



## Teamwork and Clinical Error Reporting among Nurses in Korean Hospitals



Jee-In Hwang, PhD,<sup>1</sup> Jeonghoon Ahn, PhD<sup>2,\*</sup>

<sup>1</sup> College of Nursing Science, Kyung Hee University, Seoul, South Korea

<sup>2</sup> Office of Health Services Research, National Evidence-based Healthcare Collaborating Agency, Seoul, South Korea

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### SUMMARY

**Purpose:** To examine levels of teamwork and its relationships with clinical error reporting among Korean hospital nurses.

**Methods:** The study employed a cross-sectional survey design. We distributed a questionnaire to 674 nurses in two teaching hospitals in Korea. The questionnaire included items on teamwork and the reporting of clinical errors. We measured teamwork using the Teamwork Perceptions Questionnaire, which has five subscales including team structure, leadership, situation monitoring, mutual support, and communication. Using logistic regression analysis, we determined the relationships between teamwork and error reporting.

**Results:** The response rate was 85.5%. The mean score of teamwork was 3.5 out of 5. At the subscale level, mutual support was rated highest, while leadership was rated lowest. Of the participating nurses, 522 responded that they had experienced at least one clinical error in the last 6 months. Among those, only 53.0% responded that they always or usually reported clinical errors to their managers and/or the patient safety department. Teamwork was significantly associated with better error reporting. Specifically, nurses with a higher team communication score were more likely to report clinical errors to their managers and the patient safety department (odds ratio = 1.82, 95% confidence intervals [1.05, 3.14]).

**Conclusions:** Teamwork was rated as moderate and was positively associated with nurses' error reporting performance. Hospital executives and nurse managers should make substantial efforts to enhance teamwork, which will contribute to encouraging the reporting of errors and improving patient safety.

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### Introduction

The need for strong teamwork has been emphasized as being necessary for improving quality care, with the increasing complexity of healthcare systems. Healthcare teams vary in terms of team composition and size. Ineffective teamwork has been recognized as a major factor contributing to decreased patient safety [1–3]. Thus, strengthening teamwork worldwide is crucial for enhancing patient safety.

Teamwork refers to a set of interrelated knowledge, skills, and attitudes that team members must possess in order to function as a team [4]. The core components of this concept include leadership,

situation monitoring, backup behavior, and communication [4–6]. Previous studies have explored the levels of teamwork by observing team behaviors [7–9] or by using teamwork surveys [10–13]. While observational studies of teamwork are generally resource-intensive, it is frequently difficult to administer instruments to a large number of healthcare providers. Surveys can be used more efficiently to measure teamwork in clinical practice. However, a review of teamwork surveys has found that the conceptualizations of teamwork and psychometric properties varied considerably between instruments [14]. Among the surveys, the Teamwork Perceptions Questionnaire (TPQ) has been recently developed as part of the Team Strategies and Tools to Enhance Performance and Patient Safety (TeamSTEPPS) initiative supported by the Agency for Healthcare Research and Quality, which seems useful in teamwork-related studies in healthcare settings [10,15]. The TPQ captures how healthcare providers perceive the current state of teamwork: teamwork is not affected by prior experience, nor limited to specific departments or specialties [10]. It has broad applicability to various types of teams.

\* Correspondence to: Jeonghoon Ahn, PhD, Office of Research Planning, National Evidence-based Healthcare Collaborating Agency (NECA), Jung-Gu Toegyero 173, Namsan Square Building, 7th Floor, Seoul, 100-705, South Korea.

E-mail address: [jahn@neca.re.kr](mailto:jahn@neca.re.kr)

Studies investigating the perceptions of teamwork among healthcare providers showed that the levels of teamwork varied depending on the workplace [16,17]. For instance, nurses working at intensive care units rated teamwork as higher than did those working in medical-surgical units [17]. In addition, there were differences in the dimension levels of teamwork [10,15]. A study of US nurses showed that team leadership had the highest priority for improvement [15]. From this perspective, levels of teamwork may vary by healthcare systems and settings. In addition, diagnosing the current state of teamwork is necessary in order to enhance teamwork in the workplace.

Researchers have proposed that teamwork positively influences staff performance regarding patient safety and patient outcomes [3,18]. For instance, a study of nine emergency departments found that improved teamwork led to a significant decrease in clinical error rates [19]. This reduction of errors and adverse events has also been reported in outpatient oncology [20], labor and delivery [21], and surgery [22]. However, most of the existing research has concentrated on building teamwork and reducing clinical errors in specific workplaces. Other studies focusing on nursing teams, rather than teams including various healthcare professionals, showed that higher levels of nursing teamwork related to lower levels of patient falls leading to injury [23]. Inadequate nursing teamwork was an important predictor for missed nursing care [17]. However, to the best of our knowledge, very few studies explore the relationship of teamwork with error reporting in inpatient care settings.

A clinical error is a preventable adverse event or a near miss within the current medical knowledge context [24]. Clinical errors include both acts of commission and omission [24]. One such error type, the near miss, is an event or situation that though potentially harmful, does not result in any harm to the patient [25]. The magnitude and severity of clinical errors have been reported in many studies [2,26,27]. The factors and conditions associated with error occurrence include individual characteristics (e.g., age, gender, years of nursing experience, and education level) and work environment characteristics (e.g., work unit, working conditions and workload, and hospital environment) [28–33]. Poor teamwork and communication failures have been identified as the most common causes of clinical errors in practice [1,34,35].

Identifying the incidence and nature of clinical errors in real practice is necessary for effective error reduction. Many healthcare institutions have implemented error-reporting systems. Data and information that are built into, and analyzed through clinical error reporting help detect vulnerable processes behind patient safety incidents and provide opportunities that improve system performance and prevent future patient safety risks [36,37]. Clinical error reporting is a crucial component of creating a safer healthcare system. However, the underreporting of clinical errors is a challenge to patient safety improvement. In this regard, we focus on teamwork and error reporting in this study.

Specifically, we aimed to examine the levels of teamwork in Korean hospitals using a reliable, valid teamwork tool. In addition, we investigated the relationships between teamwork and nurses' error reporting. Identifying the strengths and weaknesses of the current state of teamwork and investigating its relationships with safety-relevant staff performances will help healthcare professionals develop strategies that enhance patient safety.

## Methods

### Study design

This study employed a cross-sectional survey design. The data reported in this paper were collected as part of a larger study of

human and organizational factors relevant to patient safety. The project included explorations of systems thinking and situational awareness, as well as teamwork.

### Setting and sample

This study was conducted in two acute-care teaching hospitals in Seoul, Korea. The hospitals have different nurse staffing levels in terms of the ratio of the number of patient beds per nurse: 2.0 to less than 2.5 for one hospital and 2.5 to less than 3.0 for the other hospital. Both hospitals had three nursing shifts of 8 hours. Nurse managers in care units involve in direct patient care. The target population was nurses in adult patient care units, including operating rooms. We excluded psychiatric and ambulatory care departments. The sample consisted of 674 nurses (423 nurses from one hospital and 251 nurses from the other). To evaluate the appropriateness of this sample size, we considered the following recommendations: (a) at least 10 cases per item for factor analyses, (b) ability to obtain a power of 0.80 with a medium effect size ( $\beta^2 = 0.06$ ) and a significance criterion of .05 in analysis of variance, and (c) 10–20 cases per predictor in logistic regression analysis [38]. The sample size met all these criteria.

### Ethical consideration

This study was part of a larger research project on human and organizational factors relevant to patient safety. The overall study protocol was approved by the Institutional Review Boards of the two study hospitals (KHNMC-OH-IRB 2012-011, KOMCIRB-2012-19).

### Measurements and instruments

Teamwork was measured using TPQ. The US Agency for Healthcare Research and Quality and the Department of Defense launched a multiyear research and development effort in 2006 to create TeamSTEPPS as the national standard for team training in healthcare. The TeamSTEPPS program has a publicly available toolkit that includes the TPQ [10,39]. This questionnaire has a sound theoretical basis, and its psychometric property has been validated in hospital settings [10,11,39]. The TPQ, which can be applied to various types of healthcare teams, is available in the public domain. It consists of 35 items under the five subscales of team structure, leadership, situation monitoring, mutual support, and communication. Each subscale has seven items. The TPQ was translated to Korean by the first author of the present study. The relevance and validity of the translated scale along with the fluency of the translation were reviewed by two bilingual nursing professors and one researcher in the National Evidence-based Healthcare Collaborating Agency. No adaptations were judged necessary for a Korean hospital setting, although minor description revisions were made. The resulting questionnaire was pilot-tested with 33 nurses for clarity and readability. Additional linguistic revisions were made for clarity on basis of their feedback.

The participants were asked to indicate their degree of agreement with each statement using a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*). The Cronbach's alpha coefficient of the entire TPQ was .96, and those for the five subscales were .86, .94, .90, .85, and .89, respectively. Item analysis demonstrated that the corrected item-total correlation coefficients ranged from .54 to .68. No items had average correlation coefficients of less than .30 [38].

Principal components analysis yielded five factors with eigenvalues of 1 or greater, together accounting for 64.1% of the total variance. Each factor corresponded with one of the five subscales. Factor 1 was "mutual support", factor 2 was "team leadership", factor 3 was "team communication", factor 4 was "team structure",

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