencies of IP team interventions. Few studies clearly described the rationale for the duration and frequency of IP team interventions. The inadequate descriptions of methodological components in the studies made it difficult to measure the effectiveness of the IP team interventions. Thus, there needs to be conscious efforts for both researchers and editors of journals to completely report descriptive details in the study methods. This recommendation was supported by the Consensus Committee in the 2015 IOM report *Measuring the Impact of Interprofessional Education on Collaborative Practice and Patient Outcomes* (IOM, 2015).

Second, the majority of the included studies conducted a one group, pre-posttest design partly because the purpose of the IP team intervention was to improve quality of care within a particular unit or organization. Quasi-experimental study designs limit the ability to draw causal relationships between IP team interventions and outcomes. Pre-posttest designs make it difficult

to detect whether improvements resulted from IP team interventions or other confounding factors (IOM, 2015). As recommended in previous review studies (Reeves, et al., 2010; Abu-Rish, et al., 2012; Brashers, et al., 2015), robust and well-designed RCT and longitudinal studies need to be considered to accurately detect the effectiveness of IP team interventions on outcomes related to IP team and patients.

Third, the absence of methodological rigor in the study weakens the connection between IP team interventions and their effects on outcomes related to IP team and patients.

Approximately, three-fourths of the included studies did not report reliability and validity of evaluation instruments and qualitative methodology. Moreover, all mixed methods studies in this review failed to provide evidence of qualitative methodological rigor. Although there are many benefits from a mixed methods approach in providing rich descriptions by achieving great understanding about what and how of IP team interventions and their outcomes (Reeves, et al., 2010; Reeves, et al., 2013), if few mixed methods studies examine the rigor of qualitative methodology, the findings from these studies will continue to be problematic. Thus, further studies need to verify reliability and validity of evaluation instruments, as well as qualitative methodological rigor to draw explicit evidence about IP team interventions and their outcomes.

We focused on analyzing the various types and frequency of outcomes specific to nursing and IP teams measured in the included studies but did not specifically describe whether IP team interventions had a positive effect on the outcomes. Even if we reveal that most included studies had improved nursing and IP team outcomes after IP team interventions, the impact of IP team interventions should be cautiously interpreted and might remain unsure until we analyze more rigorous studies. Thus, as described above, we emphasize that conducting rigorous and well-designed IP team intervention studies is vital to better analyze and draw explicit effects of IP

team interventions from the included studies.

This review study has several limitations. First, although our research team has experience in researching IP team interventions and developed a data extraction tool and coding process, because of a lack of consultation with external experts, our research team might have missed important IP characteristics of the included studies. Second, this review included only studies published in English; thus, this review might have a somewhat limited scope of IP team intervention literature. Third, the search strategy and four electronic databases used for this review could have the potential for selection bias. Thus, further studies are required to utilize other search strategies and various databases related to health care in order to better understand IP team interventions and their effects on outcomes related to nursing and IP team by capturing more of the studies available in this research area.

### **Conclusion**

We systematically reviewed current (2011-2016) intervention studies aimed to evaluate the effects of IP team training or team strategies on outcomes specific to nursing and IP teams that included nurses. This review described findings from the included studies by extracting data about characteristics of the studies and assessing methodological quality. The findings from this review will contribute to the accumulating attributes of current IP intervention studies and the supporting evidence for effective interprofessional collaborative practice. As previous review studies revealed, methodological limitations were commonly found in this review. Thus, we recommend that authors report methodological details and verify methodological rigor to better understand team functioning processes, mechanisms and outcomes related to nursing and IP teams of IP team interventions.

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Figure 1.

Process Flow for Literature Review

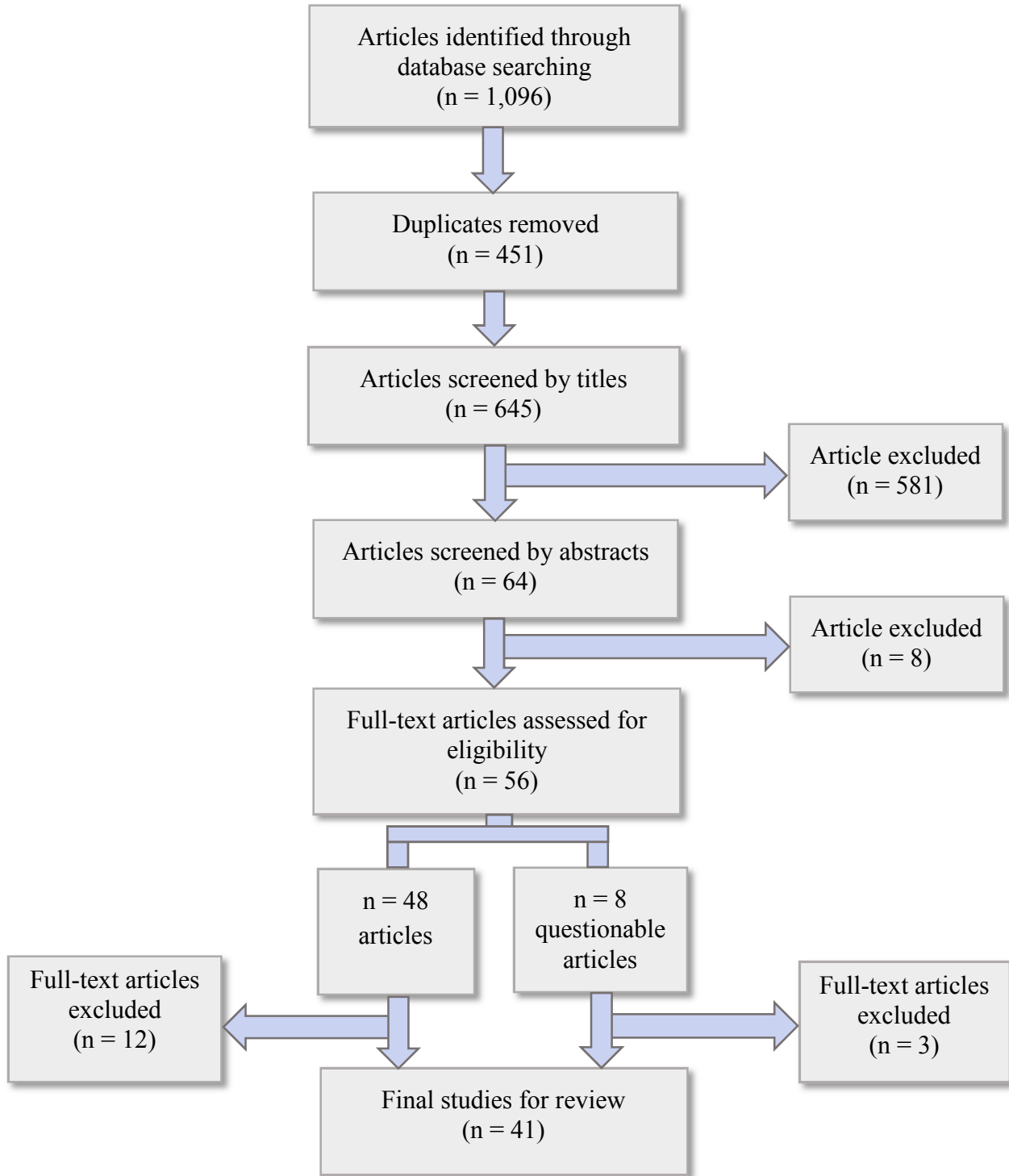


Figure 2.

Research Teams for Inter-Rater Reliability

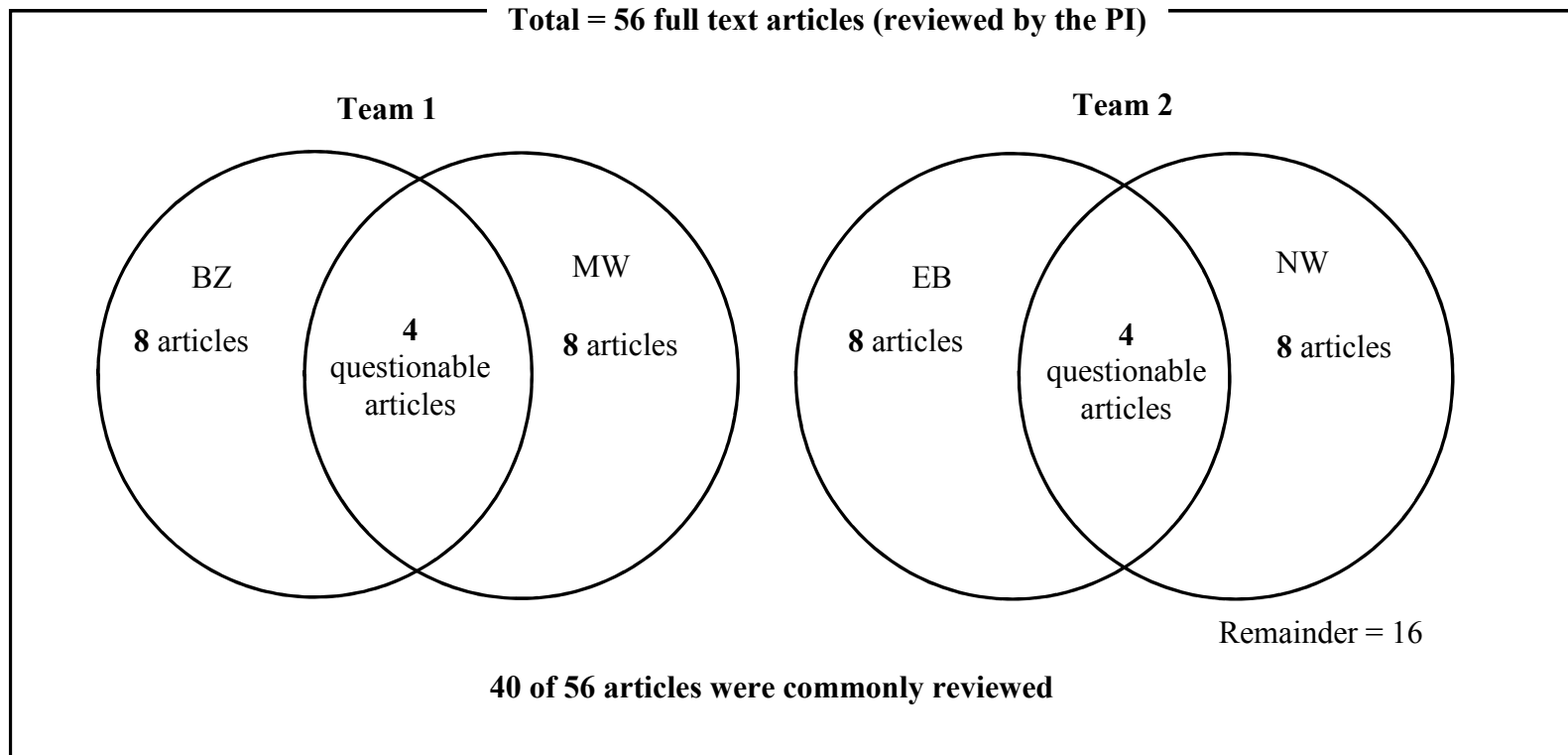


Table 1.

## Study Information of Included Studies

Study information of included studies (n = 41)		
Category	No.	%
Publication year		
2011	8	19.5%
2012	3	7.3%
2013	7	17.1%
2014	6	14.6%
2015	8	19.5%
2016	9	22.0%
Country		
United States	31	75.6%
Europe (e.g., UK, Sweden)	7	17.1%
Other (e.g., Hong Kong)	3	7.3%
Study design		
Quantitative study (quasi-experimental study)	33	80.5%
One group pretest and posttest design	22	66.7%
One group posttest only design	5	15.2%
Other	6	18.2%
Mixed methods study	5	12.2%
Qualitative study	3	7.3%
Study setting		
Inpatient unit	35	85.4%
Acute care setting (e.g., ICU, ER, OR)	33	94.3%
Other (e.g., urology unit)	2	5.7%
Outpatient unit (adult oncology)	1	2.4%
Community (primary care medical home)	1	2.4%
Not addressed types of clinics or specific units	4	9.8%

Table 2.

Description of Participants

Description of participants (n = 41)		
Category	No.	%
Professions represented		
Four professions or more	16	39.0%
Two professions	14	34.1%
Three professions	11	26.9%
Demographics reported		
No	27	65.9%
Yes	14	34.1%

Table 3.

## Characteristics of Interprofessional Team Interventions

Interprofessional Team Interventions (n = 41)		
Category	No.	%
Theoretical or conceptual framework		
Yes	25	61.0%
No	16	39.0%
Types of IP team interventions		
IP team training	29	70.7%
TeamSTEPPS training	14	48.3%
CRM training	9	31.0%
Other team training	6	20.7%
IP team strategies	12	29.3%
IP rounding	4	33.3%
IP rounding + Rounding checklist	4	33.3%
Rounding checklist	1	8.3%
IP rounding + Team meeting	1	8.3%
Debriefing	1	8.3%
Huddles	1	8.3%
Frequency of team interventions		
One-time activity training (e.g., TeamSTEPPS, CRM training)	27	65.9%
Daily (e.g., IP rounding, huddles)	11	26.8%
Other (weekly debriefing, not addressed)	3	7.3%
Duration of IP team training (n=29)		
1-6 hours	18	62.1%
Other (e.g., 9 hours, not addressed)	11	37.9%

Table 4.  
Outcomes and Assessment Methods

Outcomes and Assessment Methods (n=41)		
Category	No.	%
<b>Outcomes</b>		
Attitude/perceptions (e.g., IP teamwork, team functioning)	37	90.2%
Patient-related outcomes (e.g., patient satisfaction, length of stay, mortality)	11	26.8%
Knowledge/skills (e.g., IP communication skills, situation awareness, role responsibility)	11	26.8%
Behavioral changes (e.g., IP communication, teamwork, checklist completion, the number of pages)	8	19.5%
Change in organizational practice (e.g., organizational learning, hospital safety culture, hospital management for patient safety)	7	17.1%
Other (e.g., cost)	1	2.4%
<b>Assessment methods of nursing or team outcomes</b>		
Survey questionnaire	34	82.9%
Observation	13	31.7%
Administration data	7	17.1%
Interviews/focus groups	6	14.6%
Debriefing	2	4.9%
<b>Assessment methods of patient outcomes</b>		
Administration data	9	21.9%
Survey questionnaire	2	4.9%
Interviews	1	2.4%
<b>Both reliability and validity reported</b>		
No	30	73.2%
Yes	11	26.8%
<b>Reliability reported</b>		
No	26	63.4%
Yes	15	36.6%
<b>Validity reported</b>		
No	29	70.7%
Yes	12	29.3%

Table 5.

## Quality of Appraisal

Quality of Appraisal (n = 41)								
Scores	Total included studies (n = 41)		Quantitative studies (n = 33)		Mixed methods studies (n = 5)		Qualitative studies (n = 3)	
	No.	%	No.	%	No.	%	No.	%
25%	16	39.0%	12	36.4%	4	80.0%	-	-
50%	15	36.6%	13	39.4%	1	20.0%	1	33.3%
75%	9	22.0%	7	21.2%	-	-	2	66.7%
100%	1	2.4%	1	3.0%	-	-	-	-

Appendix A.

Search Terms

	PubMed	CINAHL	PsycINFO	Embase
Phase 1.	("nurse" OR "nurses") OR ("registered nurse" OR "registered nurses") OR "nursing"	"nurse*" OR "registered nurse*" OR "nursing"	"nurse*" OR "registered nurse*" OR "nursing"	("nurse" OR "nurses") OR ("registered nurse" OR "registered nurses") OR "nursing"
Phase 2.	[(interprofessional OR inter-professional) OR (interdisciplinary OR inter-disciplinary) OR (multidisciplinary OR multi-disciplinary)] AND [{"team training" OR "team strategy" OR "team strategies"} OR (rounds OR rounding OR huddle OR huddles OR debrief OR debriefing) OR ("team meeting" OR "team meetings") OR ("team intervention" OR "team interventions") OR ("TeamSTEPPS" OR "CRM")]	[(interprofessional OR inter-professional) OR (interdisciplinary OR inter-disciplinary) OR (multidisciplinary)] AND [{"team training" OR "team strateg*"} OR (rounds OR rounding OR huddle* OR debrief OR debriefing) OR ("team meeting*" OR "team intervention*") OR ("TeamSTEPPS" OR "CRM")]	[(interprofessional OR inter-professional) OR (interdisciplinary OR inter-disciplinary) OR (multidisciplinary)] AND [{"team training" OR "team strateg*"} OR (rounds OR rounding OR huddle* OR debrief OR debriefing) OR ("team meeting*" OR "team intervention*") OR ("TeamSTEPPS" OR "CRM")]	[(interprofessional OR inter-professional) OR (interdisciplinary OR inter-disciplinary) OR (multidisciplinary OR multi-disciplinary)] AND [{"team training" OR "team strategy" OR "team strategies"} OR (rounds OR rounding OR huddle OR huddles OR debrief OR debriefing) OR ("team meeting" OR "team meetings") OR ("team intervention" OR "team interventions") OR ("TeamSTEPPS" OR "CRM")]
Phase 3.	(teamwork OR collaboration) OR (communication OR "interdisciplinary communication" [mesh]) OR ("collaborative work" OR "collaborative activity" OR "collaborative activities" OR "collaborative	(teamwork OR MH "teamwork") OR (collaboration OR MH "collaboration") OR (communication OR MH "communication") OR "collaborative work" OR "collaborative	(teamwork OR collaboration OR communication) OR "collaborative work" OR "collaborative activit*" OR "collaborative practice") OR ("interprofessional relation*" OR "inter-professional	(teamwork OR collaboration) OR (communication OR "collaborative work" OR "collaborative activity" OR "collaborative activities" OR "collaborative practice") OR ("interprofessional relation" OR "interprofessional relations" OR "inter-

<p>practice”) OR  (“interprofessional  relations” [mesh] OR  “interprofessional  relation” OR  “interprofessional  relations” OR “inter-  professional relation”  OR “inter-  professional  relations”) OR  (morale OR  engagement OR  “mutual respect”) OR  (“psychological  safety” OR “team  culture” OR “safety”)  OR (“efficiency” OR  (“workload”[mesh]  OR “workload”) OR  (“patient care”  [mesh] OR “patient  care”) OR (“quality  of health care”  [mesh] OR “quality  of care”) OR  (“satisfaction” OR  “retention”)</p>	<p>activit*”) OR  “collaborative  practice”) OR (MH  “interprofessional  relations+” OR  “interprofessional  relation*”) OR  “inter-professional  relation*”) OR  (MH “morale” OR  morale) OR  (engagement OR  “mutual respect”)  OR  (“psychological  safety” OR “team  culture” OR  “safety”) OR  (“efficiency” OR  MH  “organizational  efficiency”) OR  (MH “workload”  OR “workload”)  OR (MH “patient  care” OR “patient  care”) OR  (“quality of care”  OR “quality of  health care” OR  “satisfaction” OR  “retention”)</p>	<p>relation*”) OR  (morale OR  engagement OR  “mutual respect”)  OR  (“psychological  safety” OR “team  culture” OR  “safety”) OR  (“efficiency” OR  “workload”) OR  (“patient care” OR  “quality of care”  OR “quality of  health care” OR  “satisfaction” OR  “retention”)</p>	<p>professional relation”  OR “inter-professional  relations”) OR (morale  OR engagement OR  “mutual respect”) OR  (“psychological safety”  OR “team culture” OR  “safety” OR  “efficiency”) OR  (“workload” OR “patient  care” OR “quality of  health care” OR “quality  of care”) OR  (“satisfaction” OR  “retention”)</p>
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Phase 1 AND Phase 2 AND Phase 3

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Appendix B.

Questionnaire of Inclusion and Exclusion Criteria

Inclusion criteria: this study will be included if all of the below are true (Q1-Q4):	
Questions	Y/N/Unsure
Q1. Did the study describe a post-licensure healthcare team consisting of nurses and other healthcare providers who participated in an IP team intervention? (trainees doing rotation in a unit undergoing training can be included with the established healthcare team)	
Q2. Did the IP post-licensure healthcare team work together as a team on the same unit, service line or clinical area, or health system?	
Q3. Did the study include an IP team intervention, such as purposeful team training, introduction of new team processes or changes in team structures? (e.g., CRM training, TeamSTEPPS training, IP rounds, briefs, huddles, debrief, and team meetings, use of checklist of it involved how the team communicated/functioned)	
Q4. Did the study include nursing outcomes and/or interprofessional team outcomes? (e.g., teamwork, communication, collaboration, team performance, psychological safety, team culture, efficiency, quality of patient care, satisfaction, retention)	
Exclusion criteria: this study will be excluded if any of the below are true (Q5-Q8):	
Questions	Y/N/Unsure
Q5. Did the study include only pre-licensure students or trainees for an educational purpose (e.g., interprofessional education activity)?	
Q6. Were participants random healthcare providers who were trained together at a conference or a team training but not as a team (e.g., continuing medical education activity)?	
Q7. Did the team intervention only include a single profession?	
Q8. Did the study describe perceptions, attitudes, mutual agreement, or quality of a team strategy, process or team training but not nursing or IP team outcomes? (e.g., perceptions or effectiveness of tools, perceptions about quality use of a checklist, levels of interest/attention in the intervention)	
What is your final decision (include/exclude/unsure)?	

## Appendix C.

Quality Appraisal Tool Extracted from Mixed Methods Appraisal Tool (Version 2011; Pluye, et al., 2011) (Permission to attach the MMAT was obtained from Pierre Pluye)

**Please choose one among A, B, C, or D (based on the relevant study design) and answer questions.**

**A. If the study was a qualitative study:**

1. Are the sources of qualitative data (archives, documents, informants, observations) relevant to address the research question (objective)?  
(E.g., consider whether (a) the selection of the participants is clear, and appropriate to collect relevant and rich data; and (b) reasons why certain potential participants chose not to participate are explained.)
  - a) Yes
  - b) No
  - c) Can't tell
  - d) Comments:
  
2. Is the process for analyzing qualitative data relevant to address the research question (objective)?  
(E.g., consider whether (a) the method of data collection is clear (in depth interviews and/or group interviews, and/or observations and/or documentary sources); (b) the form of the data is clear (tape recording, video material, and/or field notes for instance); (c) changes are explained when methods are altered during the study; and (d) the qualitative data analysis addresses the question.)
  - a) Yes
  - b) No
  - c) Can't tell
  - d) Comments
  
3. Is appropriate consideration given to how findings relate to the context, e.g., the setting, in which the data were collected?  
(E.g., consider whether the study context and how findings relate to the context or characteristics of the context are explained (how findings are influenced by or influence the context). "For example, a researcher wishing to observe care in an acute hospital around the clock may not be able to study more than one hospital. (...) Here, it is essential to take care to describe the context and particulars of the case [the hospital] and to flag up for the reader the similarities and differences between the case and other settings of the same type" (Mays & Pope, 1995).  
The notion of context may be conceived in different ways depending on the approach (methodology) tradition.)
  - a) Yes

- b) No
- c) Can't tell
- d) Comments

4. Is appropriate consideration given to how findings relate to researchers' influence, e.g., through their interactions with participants?  
 (E.g., consider whether (a) researchers critically explain how findings relate to their perspective, role, and interactions with participants (how the research process is influenced by or influences the researcher); (b) researcher's role is influential at all stages (formulation of a research question, data collection, data analysis and interpretation of findings); and (c) researchers explain their reaction to critical events that occurred during the study.

The notion of reflexivity may be conceived in different ways depending on the approach (methodology) tradition. E.g., "at a minimum, researchers employing a generic approach [qualitative description] must explicitly identify their disciplinary affiliation, what brought them to the question, and the assumptions they make about the topic of interest" (Caelli, Ray & Mill, 2003, p. 5).

- a) Yes
- b) No
- c) Can't tell
- d) Comments

**B. If the study was a quantitative randomized controlled (trials):**

1. Is there a clear description of the randomization (or an appropriate sequence generation)?  
 (In a randomized controlled trial, the allocation of a participant (or a data collection unit, e.g., a school) into the intervention or control group is based solely on chance, and researchers describe how the randomization schedule is generated. "A simple statement such as 'we randomly allocated' or 'using a randomized design' is insufficient".  
 Simple randomization: Allocation of participants to groups by chance by following a predetermined plan/sequence. "Usually it is achieved by referring to a published list of random numbers, or to a list of random assignments generated by a computer".  
 Sequence generation: "The rule for allocating interventions to participants must be specified, based on some chance (random) process". Researchers provide sufficient detail to allow a readers' appraisal of whether it produces comparable groups. E.g., blocked randomization (to ensure particular allocation ratios to the intervention groups), or stratified randomization (randomization performed separately within strata), or minimization (to make small groups closely similar with respect to several characteristics).

- a) Yes
- b) No
- c) Can't tell
- d) Comments:

2. Is there a clear description of the allocation concealment (or blinding when applicable)?

(The allocation concealment protects assignment sequence until allocation. E.g., researchers and participants are unaware of the assignment sequence up to the point of allocation. E.g., group assignment is concealed in opaque envelopes until allocation. The blinding protects assignment sequence after allocation. E.g., researchers and/or participants are unaware of the group a participant is allocated to during the course of the study.)

- a) Yes
- b) No
- c) Can't tell
- d) Comments:

3. Are there complete outcome data (80% or above)?  
(E.g., almost all the participants contributed to almost all measures.)

- a) Yes
- b) No
- c) Can't tell
- d) Comments:

4. Is there low withdrawal/drop-out (below 20%)?  
(E.g., almost all the participants completed the study.)

- a) Yes
- b) No
- c) Can't tell
- d) Comments:

**C. If the study was a quantitative non-randomized:**

1. Are participants (organizations) recruited in a way that minimizes selection bias?  
(At recruitment stage: For cohort studies, e.g., consider whether the exposed (or with intervention) and non-exposed (or without intervention) groups are recruited from the same population. For case-control studies, e.g., consider whether same inclusion and exclusion criteria were applied to cases and controls, and whether recruitment was done independently of the intervention or exposure status. For cross-sectional analytic studies, e.g., consider whether the sample is representative of the population.)

- a) Yes
- b) No
- c) Can't tell
- d) Comments:

2. Are measurements appropriate (clear origin, or validity known, or standard instrument; and absence of contamination between groups when appropriate) regarding the exposure/intervention and outcomes?  
(At data collection stage:

E.g., consider whether (a) the variables are clearly defined and accurately measured; (b) the measurements are justified and appropriate for answering the research question; and (c) the measurements reflect what they are supposed to measure.

For non-randomized controlled trials, the intervention is assigned by researchers, and so consider whether there was absence/presence of a contamination.)

- a) Yes
- b) No
- c) Can't tell
- d) Comments:

3. In the groups being compared (exposed vs. non-exposed; with intervention vs. without; cases vs. controls), are the participants comparable, or do researchers take into account (control for) the difference between these groups?

(At data analysis stage: For cohort, case-control and cross-sectional, e.g., consider whether (a) the most important factors are taken into account in the analysis; (b) a table lists key demographic information comparing both groups, and there are no obvious dissimilarities between groups that may account for any differences in outcomes, or dissimilarities are taken into account in the analysis.)

- a) Yes
- b) No
- c) Can't tell
- d) Comments:

4. Are there complete outcome data (80% or above), and, when applicable, an acceptable response rate (60% or above), or an acceptable follow-up rate for cohort studies (depending on the duration of follow-up)?

- a) Yes
- b) No
- c) Can't tell
- d) Comments:

**D. If the study was a quantitative descriptive study:**

1. Is the sampling strategy relevant to address the quantitative research question (quantitative aspect of the mixed methods question)?

(E.g., consider whether (a) the source of sample is relevant to the population under study; (b) when appropriate, there is a standard procedure for sampling, and the sample size is justified (using power calculation for instance).

- a) Yes
- b) No
- c) Can't tell

d) Comments:

2. Is the sample representative of the population under study?

(E.g., consider whether (a) inclusion and exclusion criteria are explained; and (b) reasons why certain eligible individuals chose not to participate are explained.)

a) Yes

b) No

c) Can't tell

d) Comments:

3. Are measurements appropriate (clear origin, or validity known, or standard instrument)?

(E.g., consider whether (a) the variables are clearly defined and accurately measured; (b) measurements are justified and appropriate for answering the research question; and (c) the measurements reflect what they are supposed to measure.)

a) Yes

b) No

c) Can't tell

d) Comments:

4. Is there an acceptable response rate (60% or above)?

(The response rate is not pertinent for case series and case report. E.g., there is no expectation that a case series would include all patients in a similar situation.)

a) Yes

b) No

c) Can't tell

d) Comments:

**E. If the study was a mixed methods study:**

1. Is the mixed methods research design relevant to address the qualitative and quantitative research questions (or objectives), or the qualitative and quantitative aspects of the mixed methods question (or objective)?

(E.g., the rationale for integrating qualitative and quantitative methods to answer the research question is explained.)

a) Yes

b) No

c) Can't tell

d) Comments:

2. Is the integration of qualitative and quantitative data (or results) relevant to address the research question (objective)?

(E.g., there is evidence that data gathered by both research methods was brought together to form a complete picture, and answer the research question; authors explain when integration occurred (during the data collection-analysis or/and during the interpretation of qualitative and quantitative results); they explain how integration occurred and who participated in this integration.)

- a) Yes
- b) No
- c) Can't tell
- d) Comments:

3. Is appropriate consideration given to the limitations associated with this integration, e.g., the divergence of qualitative and quantitative data (or results)?

- a) Yes
- b) No
- c) Can't tell
- d) Comments:

## Appendix D.

### Extraction Tool of Systematic Literature Review

1. Article title:
2. Author:
3. Publication Year
  - a) 2011
  - b) 2012
  - c) 2013
  - d) 2014
  - e) 2015
  - f) 2016
4. Aim(s) of the study:
5. Country where study was conducted:
  - a) US
  - b) UK
  - c) Canada
  - d) Australia
  - e) Denmark
  - f) Other (                    )
- 6-1. If the study was a quantitative study, what was the design of the study?
  - a) Experimental study
  - b) Quasi-experimental study (write in:                    )
  - c) Correlational study
  - d) Descriptive study
  - e) Other (                    )
- 6-2. If the study was a qualitative study, what was the design of the study?
  - a) Qualitative description (e.g., in-depth interviews or focus groups)
  - b) Ethnography
  - c) Phenomenology
  - d) Grounded theory
  - e) Case study
  - f) Other (                    )

6-3. If the study was a mixed methods study, what was the design of the study?

- a) Quantitative study driven
- b) Qualitative study driven
- c) Mixed study driven
- d) Other: (                      )

7. Describe the total number of participants: (                      )

8. Describe participants' disciplines and number (check all that apply)

- a) Nursing (write in participants' number:                      )
- b) Medicine (write in participants' number:                      )
- c) Pharmacy (write in participants' number:                      )
- d) Social work (write in participants' number:                      )
- e) Other (write in participants' number and disciplines:                      )

9. Study Setting:

- a) Inpatient (write specific departments:                      )
- b) Outpatient/ambulatory
- c) Community
- d) Long term care facility (e.g., nursing home)
- e) Other (write in:                      )

10. Demographic information collected from participants (check all that apply):

- a) Education
- b) Years working in their profession
- c) Years working in the organization/institution
- d) Years working with current team
- e) Other (write in):

11. Interprofessional team interventions/strategies developed based on a theoretical or conceptual framework?

- a) No
- b) If yes, describe:

12. What interprofessional team training or team strategy was used? (check all that apply)

- a) Communication skills (e.g., SBAR, CUS, briefs, huddles, debriefs, coaching) (write in:                      )

- b) Process improvement strategies (e.g., rounding, using quality or patient safety checklists that includes team communication) (write in: \_\_\_\_\_ )
- c) Team structure changes (e.g., team meeting, adding new meetings, purposely putting team members together) (write in: \_\_\_\_\_ )
- d) Other (write in: \_\_\_\_\_ )

13-1. If the study conducted interprofessional team training, how frequently did the training take place?

- a) Daily
- b) Weekly
- c) Monthly
- d) One-time activity
- e) If one-time activity, describe the duration (e.g., 4-hour): ( \_\_\_\_\_ )
- f) Other ( \_\_\_\_\_ )

13-2. If the study conducted the interprofessional team strategy, how frequently did the team strategy take place?

- a) Daily
- b) Weekly
- c) Monthly
- d) One-time activity
- e) If one-time activity, describe the duration (e.g., 4-hour): ( \_\_\_\_\_ )
- f) Other ( \_\_\_\_\_ )

14-1. How were nursing or team outcomes measured? (check all that apply)

- a) Survey questionnaire
- b) Interview/focus group
- c) Observation
- d) Debrief
- e) Other ( \_\_\_\_\_ )

14-2. If you chose a) in Q. #14-1, list the specific names of instruments used:

( \_\_\_\_\_ )

14-3. If the study collected outcomes related to patients, how were the outcomes measured?

- a) Survey questionnaire
- b) Interview/focus group
- c) Administration data
- d) Other ( \_\_\_\_\_ )

14-4. If you chose a) in Q. #14-3, list the specific names of instruments used:

( \_\_\_\_\_ )

15-1. If the study was a quantitative study, was the reliability of assessment instruments reported?

- a) No
- b) If yes, describe: (                    )

15-2. If the study was a quantitative study, was the validity of assessment instruments reported?

- a) No
- b) If yes, describe: (                    )

15-3. If the study was a qualitative study, was the reliability or validity (e.g., authenticity, trustworthiness) reported?

- a) No
- b) If yes, describe

15-4. If the study was a mixed methods study, was the reliability reported?

- a) No
- b) If yes, describe

15-5. If the study was a mixed methods study, was the validity reported?

- a) No
- b) If yes, describe

16. Select outcomes reported in the study (check all that apply)

- a) Attitude/perceptions
- b) Knowledge/skills
- c) Behavioral changes
- d) Change in organizational practice
- e) Outcomes related to patient
- f) Other:

17. Describe the outcomes you selected above:

## Appendix E.

### Details of Included Studies

Author	Year	Country	Study design	Study setting	Conceptual framework	IP team intervention	Frequency of IP team intervention	Measure of team outcomes	Reliability & Validity	Outcomes measured	Quality scores
#1. Arriaga, et al.	2014	US	Quasi-experimental design (one group posttest only design)	Inpatient (OR)	Crew and crisis resource management	Simulation training including communication skills and surgical safety checklists	One time activity (4-6 hours)	Survey questionnaire	Not addressed	Perceptions	50%
#2. Auerbach, et al.	2014	US	Mixed methods design	Inpatient (pediatric emergency department)	No	“in situ trauma simulation (ISTS)” program consisted of 20 mins of simulated patient care and 30 mins debriefing focused on teamwork, communication, and identification of gaps in care	One time activity (1 hour)	Observation by using a simulation evaluation tool	Not addressed	Knowledge/ skills	25%
#3. Bahr, et al.	2016	US	Qualitative study	Inpatient (surgical unit)	No	IP rounding, rounding checklist	Daily rounding	Interview/ focus groups/observation	Not addressed	Perceptions	75%
#4. Berg, et al.	2014	US	Quasi-experimental design (one group pretest-posttest design)	level I trauma center: trauma resuscitation team	TeamSTEPPS	Communication skills (only debriefing)	Weekly debriefing	Survey questionnaire	Not addressed	Attitude/ perceptions	50%
#5. Bunnell, et al.	2013	US	Quasi-experimental design (one group posttest only design)	Outpatient adult oncology	CRM	CRM training	One time activity (2 hours)	Survey questionnaire	Not addressed	Perceptions/ behavioral change, patient-related outcomes (patient satisfaction)	50%

#6. Carney, et al.	2011	US	Quasi-experimental design (one group pretest-posttest design)	Inpatient (OR)	No	MTT training- Team training techniques that incorporated the use of checklists for preoperative briefings and postoperative debriefings	Not addressed	Survey questionnaire	Content validity	Perceptions	25%
#7. Chan, et al.	2016	Hong Kong	Quasi-experimental design (one group pretest-posttest design)	Inpatient units, but no specific unit	CRM	CRM training	One time activity (5 hours)	Survey questionnaire	Cronbach's alpha, content validity, face validity	Attitude	75%
#8. Colacchio, et al.	2012	US	Quasi-experimental design (one group posttest-only design)	Inpatient (NICU)	TeamSTEPPS	TeamSTEPPS training	One time activity (3 hours)	Survey questionnaire	Not addressed	Attitude/ perceptions	50%
#9. F. de Korne, et al.	2013	Netherlands	Qualitative study design	Other (eye hospital)	CRM	TRM training (team resource management) including different educational approaches, such as lectures, videos, simulators, and on-the-job behavior feedback	One time activity (4 hours)	Interview/observation	Member checking, credibility	Change in organizational practice	75%
#10. Figueroa, et al.	2012	US	Quasi-experimental design (one group pretest-posttest design)	Inpatient (pediatric cardiac ICUs)	TeamSTEPPS	TeamSTEPPS training	One time activity (9 hours)	Survey questionnaire	Not addressed	Attitude/ perceptions, knowledge/ skills	50%
#11. Forse, et al.	2011	US	Quasi-experimental design(one group	Inpatient (OR)	TeamSTEPPS	TeamSTEPPS training	Not addressed	Survey questionnaire	Not addressed	Perceptions/ knowledge and skills, behavioral	25%

			pretest and posttest design)							change, change in organizational practice(average turnover of the ORs), patient-related outcomes (patient satisfaction, morbidity, mortality)	
#12. Fuhrmann, et al.	2015	Denmark	Quasi-experimental design (one group pretest and posttest design)	Inpatient (anesthetic and obstetric departments)	No	Multidisciplinary Caesarean section team training including 40 min lecture, with scenarios, debriefing	One time activity (3 hours)	Administration data	Not addressed	Behavioral change, patient-related outcomes (length of stay)	50%
#13. Gausvik, et al.	2015	US	Quasi-experimental design (posttest-only comparison group design)	Inpatient (intervention group: an acute care for the elderly unit/ control group: four non-intensive care hospital units	No	IP rounding	Daily rounding	Survey questionnaire	Not addressed	Perceptions	25%
#14. Gaston, et al.	2016	US	Mixed methods design	Inpatient (oncology acute patient care units)	TeamSTEPPS	TeamSTEPPS training	One time activity (2 hours)	Survey questionnaire, focus group interviews	Not addressed	Perceptions/ knowledge	50%
#15. Genet, et al.	2015	US	Quasi-experimental design (one group posttest-only design)	Inpatient (NICU)	No	Interprofessional rounds	Daily	Survey questionnaire, medical record review	Not addressed	Perceptions/ behavioral change	50%
#16. Henkin, et al.	2016	US	Quasi-experimental design (one group pretest-	Inpatient (general medicine services)	No	Interprofessional bedside rounding, rounding checklist	Daily rounding	Survey questionnaire	Internal structure, criterion, and	Attitude/ perceptions, behavioral change	25%

			posttest design)						outcomes validity		
#17. James, et al.	2016	US	Quasi-experimental design (one group posttest only design)	Inpatient (oncology)	IPEC/ principles from TeamSTEPPS	TeamSTEPPS training	One time activity (no information about specific duration)	Survey questionnaire, observation	Not addressed	Attitude/ perceptions, knowledge/ skills	25%
#18. Jones, et al.	2011	UK	Qualitative study design	Inpatient (medical rehabilitation ward)	No	Consultant-led daily word rounds, weekly team meeting	Daily rounding, weekly team meeting	Interview/observation/ four workshops	Peer review	Perceptions/ Change in organizational practice/ patient-related outcomes	50%
#19. Kemper, et al.	2015	Netherlands	Quasi-experimental design (pretest posttest comparison group design)	Inpatient (ICU)	CRM	CRM training	One time activity (2 days training, no information about specific duration)	Survey questionnaire, observation	Cronbach's alpha	Attitude/ perceptions (job satisfaction), knowledge/ skills, behavioral changes, change in organizational practice, patient-related outcomes	75%
#20. Klipfel, et al.	2014	US	Quasi-experimental design (one group pretest-posttest design)	Inpatient (urology unit)	TeamSTEPPS	TeamSTEPPS training	One time activity (no information about specific duration)	Survey questionnaire	Addressed, but no specific types of reliability and validity	Attitude/ perceptions, patient-related outcomes	25%
#21. Mayer, et al.	2011	US	Mixed methods design	Inpatient (PICU, SICU)	TeamSTEPPS	TeamSTEPPS training	One time activity (2.5 hours)	Survey questionnaire, interview, observation, administration data	Cronbach's alpha	Perceptions, behavioral changes, patient-related outcomes	25%
#22. Maxson, et al.	2011	US	Quasi-experimental design (one group pretest-posttest design)	Inpatient (surgical unit)	TeamSTEPPS & CRM	Team training consisting of 3 clinical scenarios and debriefing	One time activity (but no specific duration)	Survey questionnaire	Cronbach's alpha	Perceptions	25%

#23. Meurling, et al.	2013	Sweden	Quasi-experimental design (one group pretest-posttest design)	Inpatient (ICU)	No	In-situ simulation-based team training with 3-4 clinical scenarios and debriefing	One time activity (one day, but no information about specific duration)	Survey questionnaire, administration data	Cronbach's alpha	Attitude/perception (job satisfaction), change in organizational practice (turnover rate, sick leave)	50%
#24. Newman, et al.	2015	US	Quasi-experimental design (one group pretest-posttest design)	Inpatient (cardiology pediatric unit)	No	Night shift interprofessional huddle	Daily	Survey questionnaire	Cronbach's alpha, face validity	Perceptions/patient-related outcomes (the number of high-risk transfers to the ICU)	75%
#25. O'Leary, et al.	2011	US	Quasi-experimental design (pretest posttest comparison group design)	Inpatient (general medical unit)	No	Interdisciplinary rounds at the conference room	Daily	Survey questionnaire, hospital data	Not addressed	Attitude/perceptions, patient-related outcomes (length of stay), other (cost)	75%
#26. O'Leary, et al.	2015	US	Quasi-experimental design (one group pretest-posttest design)	Inpatient (general medical units)	No	Structured interdisciplinary rounds	Daily	Survey questionnaire	Cronbach's alpha	Attitude/perceptions, patient-related outcomes	75%
#27. Paull, et al	2013	US	Quasi-experimental design (one group pretest and posttest design)	Inpatient (surgical care floors)	CRM	CRM training	One time activity (2 hours)	Survey questionnaire, observation,	Addressed validity but not addressed specific types of the validity	Attitude/perceptions, skills	50%
#28. Perry, et al.	2016	US	Quasi-experimental design (one group pretest-posttest design)	Inpatient (medical unit)	No	Use of daily goals tool during exiting rounding	Daily	Survey questionnaire	Not addressed	Attitude/perceptions	25%
#29. Riggall, et al.	2015	US	Quasi-experimental design (one group pretest-posttest design)	Inpatient (medical unit)	TeamSTEPPS	Interprofessional team training with the clinical	One time activity (no information)	Survey questionnaire, administration data	Cronbach's alpha, content	Attitude/perceptions,	50%

			group pretest and posttest design)			scenarios and debriefing	about specific duration)		validity, convergent validity	patient-related outcomes	
#30. Riley, et al.	2011	US	Quasi-experimental design (interrupted time series design)	Inpatient (units related to labor and delivery three community hospitals)	TeamSTEPPS	Team Training using two methods 1) didactic training of TeamSTEPPS training (30min); 2) in-situ simulation (2hours and 30min-45min) consisting of a) briefing, b) in-situ simulation, c) debriefing, d) rapid-cycle follow-through with process improvements, e) repetition to reinforce skills and create resiliency	One time activity (no information about specific duration)	Survey questionnaire	Addressed reliability and validity using other studies, but no information about specific types of reliability and validity	Attitude/ perceptions, patient-related outcomes (perinatal morbidity and mortality)	75%
#31. Ross, et al.	2013	UK	Mixed methods design	Tertiary hospital, not addressed specific units	Cognitive Task Analysis and Crew Resource Management techniques	Simulation training component of a comprehensive development program – scenarios, debriefing, role plays, exercises using part-task trainers) (a) a 1-day human patient simulation course with six scenarios and (b) a 1-day ward-based simulation course involving five 1-h exercises	One time activity (2-day training, but no information about specific duration)	Survey questionnaire, interview, observation	Not addressed	Attitude/ perceptions, knowledge/ skills	25%

						with integrated debriefing						
#32.	2013	US	Mixed methods design	Inpatient (NICU)	TeamSTEPPS	TeamSTEPPS training	One time activity (6 hours)	Survey questionnaire, observation, debriefing	Not addressed	Attitude/ perceptions, knowledge/ skills	25%	
#33.	2014	US	Quasi-experimental design (one group pretest-posttest design)	Inpatient (medical unit)	No	IP rounding	Daily rounding	Survey questionnaire	Not addressed	Perceptions	25%	
#34.	2011	US	Quasi-experimental design (one group pretest-posttest design)	Inpatient (ED)	CRM	CRM training	One time activity (3 hours)	Observation	Not addressed	Knowledge/ skills	50%	
#35.	2012	UK	Longitudinal study design over 2 years	Inpatient (PICU)	No	Team training including simulation, scenario, & debriefing	One time activity (< 2hours)	Survey questionnaire	Not addressed	Perceptions, skills	50%	
#36.	2013	US	Quasi-experimental design (one group pretest and posttest design)	Community hospital, acute care facility	TeamSTEPPS	TeamSTEPPS training	One time activity (4 hours)	Survey questionnaire	Not addressed	Perceptions/ change in organizational practice (staffing, Organizational Learning, organizational safety)	25%	
#37.	2015	US	Quasi-experimental design (posttest-only comparison group design)	Community (primary care medical home practices)	Kotter's change theory/ TeamSTEPPS	TeamSTEPPS training	One time activity (1 hour)	Survey questionnaire	Cronbach's alpha, content validity	Perceptions	100%	
#38.	2014	US	Quasi-experimental design (one group pretest-	Inpatient (PICU)	No	Rounds moved from conference rooms to the bedside,	Daily	Survey questionnaire , medical records-analysis of rounding checklist	Not addressed	Attitude/ perceptions, behavioral change	25%	

			posttest design)			rounding checklist					
#39. Weller, et al.	2016	New Zealand	Quasi-experimental design (one group pretest-posttest design)	Inpatient (OR)	Theoretical framework of teamwork proposed by Salas (2005)	Team training consisted of three simulations with debriefs and presentations on communication strategies	One time activity (2 hours)	Observation	Not addressed	Attitude/ perceptions, knowledge/ skills	25%
#40. Wong, et al.	2016	US	Quasi-experimental design (one group pretest and posttest design)	Inpatient (ED)	TeamSTEPPS	TeamSTEPPS training	One time activity (3 hours)	Survey questionnaire	Construct validity	Attitude/ perceptions, behavioral changes, Changes in organizational practice	75%
#41. Wu, et al.	2016	Taiwan	Quasi-experimental design (one group pretest and posttest design)	Inpatient (acute and critical care units)	CRM & TeamSTEPPS	CRM training	One time activity (1.5 day, but no information about specific duration)	Survey questionnaire	Cronbach's alpha	Attitude/ perceptions	50%

## PAPER TWO

### **Nurses' Experiences and Perceptions after the Implementation of Team Training and Structured Interprofessional Bedside Rounds (SIBR): A Qualitative Study**

#### **Abstract**

**Objectives.** Despite increasing interest in interprofessional collaborative practice to improve teamwork and practice outcomes, there has been little research that focused on nurses' perspectives about interprofessional collaborative practice after a purposeful interprofessional team intervention. The purpose of this study is to explore nurses' experiences and perceptions following a purposeful team intervention.

**Methods.** This study is part of a larger study that implemented and evaluated the purposeful team intervention including interprofessional TeamSTEPPS<sup>®</sup> training and implementation of structured interprofessional bedside rounds (SIBR) at an academic medical center. The design of this study was a qualitative descriptive study. Registered nurses (RN) were invited to participate in focus group interviews approximately 3-5 months following the interprofessional team intervention. A qualitative analysis was conducted using a conventional content analysis approach and constant comparative method.

**Results.** There were three separate focus group interviews for a total of ten RN participants. We identified six interrelated themes: (1) interprofessional team building, (2) psychological safety and cultural change, (3) efficiency in delivery of care, (4) quality of patient care, (5) job outcomes, and (6) team challenges. Notably, RN participants reported that they could better understand the patient's care plan of the day because every team member was "*on the same page at the same time*". Participants perceived that they were more satisfied with their job through

improved interprofessional team performance, enhanced psychological safety and cultural change, efficient workflow, and better quality of patient care.

**Conclusion.** The purposeful interprofessional team intervention contributed to enhancing interprofessional team functioning as well as improving nurse job satisfaction. To sustain the improved perceptual and behavioral changes, team strategies to improve workflow and communication need to be considered.

## **Introduction**

The importance of a highly functioning team has garnered attention over the past decade as an approach to improve healthcare practice and patient outcomes (Young, et al., 2011). Effective interprofessional teamwork and team communication have contributed to better healthcare delivery and improved patient safety (Wagner, 2000; Grumbach & Bodenheimer, 2004). Conversely, failure in team communication and collaboration within interprofessional teams has led to negative medical events and medical errors (Institute of Medicine, 1999), and has become an economic burden due to decreased quality of care and patient safety (Joint Commission, 2012).

Effective interprofessional teamwork and team communication are also considered significant factors in improving nurse job satisfaction and retention in the context of nurse shortages in hospital settings (Chang et al., 2009; Ma, Shang, & Bott, 2015). Specifically, nurses play a pivotal role as the main caregivers at the bedside and collaborate with other healthcare professionals, patients, and families in the continuum of care (Miller & Apker, 2002). When healthcare teams have good relationships and communicate effectively with each other, nurses working in this environment experience efficient workflow for patient care (Ma, Shang, & Bott, 2015). As a result, high-performing teams allow nurses to deliver better patient care and to be more satisfied with their job, and are more likely to stay at their job (Sharma & Klocke, 2014).

There have been several studies examining the relationships between interprofessional teamwork and nurse job outcomes (Apker, Propp, & Ford, 2009; Chang et al., 2009; Wanzer, Wojtaszczyk, & Kelly, 2009). Using a cross-sectional survey design, Chang, et al. (2009) surveyed 1475 participants (180 physicians, 1019 nurses and 276 other healthcare professionals; 52.2% response rate) at four acute care hospitals in Taiwan to determine the factors associated

with job satisfaction. These authors found that interprofessional collaboration with other professionals was the most significant predictor for nurse job satisfaction.

Numerous studies have also examined the relationship between interprofessional team communication and nurse job outcomes (Apker, Propp, & Ford, 2009; Tourangeau, Cranley, Laschinger, & Pachis; 2010). Most of these studies have focused on nurse-physician communication behaviors and nurse job satisfaction (Coeling & Cukr, 2000; Monojlovich, 2005; Wanzer, Wojtaszczyk, & Kelly, 2009; McCaffrey, et al., 2010; Sharma & Klocke, 2014). Wanzer, Wojtaszczyk, and Kelly (2009) explored the impact of communication styles between nurses and physicians on nurses' reported job satisfaction by surveying nurses (205 of 211; 97.2% response rate completed the survey). This study reported that when physicians listened effectively and used clear, humorous, immediate, and empathic types of communication, nurses were more likely to be satisfied with communication ( $p = 0.001$  0.05), relationships ( $p = 0.001$ ), and perceptions of collaboration with the target physicians ( $p = 0.001$ ). Specifically, physicians' use of communication with appropriate humor and clarity significantly predicted nurses' job satisfaction ( $p = 0.003$ ).

Interprofessional team training has been recommended as a strategy to achieve effective teamwork and better work environments, as well as to enhance patient safety and patient outcomes (Joint commission, 2004). Moreover, structured interprofessional bedside rounds (SIBR) have been identified as a validated model that allows for effective communication with a healthcare team who are involved in patient care at the bedside, and enables the patients and their families to engage in the care plan (Genet, Firestone, & Volsko, 2015; Henken, et al., 2016). Numerous studies have investigated the impact of interprofessional team interventions such as interprofessional team rounds (Sharma & Klocke, 2014; Gausvik, et al., 2015), regular morning

meetings (Aston, et al., 2005) or educational programs (McCaffrey, et al., 2010) focused on interprofessional collaboration and communication (Aston, et al., 2005; McCaffrey, et al., 2010; Sharma & Klocke, 2014; Gausvik, et al., 2015), psychologically safe environment (Aston, et al., 2005; Gausvik, et al., 2015), workflow efficiency (Aston, et al., 2005; Sharma & Klocke, 2014; Gausvik, et al., 2015), job satisfaction among healthcare professionals (Sharma & Klocke, 2014; Gausvik, et al., 2015) and patient outcomes (Aston, et al., 2005; McCaffrey, et al., 2010).

However, although nurses have an important role as the main caregivers at the bedside and directly help improve the delivery of care and patient outcomes, there has been little research that focuses on nurses' experiences and perspectives following interprofessional team interventions. To fill this gap, this study explored nurses' experiences and perceptions following a purposeful team intervention that included an interprofessional team training and implementation of SIBR.

## **Background**

### ***Context of the study***

This study is part of a larger study (“parent study”) which aimed to enhance health outcomes for patients with advanced heart failure (AHF) by improving interprofessional team functioning at an academic medical center in the Pacific Northwest. The parent study implemented and evaluated interprofessional team interventions comprised of Team Strategies and Tools to Enhance Performance and Patient Safety (TeamSTEPPS<sup>®</sup>) training (AHRQ, 2016), implementation of SIBR, and quarterly leadership workshops. A more detailed description of the interprofessional team interventions can be found in the parent study (Zierler, Blakeney, & O'Brien, 2017); thus in this study, we will only briefly introduce the interventions.

### ***Interprofessional team interventions of the parent study***

The interprofessional team interventions were designed for a specific unit caring for patients with AHF and included five four-hour training sessions conducted during the month of March, 2016. Certified TeamSTEPPS trainers and experts in interprofessional collaboration and leading change provided TeamSTEPPS training focused on communication tools that would be used to support SIBR. The process of conducting SIBR was introduced and simulated during the four-hour team training. Moreover, optional quarterly leadership workshops were offered over a three-year period for members of the unit participating in the training. The topics that were covered included relational coordination, peer and microsystems coaching, use of liberating structures, leading change, change management, resolving conflict and speaking up strategies. The SIBR process began on an inpatient AHF unit on March 17, 2016 and has continued with multiple iterations using continuous quality improvement processes. Multiple internal (the clinical AHF team in the medical center) and external stakeholders (the grant team of the parent study) were involved in the development and implementation of the SIBR.

While the parent study focused on the AHF interprofessional team and patient and systems' outcomes pre-and post-interprofessional team interventions, this smaller study focused solely on the nurses' experiences and perceptions following the 4-hour team interventions. Nurse participants of this smaller study participated in the four-hour TeamSTEPPS training and implementation of the SIBR process, but did not attend the optional and quarterly leadership workshops. We will refer to the "interprofessional team intervention" as being the four-hour TeamSTEPPS training and implementation of the SIBR process in this smaller study.

## **Methods**

### **Study design**

A qualitative descriptive study design (Sandelowski, 2000) was employed to better

understand nurses' experiences and perceptions of a purposeful interprofessional team intervention. This approach provides a comprehensive description of findings in everyday language rather than in abstract terms (Sandelowski, 2000). We conducted focus group interviews to elicit nurses' collective opinions and beliefs on the interprofessional team intervention and subsequent changes by sharing viewpoints about each other's experiences (King, 1998).

### **Study Setting**

The study was conducted at an academic medical center in the Pacific Northwest which is one of four medical centers within a larger health system. In addition to providing patient care, this academic medical center is designated as a national TeamSTEPPS training site (since 2007) and has more than 200 master-trained employees. The nursing department within this academic medical center has been consistently recognized as a Magnet hospital since 1994. This study was conducted in the cardiothoracic surgery-telemetry unit where multiple healthcare providers (nurses, physicians, advanced practice providers, pharmacists, social workers, and allied health professionals) care for patients with cardiovascular diseases (e.g. AHF, myocardial infarction, etc.). This unit has 30 single patient rooms and 66 registered nurses (RNs) work on this unit, including a nurse manager.

### **Study Participants**

This study employed a convenience sampling method to recruit RNs to participate in the focus group interviews. All RNs who 1) work in the cardiothoracic surgery-telemetry unit, 2) provide direct care to patients, 3) received the interprofessional team training intervention, and 4) work as a full-time or part-time employee were recruited for this study. RNs employed as contractors through a third party or who work on a per-diem basis were excluded from this study.

RN participants were invited to the focus group interviews through two different approaches: 1) flyers posted on the bulletin board of their report room, a break room, and a bathroom in the cardiothoracic surgery-telemetry unit, and 2) through email (contact information of eligible participants (name and email address were provided by the RN Manager) for those who participated in the interprofessional team intervention.

### **Data Collection**

Data collection started three months after the four-hour TeamSTEPPS training and SIBR process (interprofessional team intervention) were implemented. Data were collected between June and August 2016. The focus group interviews took place in a conference room at the medical center away from the cardiothoracic surgery-telemetry unit.

Prior to the focus group interviews, the purpose of this study was explained and each participant was provided a written informed consent document describing the study. Demographic data were collected from participants just prior to starting the focus group interview. An interview guide was developed by the research team and included open-ended, semi-structured questions, such as “How did the interprofessional team intervention influence your overall daily work with team members?” and “Do you perceive a change in communication, within and among team members following the interprofessional team intervention?” (Appendix A-Interview Guide). A handout summarizing the communication tools presented and practiced during the 4-hour team training was provided to participants as a reminder of what they were taught during the training. A moderator and an assistant moderator facilitated the focus group interviews. The moderator who was in a doctoral program in nursing and trained in the qualitative research methods, and facilitated discussions following the guidelines of Krueger and Casey (2000). The assistant moderator who was in a doctoral program in nursing and trained in

the qualitative research methods, observed the reactions of participants and took notes about the observed information and participants' comments for further data analysis following the guidelines of Krueger and Casey (2000).

During each focus group interview, the moderator started with an introduction of the study, and then asked the interview questions. When needed, additional questions were asked to elicit further details (e.g., "Could you tell me more...?"). The focus group interviews were audio-recorded and lasted between 60 and 75 minutes.

### **Ethical Considerations**

This study was granted exempt status by the Human Subject Division (the institutional review) at the University of Washington (#51337). Permission to conduct focus group interviews in the cardiothoracic surgery-telemetry unit was obtained from the nursing department. The information about this study was given to eligible participants prior to their participation and informed consent was obtained from all participants.

### **Data Analysis**

A qualitative analysis of focus group interviews was conducted using a conventional content analysis approach (Hsieh & Shannon, 2005) and constant comparative method for emerging categories and themes (Glaser & Strauss, 1967; Krueger & Casey, 2000). Focus group interview data were audio-recorded, fully transcribed verbatim, and coded using the NVivo qualitative data analysis software, Version 11 (QSR International Pty Ltd, Doncaster, Australia). The transcripts were compared with audio recordings to ensure accuracy.

All focus group interview transcripts were thoroughly read several times to comprehend the essence of the contents and to identify key themes. Segments of transcripts were assigned codes based on interview questions or emergent categories (Krueger & Casey, 2000). The

principal investigator (PI-DB) conducted initial coding of the first two transcripts to develop a codebook (Appendix B). The codebook, which included codes, descriptions and quote examples was reviewed for content validity by the senior PI of the parent study (BZ). Following the guidelines of Creswell (2012), the PI (DB) and a research assistant who was a doctoral student in nursing and trained in qualitative research methods, coded all the transcripts independently based on the codebook. The codebook was revised from the initial coding process to improve inter-rater reliability. The two coders had weekly meetings to discuss coded segments in the transcripts and themes, and to reach an agreement when there were differences in the interpretation. Agreement after reconciliation was 100%. Through the process of merging, dividing, or removing codes, codes were organized into themes according to similarity. Final results were discussed with the senior PI (BZ) and were summarized by this study PI (DB).

### **Rigor**

The trustworthiness of a qualitative study is developed through credibility, dependability, confirmability and transferability (Lincoln & Guba, 1985). Credibility and dependability were established through member-checking (Polit & Beck, 2012) where the PI asked two individual participants to review and provide comments on interpretive notes through in-person meetings. Confirmability was established using investigator triangulation (Polit & Beck, 2012). The two coders and other researcher (BZ) discussed codes, categories, and themes and made analytic decisions for the data interpretation. Transferability was established by developing a codebook as well as describing the study context with detailed descriptions, including verbatim quotes (Polit & Beck, 2012).

## Results

There were three separate focus group interviews for a total of 10 participants with three to four participants per group. All participants were female and their mean age was 34.7. All participants had earned a bachelor's degree and their length of experience working as a RN ranged from 1 to more than 20 years (approximate mean was 6.5 years) and their length of experience working in the current position in the cardiothoracic surgery-telemetry unit ranged from 1 to more than 20 years (approximate mean was 6.1 years). Nine participants (90%) were working full time and worked day shift during the week.

Qualitative analyses yielded six interrelated themes: (1) interprofessional team building, (2) psychological safety and cultural change, (3) efficiency in delivery of care, (4) quality of patient care, (5) job outcomes, and (6) team challenges (Table 1). Three of the six interrelated themes also had subthemes (See Table 1).

### **Interprofessional team building**

#### ***Interprofessional relationship***

Most participants stated that they had an opportunity to get to know other professionals through the TeamSTEPPS training, which was helpful in building relationships. Through conversations with team members from other disciplines during the training, participants could share their perspectives and discuss their roles and responsibilities. One participant stated, *“During the training you got a chance to ask them more about how their job works, and then when you go into work, it's oh, you're so and so from the training.”*

Many participants stated that they felt included as a member of the interprofessional team when attending daily SIBR. They also perceived that SIBR was implemented based on a team-based approach requiring collaborative participation rather than being physician-led rounds. One

participant stated, *“Everyone is a part of the puzzle.”* Moreover, the structured process of SIBR enabled nurses to better engage with the interprofessional team. In particular, notification of the nurse that their patient was next in the SIBR process, and waiting for them before starting SIBR encouraged the nurses to participate as a member of the team.

RN participants perceived a different level of change in relationships with other team members depending on their profession. Most participants stated that nurses already had good relationships amongst themselves prior to the interprofessional team intervention, thus it seemed that they did not perceive a prominent change within nursing. Many participants reported that they perceived improved change in relationships with those of a different profession such as nurse practitioners, pharmacists or social workers. A participant who had more than 20 years of clinical experiences did not perceive a change in relationships with pharmacists and the social worker because she already had good relationships with them prior to the intervention.

A few participants perceived that attending physicians better understood nurses’ roles and knowledge for patient care and demonstrated minor improvements in knowledge of and appreciation of their role after the interprofessional team intervention. However, most participants stated that existing poor relationships with attending physicians had not improved. One participant felt disappointed that there was not a larger impact with how attending physicians communicated after the training. Notably, participants perceived that such poor interaction with attending physicians led to the lack of understanding of the nurse’s roles and workflow for patient care. Some participants perceived that a few of the attending physicians did not value all information obtained from nurses as essential for patient care; instead, they perceived that the attending physicians expected that nurses to provide them with what they wanted to know. One participant stated:

*“When we [nurses] present the summary of how it’s going with the patient [in the rounds], some attendings [attending physicians] just want to know their blood pressure and weight. They’re not really as concerned about the whole picture, but they’re viewing it in a different way. ... It was kind of a clear line drawn of like “this is all I need from you” pretty much.”*

Given this situation, participants emphasized that if team members from other professions, especially attending physicians, demonstrated respect and acknowledged nurses’ roles and competencies, it would be helpful for improving interprofessional teamwork and relationships.

### ***Interprofessional team communication***

*“I think the concepts of CUS and callback and the brief and the huddle — all of those [TeamSTEPPS tools] have helped me integrate those skills when I’m working with other people during situations where I need, like in situations where I’ve got an issue with my patient. I feel like I utilized those tools more since having the team training.”*

Many participants reported that they used the TeamSTEPPS communication skills learned from the training for better communication with team members, as well as with patients and families. Specifically, one participant pointed out an example of a potential unsafe situation in which there was a breakdown in communication between the nurse and a nursing assistant. Following the incident, the nurse used communication skills learned from the training with the nursing assistant and they had a better conversation by immediately recalling case studies or scenarios about communication tools. As a result, the nursing assistant accepted the nurse’s feedback in a positive manner. Moreover, some participants stated that they carry a card

describing the TeamSTEPPS communication tools from the training in their back pockets and utilize them in situations when needed to effectively communicate.

All participants reported that the clarity and accuracy of communication with team members improved since the interprofessional team intervention was implemented. Many participants reported that they could have open and direct conversations and discussions after participating in the SIBR process. Participants also perceived that they communicated more frequently with team members than before the intervention. For example, a participant reported that she had better communication with pharmacists because they called more often to tell nurses about their discharge medication planning and teaching for patients. Several participants felt that providers responded more quickly when nurses paged them.

Moreover, participants pointed out that as a change in communication behaviors due to the interprofessional team training that team members were more likely to use closed-loop communication to clarify patient information and enhance patient safety.

### **Psychological safety and cultural change**

*“I think that you set a culture for nurses to speak up. ... It seems like the timing and respectfulness and the openness is more available.”*

Most participants perceived that their work environment became more open and safer to speak-up after the interprofessional team intervention. Notably, they reported that their voice was “better received” by being acknowledged, respected, or not brushed off during the SIBR process. In this work environment, participants felt comfortable asking questions and bringing up concerns about patients prior to the interprofessional team intervention. Many participants emphasized that the structured rounding format and tools developed to support SIBR that

described roles and scripted what each professional would contribute to SIBR, enabled nurses to be an active member of the team and provided a safe environment for them to speak-up.

Most participants reported that the structured process of the bedside rounds provided a degree of psychological safety that helped them to effectively present pertinent information about patients. Participants perceived their speaking-up as “*a normal part of the flow*” during SIBR, welcomed and expected rather than previously when their participation was described as “*fluttering at the edge*” or feeling “*self-conscious*” about asking questions about their patients. One participant also pointed out that even if certain nurses had low levels of confidence to voice their opinions, that the interprofessional team intervention and focus on creating a psychologically safe environment encouraged them to bring up concerns and issues about patients.

### **Efficiency in delivery of care**

All participants reported that they could better understand the patient’s care plan of the day because every team member was “*on the same page at the same time*” during SIBR. Many participants pointed out that they paged providers less frequently to ask about the plan of care because they were together in the room with the patient and family and questions could be addressed and orders were entered real-time. That is, instead of constantly catching up with doctors to get orders and patient care plans, nurses could better organize their work flow for the day and appropriately utilize their time for direct patient care.

Several participants perceived that the structured formats for rounding made their delivery of care more efficient. Because healthcare providers who attend the SIBR are required to document the plan of care on the daily rounding sheet or white board, the process enabled nurses to effectively review the patient care plans, as well as hand-off pertinent information to

the next nurse. Participants stated that the process also enabled nurses on the next shift (after SIBR took place) to feel like they were part of process because they could see the documented plan of care.

In addition to sharing daily patient care plans, participants suggested that knowing and understanding long-term plans for patient care would be helpful for providing better quality of patient care. The participants stated that physicians often communicated care plans in the context of what nurses needed to understand for their respective shift that day, rather than talking about long-term plans for the patient. One participant stated: *“Usually, when I talk with the patients about the plan I don’t talk with them about long-term plans ... I just think that we don’t have those conversations with the team as much, I mean, because I feel like I have blinders on sometimes for one shift.”*

### **Better quality of patient care**

Most participants perceived improvement in the quality of patient care after the interprofessional team intervention was implemented. Participants stated that they could provide better patient care because healthcare providers had shared goals and plans for patient care, and they felt safe to share their opinions. For example, one participant stated that the healthcare team could adjust care plans for patient safety when the bedside nurse spoke up with important information about the patient which the other team members were now aware. Another, a participant acknowledged that she could plan and provide relevant hospice care for the patient and family because she heard a physician tell the patient that he had six weeks to three months to live during SIBR.

Participants stated that because the patient and family members also participated in SIBR, that they could ask questions and express concerns about the care plans. Notably, participants

perceived that because healthcare providers wrote daily care plans on the white board in the patient's room, that this patient-centered approach was associated with improvement in patient satisfaction. Also, participants felt more confident in patient care or patient education by knowing and contributing to the care plans and concerns about the patients.

## **Job outcomes**

### ***Job satisfaction***

Most participants felt more satisfied with their job through improved changes resulting from the interprofessional team intervention. Many participants pointed out the improvement in efficiency and workflow as a reason for improved job satisfaction. One participant stated:

*"I think [I feel] better job satisfaction because of my workflow. I feel like I don't have to page as much. I feel like I know more so what the plan of care is, and so does my patient. I think it's just a more effective use of my time now."*

Several participants stated they were more satisfied with their work because they felt included as a member of the team, as expressed in the following comment: *"[I am] More satisfied [with my job], because I'm included and I feel included. ... I think circling around it's really nice to feel a part of the team."* At the same time, one participant stated that the reason for better job satisfaction was because nurses felt more comfortable speaking up as a member of the team. Moreover, participants were more satisfied with their work because of better teamwork and the increase in confidence in patient care.

### ***Retention***

When participants were asked about whether there was a change in their intent to stay on their unit following the interprofessional team intervention, participants stated that although the intervention was helpful for improving *"the culture of the unit"*, it was difficult to mention if

they were more or less likely to stay at their unit following the intervention. Subsequent changes in interprofessional collaborative practice did not have a large effect on participants' intent to stay or leave. In terms of the reasons, participants stated that they already loved their job and they were satisfied with their coworkers, management, and supportive workplace environments prior to the interprofessional team intervention.

## **Team challenges**

### ***Lack of consistency***

Most participants reported that they have experienced team challenges during the implementation of SIBR and expected more as the team continued to refine their processes. One challenge noted was the lack of consistency from several attending physicians in following the structures developed for the SIBR. Specifically, participants perceived a lack of adherence to the structured process of the rounds when each member's roles defined in the rounding structure were overlooked. One participant stated:

*“I think that it's challenging sometimes when they [providers] don't stick to what you expect out of this training, the order of it and knowing when you're speaking. ... Usually, they'll sweep back to you and say, “Do you have any thoughts? Did you have anything you wanted to add?” I think when that structure gets broken; a lot of what we're supposed to say is already said. I think when the structure is followed, it works really well.”*

Many participants reported that nurses felt embarrassed when they did not receive a call as a pre-notification for the SIBR process and consequently could not attend the rounding. The embarrassment was because they could not explain the reasons for the physician's orders and care plans to the patient, and because they had to ask the patient about the physician's orders or plans which the patient heard in the rounding. Given this, participants suggested that giving the

nurse enough notification before the rounding on his/her patient would be needed to improve the process of SIBR and the quality of patient care. Some participants stated that a suggestion to enhance the process was to have a dedicated person on the team call the nurses ahead of time so that they could be prepared and present when the team arrived.

Several participants pointed out the lack of debriefing at the end of the rounding to discuss the process was a lost opportunity to continuously improve collaborative practice. One participant suggested adding a debrief after SIBR for process improvement: *“I like the debriefing idea. I think that would really improve, because if you don’t know that something is wrong you can’t fix it.”*

Participants indicated that because SIBR process was less likely to occur on the weekends, that nurses had to chase down physicians to obtain patient’s daily plans or discharge plans, which led to poor communication with other professionals and had a negative impact on patient care. Participants stated that nurses who worked on the weekends felt that they could not communicate what patients actually wanted to know, and then suggested organizational systems to improve processes of patient care delivery specific to discharges on the weekends.

### ***Physician’s engagement in SIBR***

Most participants stated that attending physicians’ values and attitudes toward interprofessional collaboration had a large effect on whether rounding structures were followed effectively and whether nurses were included in the rounding. One participant stated:

*“I think there are times where depending on who the attending [attending physician] is, because they’re the driver of every setting and of every situation and every round that occurs. If the attending [attending physician] is on board and wants to make sure that the nurse is present, then the team will wait and make sure that the nurse is present. If the attending [attending*

*physician] talks the talk but does not walk the walk, they're going to get through rounds. If the nurse shows up, great, but we're not going to include them in our process."*

### ***Hierarchical culture***

Many participants pointed out the hierarchical culture or "*trickledown effect*" as a reason for the attending physicians' influence on the rounding, as expressed in the following comment:

*"That hierarchy is there and there should be in general a culture shift, but the nurse practitioners are under the attendings [attending physicians] and surgeons. They're getting crapped upon by them. And then it trickles down to us."*

One participant stated the example of hierarchical culture that she experienced: "*I'm a preceptor to a traveler [travel nurse]. She had never worked at a teaching hospital, and so she was kind of telling me that she was a little bit surprised at this hierarchy thing going on. She said, "I don't understand why you can't just have a conversation." ... She's like "why can't we just talk to them [attending physicians]" She's right.*" Moreover, many participants stated that the hierarchical culture has a negative effect on interaction with some attending physicians.

### ***Competing priorities***

Another team challenge, identified with the process of SIBR, was that many participants experienced conflicts with their schedule when they had to be in two places at the same time. For example, participants stated that SIBR started on patients while the nurse was changing a dressing or delivering the medications for another patient. Participants suggested that setting an accurate time schedule for when SIBR is done for each patient might enable nurses to prepare for the rounds, as well as to organize their workflow for direct patient care. Although participants were provided with the daily rounding schedule (order that the patients would be seen), they

perceived that the structural process was not helpful in knowing the exact time for SIBR on their patients. One participant stated:

*“They [team members] try to order whom they’re going to round on in the mornings, but that doesn’t always help me. It’s hard to know exactly how long the rounds will take, because sometimes it’s half an hour and sometimes we’re starting rounds now.”*

Furthermore, participants stated that they felt a higher workload since the SIBR process was implemented, because they had to be ready to attend rounds when notified and they needed to collect pertinent data that they would share during the rounds (e.g. checking the patient status or vital signs and filling out the rounding sheet).

### **Discussion**

Despite continuing interest in interprofessional collaboration to improve teamwork and practice outcomes, there has been little research that focused on nurses’ perspective about interprofessional collaborative practice after purposeful team training. This study provides an understanding of nurses’ perceptions and experiences following a interprofessional team intervention.

This study was part of a larger parent study, which involved the implementation and evaluation of an interprofessional team intervention to enhance team and patient outcomes for patients with AHF. The parent study utilized quantitative methodology to gain insight into the effects of the interprofessional team intervention on interprofessional team functioning and communication. However, quantitative methods do not allow for a comprehensive understanding of what effects the interprofessional team intervention had and how it was implemented among healthcare team members. Therefore, this present study employed qualitative focus group interviews and a content analysis to offer insight into the questions of how and why an

interprofessional team intervention impacted participants' (nurses only) perceptual and behavioral changes in detail.

Our findings indicated that participants perceived improved changes in interprofessional relationships and team communication following the interprofessional team intervention. This study supports the positive findings from the parent study of improved relationships and communication among team members. In addition, this study identified team performance processes that need to be improved to promote interprofessional teamwork and effective communication. Notably, interprofessional relationships with different healthcare professionals were built and improved by understanding other professionals' roles and responsibilities, and by participating as a member of the team through the structured support of the interprofessional team intervention. Moreover, we found that open and direct conversations and frequent and responsive communication styles improved quality of communication with other healthcare professionals. This study also suggested that communication skills obtained from the intervention were useful for healthcare professionals to achieve better communication with each other when conflicts occurred in patient care.

This study added information about specific team processes following the interprofessional team intervention. The parent study evaluated changes in communication and relationships and did not study workflow processes, whereas this smaller study revealed further findings in team functioning that were not specifically explored in the parent study. This study found participants' perceptions and subsequent changes in the efficiency of care delivery, the quality of patient care and psychologically safe environment, as well as team challenges that participants experienced following the interprofessional team intervention. Specifically, understanding the team challenges that occurred after implementing the SIBR process would be

helpful to adjust the structured process or communication tools of SIBR for better improvements in interprofessional collaborative practice. Therefore, the findings of this study added value in filling gaps between the studies which examined effectiveness of the interprofessional team intervention, as well as in understanding improvements in team performance and barriers to implementation of the interprofessional team intervention.

Our study revealed that the implementation of the interprofessional team intervention was perceived as highly beneficial to nurse job satisfaction. This study supports positive findings from previous studies that examined the effect of interprofessional rounding (Sharma & Klocke, 2014; Gausvik, et al., 2015). Moreover, this present study provided further details about team process mechanisms describing how nurse job satisfaction improved after the interprofessional team intervention. That is, we found that the interprofessional team intervention did not directly affect nurse job satisfaction; rather, the improved team functioning, increased psychological safety, and efficient delivery of care associated with the introduction of SIBR processes had a direct and positive effect on nurse job satisfaction. Therefore, team performance strategies that contribute to nurses' job satisfaction need to be considered to retain competent nurses and improve the quality of patient care.

We also found that study participants did not perceive a change in their intent to stay in their unit after the interprofessional team intervention. The reason for this finding might be that the team processes after SIBR had only been in place for approximately 3 months; thus, it may have been too early to determine if their intent to stay or go was related to the intervention. Another possible reason for the finding was that nurses might already have had a high level of satisfaction with their work environments prior to the intervention because this study setting has

consistently achieved Magnet status since 1994 (Kelly, McHugh, & Aiken, 2011; Park, Grass, & Boyle, 2016).

Despite valuable findings of this study, there are several limitations that need to be recognized. First, this study was conducted in a single inpatient unit of a single institution and may not be generalized to other institutions or units. This study also had a small number of participants in the focus group interviews; thus, the results of this study might not be representative in evaluating the interprofessional team intervention. Second, the focus group interviews of this study were conducted early in the process of implementing SIBR; thus, further research needs to be conducted with focus group interviews at least six months after the SIBR process was introduced to effectively assess the impact of the SIBR process. Moreover, even though the SIBR process has a structured format, attending physicians who lead the SIBR process are on service for two week periods at a time, and there could be changes to the process every two weeks. Furthermore, the SIBR process was initially implemented only during weekdays because of staffing issues on the weekends – consisting of mostly moonlighter attending groups without nurse practitioners or physician assistants; thus, the SIBR process could not be followed consistently. Also, because the SIBR process is implemented in the morning, nurses who work during the evening or night shifts do not utilize communication skills which are needed during SIBR. To sustain the new processes, follow-up materials, standardization of SIBR approaches across all shifts and days with the entire team, and repeat team trainings to reinforce communication skills need to be considered.

### **Conclusion**

This study aimed to investigate nurses' experiences, perceptions and subsequent changes following a purposeful interprofessional team intervention. Our findings demonstrated that most

participants perceived improved changes in interprofessional team functioning, the culture of the work environment, efficiency in delivery of care, the quality of patient care, and job satisfaction. Moreover, this study identified team challenges and suggested improvements following the purposeful interprofessional team intervention. In further research, team strategies and ongoing coaching to maintain improved changes and to overcome the barriers to the implementation of the interprofessional team intervention need to be considered. Moreover, efforts by individuals within an organization and by organizational leadership that values interprofessional teamwork and supports a culture of safety need to be considered to improve interprofessional collaborative practice and patient outcomes.

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Table 1.  
Themes and Subthemes

Themes	Subthemes
Interprofessional team building	<ul style="list-style-type: none"> <li>• Interprofessional relationship</li> <li>• Interprofessional team communication</li> </ul>
Psychological safety and cultural change	-
Efficiency in delivery of care	-
Quality of patient care	-
Job outcomes	<ul style="list-style-type: none"> <li>• Job satisfaction</li> <li>• Retention</li> </ul>
Team challenges	<ul style="list-style-type: none"> <li>• Lack of consistency</li> <li>• Physician's engagement in SIBR</li> <li>• Hierarchical culture</li> <li>• Competing priorities</li> </ul>

Appendix A.  
Interview Guide

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<b>Interview Questions</b>	
<b>Welcome</b>	
<b>Introduction</b>	Study aims Brief description of the focus group interview Roles of moderator and note taker
<b>Discussion</b>	<b>Part 1: Questions about team functioning</b> <ul style="list-style-type: none"><li>• How did the interprofessional team intervention influence your overall daily work with team members?</li><li>• Do you perceive a change in communication, within and among team members following the interprofessional team intervention? Any examples? (Probe: a change in frequent, timely, accurate, and problem solving communication, quality)</li><li>• Do you perceive a change in relationships, within and among team members following the interprofessional team intervention? Any examples? (Probe: relationships broadly, for example, personal relationship or team cohesion or task-focused ties)</li><li>• Do you perceive a change in speaking-up in your cards-B rounding following the interprofessional team intervention? Any examples? (Probe: Speaking up in the rounding includes asking questions, providing suggestions, and discussing problems, and concerns about patient care)</li><li>• What specific structural changes were made to support team functioning? (Probe: leadership, communication tools, interprofessional team meetings, conflict resolution strategies, etc.)</li></ul> <b>Part 2: Team challenges</b> <ul style="list-style-type: none"><li>• What is the biggest challenge you have experienced, within and among team members following the interprofessional team intervention (Probe: communication skills, team climate, mutual support, peer mentorship, leadership, etc.)?</li><li>• If your team were to take one action to further improve teamwork, what should it be? (Probe: communication skills, team climate, supportive culture, peer mentorship, leadership, etc.)</li></ul> <b>Part 3: Job satisfaction</b>

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- Are you more or less satisfied with your job while working together with team members since the interprofessional team intervention was implemented? And why?
  - Regardless of the intervention, in general, what about your unit contributes to your job satisfaction? (Probe: Leadership, team climate, teamwork, staffing level, opportunity for promotion, workload, shift work, etc.)

**Part 4: Retention**

- Are you more or less likely to stay on this team since the interprofessional team intervention was implemented? And Why?
- Regardless of the intervention, in general, what about your unit makes you want to stay or leave there? (Probe: That is leadership, team climate, teamwork, staffing level, opportunity for promotion, workload, shift work, etc.)

**Part 5: Other opinions**

What else would you like to share about today's discussion?

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<b>Summary</b>	Summarize the discussion
<b>Finish</b>	Thank the participants for their time and participation in the focus group interview

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Appendix B.  
Codebook of Qualitative Data Analysis

<b>Codes</b>	<b>Description</b>	<b>Examples</b>
1. Better patient care	Comments that nurses answer patients' questions about care plans better than before, or reinforce care plan or patient education discussed in interprofessional rounding.	"I feel like I am more confident in what I can reinforce with teaching for my patient, if I know. If I hear all the concerns and all the plan that the team has in their discussion — then if the patient has a question later or I'm sensing that they're not quite understanding — I feel like it is within my scope to kind of reinforce those things"
2. Better organization for the day	Comments about better planning for daily patient care by participating in the rounding.	"I just feel like it's just a better organization for the day." "It felt less like I was just constantly getting orders, you know? I could plan my day a little bit better, and it was a better use of my time I think."
3. Closed-loop communication	Comments about reading back or closed loop communication to clarify with the sender of the message that the message received is the same as the intended message.	"The importance of like they emphasized reading back — I don't know — confirming what someone else said, and so you're not getting the wrong information."
4. Weekend coverage	Comments about the checklists or systems to plan for discharge over the weekend.	"I wonder if there was a system in place that was specific to discharge over the weekend plans."
5. Face-to-face communication	Comments that health care providers communicate with each other face-to-face	"You've like seen them face-to-face and you've been on the same page and discussed something directly."
6. Feeling as part of team	Comments that nurses feel as part of the team or as part of the rounds	"I think circling around it's really nice to feel a part of the team — even if it's just in the room."

7. Getting to know other professionals	Comments that nurses get to know other professionals through conversation outside of the work environment during the team training	“I think just getting to know the people on the team was helpful outside of a work environment, too, because I don’t often get to talk to like pharmacists or social workers.”
8. Helping others accept feedback	Comments about how lessons from the team training help other providers accept the feedback when inappropriate things happen	“it also gave me the ability to just have a conversation — have them accept the feedback that this was not appropriate.”
9. Helping other’s need	Comments that coworkers are willing to help someone when help is needed	“You’ve got your assignment, but if you have time, everybody is willing to help out. When you need help, there is always somebody that will help.”
10. Hierarchy	Comments about hierarchical culture or difficulties from differences in status as a patient care barrier.	“That hierarchy is there and there should be in general like a culture shift, but like the nurse practitioners are under the attendings and surgeons. They’re getting crapped upon by them, and then it trickles down to us.”
11. High workload	Comments about a large amount of work to perform in the time constraints.	“I also think like a major part, too, is just the time constraints on our floor. I think our floor is crazy busy.”
12. Improved communication	Comments about improved communication or examples of better communication since the intervention was implemented.	“I feel like the cardiology team used to be the best team about communication in general, just in the time that I’ve been on 5-Northeast, but they have gotten even better as a result of this training.”
13. Frequent communication	Comments about more often communicating with other healthcare providers as a change in communication.	“I feel like they call more often now — I don’t know — to let you know that they’ve done the teaching or when they plan on doing it. I think that’s helpful when a patient wants to leave.”

14. Improved satisfaction with work	Comments about better job satisfaction after the intervention.	“I know that we can always find more ways to grow, but it’s definitely better and that makes my job better.”
15. Improved relationship	Comments about improved relationship with other professionals.	“I feel like that in and of itself has improved the relationship, because I feel like they understand my role and my knowledge and investment in my patient.”
16. IP rounding structure	Comments about specific structures of interprofessional rounding, including the rounding sheet	“I think in that way it’s nice to have this kind of structure where okay, this is when you speak.” “structure in the sense that we go first and then I feel like the team goes.”
17. Lack of acknowledgement	Comments that attending physicians don’t know or acknowledge nurses’ work as valuable things for patient care.	“I think the biggest thing and like it all kind of comes down to I often feel like the attendings don't value the work that I do and the knowledge that I have.”
18. Lack of consistent implementation	Comments about inconsistent practices in conducting the rounding, depending on when it happens, who the attending physicians are, and who attends.	“I do feel like on the weekends that people are less likely or are less inclined to follow the rounding structure.” “I think that it’s very much driven by the attending and how much they value this process.”
19. Lack of interaction with attending physicians	Comments about what nurses don’t interact with attending physicians or why they don’t have a good relationship with attending physicians	“They don’t have the time to even do rounds it seems like sometimes, and so like how do we have that working relationship with them?” “I have heard from many of them that they like working on 5-Northeast because the nurses are really supportive, but they do not like interacting with the providers. Our services are very difficult and they’re not approachable. They can be rude. They are not responsive.”
20. Paging less	Comments that nurses don’t have to page as much because of seeing	“I just feel like it’s such a great place to see everybody at one time. I feel like I page way less knowing like I can see their face.”

	other professionals in the rounding.	
21. No change in relationship	Comments that nurses don't feel any change in relationships with attending physicians after the intervention.	"I at least feel like the doctors are more familiar with my face. I don't know relationship-wise if anything has changed." "I can't say that this has made my relationship with attendings any different. I don't think that has changed my relationship."
22. Opportunity for better communication	Comments that communication tools obtained from the team training can be used in the future when nurses feel like something is not working.	"I feel like this is an opportunity for us to communicate a little bit better. I feel like I could use just the term "team core training" to call attention to the fact that this is not working. Whatever we're doing in the moment is not working. That hasn't happened yet, but I almost feel like I have it like in my back pocket where I could bring it out."
23. Patient-driven care	Comments that the unit stresses patient focused care or on building good relationships with patients	"there is like a patient trajectory on our floor and like you see them. You have to establish relationships with your patients."
24. Poor communication	Comments about the lack of communication for patient care plan during the weekend.	"I feel like there have been a few times where patients have been really angry, because like there is no one there to do pharmacy teaching and no one getting back to pages — even though they're listed as being the pharmacist for that time period."
25. Pre-notifying	Comments about calling nurses to the bedside before the rounding as a new structure or as a suggested improvement.	"Well, calling you to the bedside. That didn't used to happen." "More notice would be great, but just knowing that there is a structure is kind of nice."
26. Satisfaction with unit	Comments about satisfaction with working at the unit as a reason for intent to stay	"There is no better place to go and like this is the dream job in this specialty, in this hospital and this floor."

		“I’ve always liked the unit, and I don’t think that the team core is what’s contributing to me wanting to stay there.”
27. Shared knowledge	Comments about understanding each other’s role and responsibilities drawing on individual’s job function, or enabling participants to see how their specific tasks interrelate with the whole process.	“it’s just because we had a chance to sit down during the training and talk and learn about each other’s jobs; trying to gain respect for what the other people do and what their staffing looks like.”
28. Speaking up behavior	Comments about speaking up behavior which include asking questions, providing suggestions, or discussing problems about patient care during the rounding.	“I have an opportunity to bring up concerns easier and don’t feel like I’m nagging.”
29. Psychological safety	Comments about team climate that accepts participants’ voice about patient care	“I’ve never been nervous about saying something if I feel like I need to ask a question or say it.”
30. Support for professional development	Comments about support for nurses’ professional development including opportunity to receive continuing education and financial support for the education as a factor of job satisfaction or intent to stay at the unit.	“The floor does have great continuing education suggestions.”
31. Supportive culture	Comments that nurses feel supported in the unit as a factor of job satisfaction or intent to stay at the unit.	“I do feel like that’s part of the culture of our unit. It’s just knowing that when you’re on the clock, even if you have everything that you have taken care of, there is

		somebody that doesn't. You need to find that person and you need to help them.”
32. Supportive management	Comments about support from managers who understand busy work environments and help nurses’ need as a factor of job satisfaction or intent to stay at the unit.	“I feel supported that if there is an issue or concern with either an issue with a patient or provider or whatever it is, I have people in management that I can say that this is a problem.”
33. Taking time for better relationship	Comments that it takes time to build better relationships with team members after the training.	“I think that it’s planted a seed. I think that it’s going to take a while for it to truly grow into like a stronger relationship.”
34. Time conflict	Comments that nurses struggle with more than one task at a time in the morning because of the rounding	“rounding on three patients at one time. You can’t be in three places at once.” “It’s really during that morning rush when you’re doing your assessment and your meds, and the rounds all at the same time.”
35. Understanding care plan	Comments that nurses understand big picture plan of patient care as well as daily care plans during the rounding.	“nurses knowing and like feeling like they are a part of the plan and getting them in the room and understanding what the plan of the day is — where before we were probably not in the room.”

## PAPER THREE

### Effects of Interprofessional Team Training and Structured Interprofessional Bedside Rounds (SIBR) on Nurse Job Satisfaction and Retention

#### Abstract

**Objectives.** Despite continuing interest in interprofessional teamwork and communication to improve nurse outcomes and quality of patient care, there has been little research that focuses on the levels of nurse job satisfaction and retention before and after an interprofessional team intervention. The aim of this study is to examine whether or not there are positive changes in nurse job satisfaction and retention after a purposeful interprofessional team training and structured interprofessional bedside rounds (SIBR) were implemented.

**Methods.** This study is part of a larger study that involved the implementation and evaluation of a purposeful interprofessional TeamSTEPPS® training and SIBR process at an academic medical center. The design of this study was a comparative cross-sectional study. The sample population was registered nurses (RN) who care for patients with cardiovascular diseases. The academic medical center provided pre-intervention RN job satisfaction data and monthly RN turnover data pre-and post-intervention. The principal investigator following the interprofessional team intervention collected post-intervention job satisfaction data.

**Results.** This study found that RNs had significantly higher scores of job satisfaction after the interprofessional team intervention than before the intervention. RNs were likely to be more satisfied with their job after SIBR process was implemented than after the interprofessional TeamSTEPPS® training. The six-month period turnover rate in the pre-intervention period was

5.74%; the six-month period turnover rate in post-intervention period was 5.3%, but the numbers were too small to measure statistical differences.

**Conclusion.** The purposeful interprofessional team intervention had effects on a higher level of RN job satisfaction and a slightly lower level of RN turnover. Future studies that utilize a longitudinal study design over time or a randomized controlled trial design need to be considered in order to provide robust empirical evidence about the effects of the interprofessional team intervention on nursing outcomes.

## Introduction

As nursing shortages have continued over time nationally and internationally, the importance of retaining and recruiting nurses in healthcare has garnered attention (Cicolini, Comparcini, & Valentina, 2014). Because nurses as primary caregivers for patients have played a pivotal role in effectively delivering healthcare and enhancing patient care, the interest in nurse retention has been increased (Cullen, Ranji, & Salganicoff, 2010). Moreover, high levels of nurse retention in healthcare settings are positively related to cost-effective benefits from decreasing direct and indirect costs caused by nurse turnover (Twibell, et al., 2012).

Given the importance of nurse retention, the interest in nurse job satisfaction has also significantly increased for several decades because job satisfaction is the most predictive factor of nurse retention (Tourangeau & Cranley, 2006). Job satisfaction is defined as “the degree of positive affect towards a job or its components” (Adams & Bond, 2000, p.3). Because job satisfaction is a complex phenomenon, numerous studies have examined work environmental factors in the healthcare setting that influence nurse job satisfaction and retention (Kalisch, Lee, & Rochman, 2010).

Effective interprofessional team functioning has been identified as a crucial factor that contributes to high levels of nurse job satisfaction and retention (Chang et al., 2009). DiMeglio, et al. (2005) revealed that nurses were more likely to be satisfied with their job and stay at their job when they experienced good relationships and effective collaboration with healthcare team members. Specifically, Blake et al. (2013) found that effective team collaboration between nurses and physicians had a significant positive impact on nurses’ intent to stay. Aston, et al. (2005) found that effective interprofessional teamwork can offset various factors of frustration occurring in the work environments, thereby leading to improved interprofessional team and patient outcomes. In

terprofessional team trainings or team strategies are recommended to help healthcare team members including nurses achieve effective teamwork and resolve conflicts at the workplace, as well as enhance patient safety (Joint commission, 2004). Given this recommendation, numerous studies have investigated the effects of interprofessional team trainings or introduction of team strategies and revealed that team interventions enhanced team related outcomes (McCaffrey, et al., 2010 ; Ajeigbe, Leach, McNeese-Smith, & Phillips, 2013; Gausvik, et al., 2015). However, there is little research that has focused on the effects of an interprofessional team training or team strategies on nurse outcomes specific to nurse job satisfaction and retention within clinical practice settings . To fill this gap, the aim of this study was to examine whether or not there were positive changes in nurse job satisfaction and retention after a purposeful interprofessional team training and structured interprofessional bedside rounds (SIBR) were implemented.

### ***Context of the study***

This study is part of a larger “parent study” which involved the development and evaluation of interprofessional collaborative practice (IPCP). The parent study has implemented and evaluated the interprofessional team intervention including a four-hour Team Strategies and Tools to Enhance Performance and Patient Safety (TeamSTEPPS) training (AHRQ, 2006), SIBR process, and quarterly leadership workshops. The interprofessional team intervention has been explained in the parent study (Zierler, Blakeney, & O’Brien, 2017); thus in this study, we will only briefly introduce the intervention.

### ***Interprofessional team intervention of the parent study***

The four-hour TeamSTEPPS training was aimed at supporting the implementation of SIBR process and was conducted during the month of March, 2016. All healthcare professionals who care for patients with advanced heart failure (AHF) from two specific units at a single

academic health center were invited to the training. The trainer group of the four-hour training was comprised of TeamSTEPPS master trainers and interprofessional education experts. They provided TeamSTEPPS competencies by focusing on the communication skills needed to implement the SIBR process. The SIBR process was implemented in the inpatient AHF unit on March 17, 2016, and is undergoing continuous quality improvement to improve the process. Internal and external stakeholders were enlisted to plan, implement, and assess the SIBR process. Also, quarterly and optional leadership workshops were provided to the AHF healthcare team over a three-year period with diverse topics such as relational coordination, leading change within an organization, coaching strategies, and addressing conflict strategies. More details of the SIBR development and implementation, and leadership workshops are described in the parent study (Zierler, Blakeney, & O'Brien, 2017).

While the parent study focused on the interprofessional team performance and patient outcomes pre-and post-intervention, this smaller study focused more specifically on nurse job satisfaction and retention before and after the intervention. Moreover, because the optional and quarterly leadership workshops might have had minor effects in improving outcomes of frontline nurses, we will consider the four-hour team training and the SIBR process as the “interprofessional team intervention” in this smaller study.

### ***Conceptual Framework***

#### **Donabedian’s Structure-Process-Outcome Model**

Donabedian’s (1966) structure-process-outcome (S-P-O) model was utilized as the foundation for this study. This model has been utilized in numerous studies to analyze and assess health services (McDonald, et al., 2007) and the quality of healthcare associated with work environments (Mitchell, Ferketich, & Jennings, 1998). According to this theory, organizational

healthcare structures affect processes of care, and processes of care affect outcomes related to patients and healthcare providers. Based on this model, structures might include employee training, payment processes, facilities, and human resources. Processes refer to all actions or interactions which are performed to achieve the outcomes, which encompass all ways that healthcare is delivered. Outcomes might include positive results such as enhanced changes in behavior, perception, job satisfaction, and health-related quality of life (Macphee, Wardrop, & Campbell, 2010). Applying Donabedian's model to this study shows the relationships between the interprofessional team intervention and nurse job satisfaction and retention (Figure 1).

[Figure 1 about here]

## **Methods**

### ***Study Design and Study Participants***

The design of this study is a comparative cross-sectional study examining the effects of the purposeful interprofessional team intervention on nurse job satisfaction and retention. As described above, the interprofessional team intervention of this study consisted of a four-hour TeamSTEPPS training and the introduction of the SIBR process (using simulations). The four-hour training was conducted during the month of March 2016. The SIBR process was introduced the inpatient AHF unit on March 17, 2016, and is undergoing process for quality improvement. This study utilized job satisfaction and turnover data pre-and post- intervention. The academic medical center provided pre-intervention job satisfaction data extracted from the 2015 National Database of Nursing Quality Indicators (NDNQI) registered nurse (RN) survey, and they also provided monthly RN turnover data (the monthly number of RN turnover and the monthly number of RN headcount of the unit) pre-and post-intervention. Post-intervention data on job

satisfaction using the same NDNQI RN survey utilized for pre-intervention data was collected by the principal investigator (PI-DB) of this study in November, 2016.

This study was conducted in an academic medical center in the Pacific Northwest. The nursing department of this medical center has been recognized as a Magnet hospital since 1994. This study employed a convenience sampling method to recruit RNs who care for patients with cardiovascular diseases (e.g. AHF, myocardial infarction, etc.) in the cardiothoracic surgery-telemetry unit; this unit has 30 single patient rooms.

### ***Data Collection***

To collect nurse job satisfaction data after the interprofessional team intervention, we administered a nurse job satisfaction survey between November 3rd and November 28th, 2016 with assistance from the nursing department of the medical center. Participation in the job satisfaction survey was anonymous and voluntary. In order to advertise the survey, the unit nurse manager sent weekly emails to all RNs in the unit and made announcements to them during the weekly unit huddle to encourage them to participate in the survey. In order to increase the response rate, there were two options for participating in this survey, and participants could select the more convenient option. One option was to complete a web-based questionnaire using a Catalyst survey link provided by the institution, and attached in weekly emails from the nurse manager. Another option was to place hard copies of the survey questionnaire with envelopes and some candies for encouragement in the break room on the cardiothoracic surgery-telemetry unit, and the PI (DB) collected the completed surveys twice a week.

### ***Measure***

#### **RN Job Satisfaction**

The Job Enjoyment scale, which was extracted from the NDNQI RN Survey (National Database of Nursing Quality Indicators, 2004) used in the medical center, was employed to measure RN job satisfaction pre- and post-intervention because this instrument is conceptualized as being reflective of nurse job satisfaction (Taunton et al., 2004). The Job Enjoyment instrument uses a Likert-type scale (1- 6) ranging from strongly agree (1), to strongly disagree (6), for the following 7 items:

- a) “As RNs, we are fairly well satisfied with our jobs on our unit.”
- b) “RNs on our unit would not consider taking another job.”
- c) “I have to force myself to come to work much of the time.”
- d) “RNs on our unit are enthusiastic about our work almost every day.”
- e) “RNs on our unit like our jobs better than the average RN does.”
- f) “I feel that each day on my job will never end.”
- g) “We find real enjoyment in our work on our unit.”

The Job Enjoyment instrument is a validated and reliable instrument to measure nurse job satisfaction. Cronbach’s alpha reliability coefficients for the constructs were 0.90 (Taunton et al., 2004). Cronbach’s alpha reliability of this present study were 0.88. The concurrent validity was supported in a study of Taunton et al. (2004) by examining associations between scores on the NDNQI-Adapted Index and Job Enjoyment.

In addition, in order to examine how the four-hour team training and the implementation of the SIBR process each affected the level of nurse job satisfaction, two items were added in the post-intervention survey: 1) “Are you more satisfied with your job since the four-hour team training in March of 2016?” and 2) “Are you more satisfied with your job since the SIBR process

has been implemented?” There were three possible answers – a) yes, b) no, and c) N/A (“I did not attend the training” or “I did not attend rounds”).

### **RN Retention**

To measure the change in RN retention following the interprofessional team intervention, we utilized RN turnover data provided from the academic medical center. RN turnover was defined as the number of RNs who left a budgeted position, including voluntary and involuntary resignations. RN turnover data is based on the number of RNs working as classified staff (FTE), not per diem. Monthly RN turnover data from May to October, 2015 and May to October, 2016 were obtained to compare the same six month periods of each pre- and post-intervention year because seasonal differences might affect nurse turnover. That is, because the reference point for the intervention was March-April of 2016, monthly turnover rate data between May to October, 2015 and May to October, 2016 were utilized in this study.

### ***Ethical Considerations***

Permission was obtained from the nursing department in order to a) utilize pre-intervention data of RN job satisfaction and monthly RN turnover data of the cardiothoracic surgery-telemetry unit, and b) administer the NDNQI survey in the cardiothoracic surgery-telemetry unit following the interprofessional team intervention. Because collecting RN job satisfaction survey in 2016 was part of the Quality Improvement of the nursing department, this study was deemed exempt by the Human Subject Divisions (the institutional review board) at the University of Washington.

### ***Data Analysis***

Data analysis for this study was conducted using SPSS software package (ver. 19.0 for Windows; SPSS Inc., Chicago, IL, USA). Descriptive statistics were utilized to analyze job

satisfaction and turnover data. Although job satisfaction survey questionnaires were collected from RNs in the same unit pre- and post-intervention, because RN participants were required to be anonymous at each pre-and post- data collection time period, there is no way to link pre-and post-scores for the participants who had answered the survey questionnaire twice. Thus, the mean differences between the baseline scores and post-intervention scores of the Job Enjoyment scale were analyzed using independent t-tests rather than the potentially stronger paired t-tests. McNemar's test and binomial tests were employed to analyze two additional questions in the post-intervention survey. Internal consistency of the Job Enjoyment instrument was assessed using Cronbach's  $\alpha$ . A significance level of 0.05 was used for all statistical tests.

## **Results**

### ***Sample Characteristics***

Based on the administration data from the medical center, the current number of RNs working in this unit is 66, where 62 RNs (94%) work as classified staff (FTE) and 4 RNs (6%) work per diem (Table 1). Most RNs in the cardiothoracic surgery-telemetry unit had between 2 and 5 years of clinical experiences ( $n = 19$ , 29%), followed by less than 2 years ( $n = 18$ , 27%) and between 5 and 10 years ( $n = 13$ , 20%). A total of 57 RNs (86%) achieved a bachelor's degree or higher, and 28 RNs (14%) achieved advanced nursing certifications such as the progressive care clinical nursing and the medical-surgical nursing certification (Table 1).

In the pre-intervention period, the NDNQI RN Surveys were distributed to a total of 65 RNs in the unit and 31 surveys (48%) were returned. For the post-intervention period, 45 of 66 RNs (68%) completed the survey. In the post-intervention survey, one participant did not respond to the seven items of the Job Enjoyment scale, but did complete the two additional questions about the four-hour interprofessional team training and SIBR process.

### ***RN Job Satisfaction***

As represented in Table 2, nurses had significantly higher scores of satisfaction with their job after the interprofessional team intervention (Mean= 4.46, SD = 0.74;  $p = .001$ ) than before the intervention (Mean = 3.95, SD = 0.51). Figure 2 also shows that RN job satisfaction was improved following the interprofessional team intervention by comparing mean scores between pre-and post-intervention (Figure 2-A) and demonstrating distributions at five percentiles (10, 25, 50, 75, and 90 percentiles, Figure 2-B) pre-and post-intervention.

Moreover, Table 3 demonstrates that RNs had significantly higher scores in all items of job satisfaction after the intervention (between  $p < .05$  and  $p < .001$ ) compared to pre-intervention. Three items had the greatest statistical changes pre- versus post-intervention; “RNs on our unit like our jobs better than the average RN does” ( $t = - 4.23, p < .001$ ), “I have to force myself to come to work much of the time.” (reverse-coded;  $t = - 3.76, p < .001$ ), and “As RNs, we are fairly well satisfied with our jobs on our unit.” ( $t = - 3.47, p = .001$ ).

In terms of the two questions added to the NDNQI survey in the post-implementation period, a greater number of RNs felt more satisfied after the four-hour interprofessional team training (yes =19, 52.8%) than nurses who did not feel more satisfied (no = 17, 47.2%); however, there was no significant difference between the two responses. Nurses who stated that they were more satisfied after SIBR was implemented (yes = 26, 74.3%) was greater than nurses who did not feel more satisfied (no = 9, 25.7%); there was a significant difference between the two responses ( $p = .006$ ). Moreover, nurses were likely to be more satisfied with their job after SIBR was implemented than after the four-hour team training ( $p = .016$ ).

### ***RN Retention***

RN turnover data for the same six month periods of each pre- and post-intervention year (May 2015 – October 2015/ May 2016 – October 2016) are shown in Table 4. The six-month period turnover rate in the pre-intervention period was 5.74%; the six-month period turnover rate in post-intervention period was 5.3%.

### **Discussion**

Despite continuing interest in interprofessional teamwork and communication to improve nurse outcomes and patient care, there has been little research that focuses on the levels of nurse job satisfaction and retention after an interprofessional team intervention. This study provides empirical evidence that the interprofessional team intervention, including a four-hour team training and the SIBR process, has effects on a higher level of RN job satisfaction and a slightly lower level of RN turnover. The findings of this study suggest that team strategies to achieve effective interprofessional team-based care approach are essential to improve IPCP and nurse outcomes.

This study focused on nurse job satisfaction and retention as outcomes following an interprofessional team intervention rather than examining specific team processes such as interprofessional teamwork and communication. However, as we addressed Donabedian's theory as the conceptual framework, the team intervention of this study might improve interprofessional team processes such as teamwork and communication, and the improved team processes might positively influence nurse job satisfaction and retention. Team outcomes, such as improved teamwork and team communications following the interprofessional team intervention were examined in the parent study and will be reported elsewhere. Moreover, previous studies supported the relationship between an interprofessional team intervention and improvement in team processes such as teamwork, communication, and delivery of care (Sharma & Klocke,

2014; Gausvik, et al., 2015; Kemper, et al., 2016).

Our key findings revealed that job satisfaction among nurses was significantly improved after the interprofessional team intervention. This study supports positive findings from previous studies that examined the effects of SIBR on job satisfaction among nurses (Sharma & Klocke, 2014) and among interprofessional acute care teams (Gausvik, et al., 2015). Kemper, et al. (2016) also found that healthcare providers who participated in a crew resource management training perceived positive changes in job satisfaction. However, because there was a lack of consistency in utilizing measurements to examine job satisfaction among nurses or healthcare providers pre-and post-intervention, there might be difficult to make meaningful comparisons about the effectiveness of the interprofessional team interventions. Thus, future studies that utilize standardized and validated job satisfaction instruments pre-and post-intervention need to be considered to more effectively evaluate the impact of an interprofessional team intervention on job satisfaction.

This study revealed that the implementation of the SIBR process was more beneficial to increasing nurse job satisfaction than the four-hour team training. This finding was not surprising because the four-hour team training was a one-time activity in March, 2016 and the SIBR process has been ongoing continuously since the process was introduced in March, 2016. The finding suggests that the sustainable SIBR process was more effective for improving nurse outcomes than a one-time training activity. In order to maintain improved changes through the new processes for quality improvement, follow-up materials and repeat team trainings to reinforce interprofessional collaboration and communication skills between healthcare professionals need to be considered.

We also found that although DiMeglio, et al. (2005) described decreased RN turnover

rates following a team-building intervention, that the monthly RN turnover pre-and post-intervention for this study was too low to determine the significance. A possible reason for the low monthly turnover rates of the unit might be that this study setting has consistently achieved Magnet hospital status since 1994; thus, nurses might perceive higher levels of satisfaction with teamwork and their work environments. For these reasons, the RN monthly turnover rates of this unit pre-and post-intervention might be low. A number of previous studies supported this interpretation and indicated that RN turnover rates in Magnet hospitals were significantly lower than non-Magnet hospitals (Kelly, McHugh, & Aiken, 2011; Staggs & Dunton, 2012; Park, Grass, & Boyle, 2016). Therefore, a future study conducted in diverse study settings including non-Magnet hospitals and community settings needs to be considered to explicitly investigate whether or not RN retention is improved following the interprofessional team intervention.

Despite valuable findings of this study, there were several limitations of this study. First, we conducted this study in a single inpatient unit at an academic medical center; thus, the findings of this study might not be generalizable to other units in different clinical settings. Second, because this study conducted a comparative cross-sectional study design that provides snapshots at two points (e.g., pre- and post-intervention), this study could not verify causal relationships between the interprofessional team intervention and nurse outcomes. Moreover, even though there are a number of variables that impact RN job satisfaction and retention, this study could not consider other confounding factors such as participants' characteristics, team culture, work environments, and promotional opportunity that might influence RN job satisfaction and retention. Thus, in order to provide robust empirical evidence about the effects of the interprofessional team intervention on RN job satisfaction and retention, further studies that utilize a longitudinal study design over time or a randomized controlled trial design need to

be considered. Third, because this study utilized independent t-tests for analyzing pre- and post-intervention job satisfaction data, this generally results in an equal or more conservative analysis than paired t-tests; however, under unusual conditions (such as negative correlation between pre- and post-conditions) the independent t-tests might not be a conservative estimate. Furthermore, this study used survey questionnaires with different lengths before and after the interprofessional team intervention. Although we utilized job satisfaction pre-intervention data with 7 items extracted from the 2015 NDNQI RN Survey data of the academic medical center, because the NDNQI RN Survey consisted of more than 50 items, this pre-intervention survey questionnaire was much longer than the post-intervention questionnaire (9 items). For this reason, the pre-intervention questionnaire might increase participants' fatigue and then might affect negative responses on their job satisfaction. Therefore, further studies that utilize surveys with the same length pre-and post-intervention need to be considered to reduce biases from the survey response.

### **Conclusion**

This study aimed to examine levels of nurse job satisfaction and retention following a purposeful interprofessional team intervention. Our findings demonstrated that nurses experienced improved changes in job satisfaction after the four-hour team training and SIBR process were implemented. Moreover, this study indicated that the six-month period turnover rate in the post-intervention period was slightly lower than the six-month period turnover rate in pre-intervention period. In further research, ongoing coaching and follow-up trainings to maintain improved changes need to be considered to achieve IPCP *business as usual*. Efforts of organizational leadership to promote nurse job satisfaction and retention through improved interprofessional team functioning need to be considered to directly and indirectly promote

patient delivery of care and patient outcomes in healthcare.

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Figure 1.

Structures, Processes, and Outcomes



Table 1.

## Sample Characteristics of Cardiothoracic Surgery-Telemetry Unit

Sample Characteristics (RNs = 66)		
Category	No.	%
Working as		
Classified (FTE)	62	93.9%
Per diem	4	6.1%
Clinical experiences in the current unit		
> 2 years	18	27.3%
2 – 5 years	19	28.8%
5 – 10 years	13	19.7%
10 – 15 years	5	7.6%
15 – 20 years	6	9.0%
> 20 years	5	7.6%
Education		
< Bachelor's degree	9	13.6%
≥ Bachelor's degree	57	86.4%
Advanced nursing certification		
Yes	28	42.4%
No	38	57.6%

Table 2.

RN Job Satisfaction Pre-and Post-Intervention

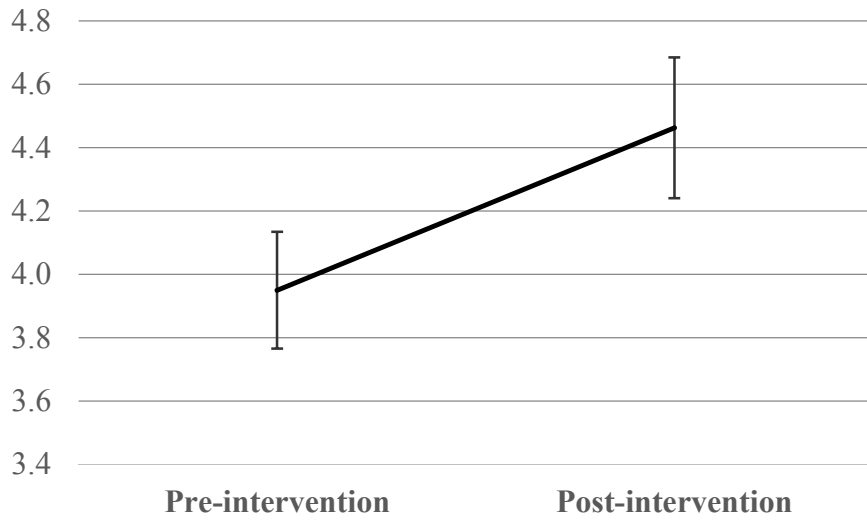
	<b>Pre-intervention</b>				<b>Post-intervention</b>				<b>t-value</b>	<b>P-value (2-tailed)</b>
	N	Mean	SD	Median	N	Mean	SD	Median		
<b>Job Enjoyment Scale</b>	31	3.95	0.51	4.03	44	4.46	0.74	4.50	-3.57	.001

Figure 2.

RN Job Satisfaction Pre- and Post-Intervention

2-A.

Mean Differences between Pre- and Post-intervention



2-B.

Distributions at 10, 25, 50, 75, 90 Percentiles Pre- and Post-Intervention

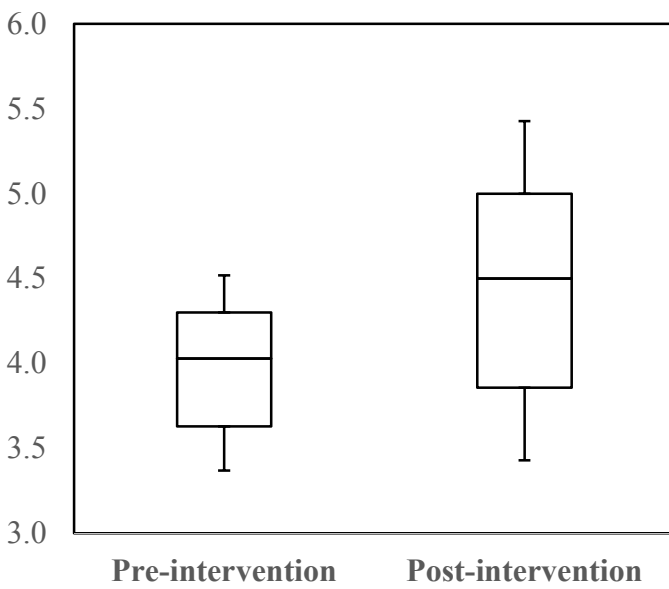


Table 3.

## Items of RN Job Satisfaction Pre- and Post-Intervention

Items	Pre- intervention		Post- intervention		t-value	p-value (2-tailed)
	Mean	SD	Mean	SD		
As RNs, we are fairly well satisfied with our jobs on our unit.	4.17	0.68	4.81	0.91	-3.47	.001
RNs on our unit would not consider taking another job.	3.37	0.75	3.95	1.05	-2.80	.007
I have to force myself to come to work much of the time.*	4.07	0.45	4.68	0.93	-3.76	< .001
RNs on our unit are enthusiastic about our work almost every day.	3.94	0.56	4.32	1.05	-2.02	.047
RNs on our unit like our jobs better than the average RN does.	3.94	0.56	4.76	1.06	-4.23	< .001
I feel that each day on my job will never end.*	3.85	0.40	4.18	0.97	-2.02	.047
We find real enjoyment in our work on our unit	4.24	0.50	4.59	0.76	-2.41	.018

\*These items were reverse coded for consistency with the total scale direction

Table 4.  
 Monthly RN Turnover Pre- and Post-Intervention

	Pre-Intervention (2015)			Post-Intervention (2016)		
	# Turnover	# Headcount	Turnover rate (%)	# Turnover	# Headcount	Turnover rate (%)
May	1	53	1.89%	1	58	1.72%
June	0	53	0	1	56	1.79%
July	1	53	1.89%	1	56	1.79%
August	1	51	1.96%	0	59	0
September	0	55	0	0	60	0
October	0	55	0	0	60	0