Validity and reliability of the Teamwork Evaluation of Non-Technical Skills tool

AUTHORS

Wei-Ting Lin
PhD, RN, Assistant Professor, College of Nursing, Kaohsiung Medical University
Adjunct Research Fellow, Department of Medical Research, Kaohsiung medical University Hospital, University, No. 100, Shi-Chuan 1st Rd., San Ming District, Kaohsiung 80708, Taiwan
waittea@gmail.com

Bih-O Lee
PhD, RN, Professor, College of Nursing, Kaohsiung Medical University and
Deputy Director, Department of Nursing, Kaohsiung Medical University Hospital
100, Shih-Chuan 1st Road, Kaohsiung, 80708, Taiwan
biholee@kmu.edu.tw

Celeste Mayer
RN, PhD, CPPS. Patient Safety Officer, UNC Health Care
101 Manning Drive, Chapel Hill, NC 27514
celeste.mayer@unchealth.unc.edu

Acknowledgements:
This work was supported in part by a contract from the Agency for Healthcare Research and Quality (HHSA290200600001I #4).

The described study received University of North Carolina – Chapel Hill, Office of Human Research Ethics, Public Health-Nursing IRB approval: 08-0001.

KEY WORDS

Teamwork, TENTS, instrument validation, observational tool

ABSTRACT

Background
TENTS (Teamwork Evaluation of Non-Technical Skills) is a valuable team performance, 13 item observational assessment tool that has been used in clinical settings, but validity and reliability have not been tested.

Objective
This study conducted validity and reliability tests on the TENTS observation tool.

Method
This study used a convenience sample of 109 teamwork event observations conducted in an academic medical center in the United States of America (USA). Five different events were observed; new admissions, transfers to and from other units, rapid response team events, morning rounds, and medical procedures. Exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were conducted and the Cronbach's alpha coefficients of the inventory were obtained.

Result
The EFA results indicated the TENTS tool consisted of three factors; communication, leadership, and cross-monitoring. These three factors accounted for 46.30% of the total variance and their internal consistencies (Cronbach's α) were .71–.79 (.88 overall).

Conclusion
TENTS is a valid and reliable instrument for observing a variety of clinical teamwork events. EFA and CFA demonstrated that the tool is well-aligned with long-standing essential teamwork components described in the literature and in the TeamSTEPPS™ system.

INTRODUCTION

Several studies have identified teamwork as a crucial factor for reducing medication-related errors, improving care quality, and patient safety (Wheeler et al 2018; Pellegrin et al 2017; Xu et al 2017; Hicksand et al 2014). The Agency for Healthcare Research and Quality developed TeamSTEPPS™, ("TeamSTEPPS 2.0 Online" 2018 DEC) an evidence-based teamwork program that is designed to optimize patient outcomes by improving health care professionals' communication and teamwork skills. However, evaluating the outcomes of TeamSTEPPS™ training is difficult without a proper instrument.

The Teamwork Evaluation of Non-Technical Skills (TENTS) tool was designed and developed by Hohenhaus et al (2008) to measure teamwork performance and has been used in clinical studies (Fraino and Sneha 2015; Sheppard et al 2013; Mayer et al 2011). After obtaining permission from the original author (Hohenhaus et al 2008), the original TENTS tool was modified to eliminate redundancy and add clarity to item meaning and was used while conducting interdisciplinary team event observations during research to evaluate the impact of TeamSTEPPS™ training. The purpose of this study is to test TENTS validity and reliability through a literature review and factor analysis using the observation data.

BACKGROUND

There are two ways in the literature to measure teamwork. One is via the use of retrospective self-evaluation questionnaires, the other is independent observation and evaluation of team performance during team events. This study focuses on the independent observation and evaluation of individual or team performance.

Eleven teamwork evaluation instruments identified in the literature are listed in table 1. Most of the identified teamwork observation tools were designed to evaluate team performance, and two tools were designed to evaluate individual team members during team meetings (Jalil et al 2014; Lamb et al 2011).

Current teamwork observation tools have limitations. The instruments may have limited applicability to all clinical settings. For example, six instruments are limited to use in critical care settings, such as the emergency department or intensive care units, two are designed for use in the operating room (Hull et al 2011; Mishra et al 2009), two are specific to meetings (Jalil et al 2014; Lamb et al 2011), and one for the delivery room (Guise et al 2008). Also, the rating scales used in the instruments vary from one another. Some instruments use qualitative analysis (quality of behavior), others focus on quantitative analysis (frequency of behavior), and one focuses on both frequency and quality (Weller et al 2011). However, Weller et al (2011) only used one question to evaluate the overall quality of the teamwork. Finally, the reliability and validity of these instruments has not been thoroughly tested. Seven out of 11 instruments provide inter-rater reliability, but only five provide internal consistency, only Cooper et al (2010) provided both. All instruments provide content validity, but only two teamwork observational instruments used exploratory factor analysis (EFA) to investigate construct validity (Kolbe et al 2013; Cooper et al 2010). The results indicated that the Teamwork in Multidisciplinary Critical Care Tool (Weller et al 2011) has three factors and the Team Emergency Assessment Measure (Cooper et al 2010) has one factor. Teamwork observational instruments have been tested during actual live events, video events, simulated events (Sawyer et al 2013; Guise et al 2008; Malec et al 2007) or both video and live events (Jalil et al 2014). Among these, actual live events are the most suitable for determining the feasibility and accuracy of observational instruments; however, less than half of the instruments have been tested during actual live events. Observers require focus and familiarity with an instrument when using it for evaluation during actual live events; video events can be viewed multiple times and thus are easier to evaluate compared to actual live events. In simulated events, team members' actions can be anticipated, and thus simulated events are also easier to evaluate than actual live events. Lastly, most teamwork observation instruments only partially

measure TeamSTEPPS™ concepts. For example, the Oxford Nontechnical Skill in Operating Room (Mishra et al 2009) focused on problem-solving and decision-making and did not focus on mutual support. Only the Team Performance Observation Tool (Sawyer et al 2013) has been developed according to TeamSTEPPS™; however, the Team Performance Observation Tool only tested for internal reliability and content validity.

Table 1: Summary of teamwork observational tools

Name of Instrument	Developing authors	Applied Field	Validity	Reliability	Rating score	Rating professional	Live event/ Video
Clinical Teamwork Scale	(Guise et al 2008)	Specificity (delivery room)	Content	Inter-rater, Test-retest	Quality	Team	simulation
The Framework for Observing Coordination Behavior in Acute care teams (Co-ACT)	(Kolbe et al 2013)	Critical care	Content	Inter-rater	Frequency	Team	Video
Explicit Professional Oral Communication Observation Tool	(Kemper et al 2013)	Critical care	Content	Inter-rater Reliability	Frequency	Team	Live
Multidisciplinary Team Performance Assesment Tool	(Lamb et al 2011)	Specificity (Tumor board meeting)	Content	Inter-rater	Quality	Individuals	Video
Mayo High Performance Teamwork Scale	(Malec et al 2007)	Critical care	Content, Construct	Inter-rater	Frequency	Team	Simulation
Oxford Nontechnical Skill in Operating Room	(Mishra et al 2009)	Specificity (Operation room)	Content, Concurrent	Internal consistency	Quality	Team	Live
Observational Teamwork Assessment for Surgery	(Hull et al 2011)	Specificity (Operation room)	Content	Internal consistency	Quality	Team	Live
Team Performance Observation Tool	(Sawyer et al 2013)	Critical care	Content,	Internal consistency	Quality	Team	Simulation
Teamwork in Multidisciplinary Critical Care Tool	(Weller et al 2011)	Critical care	Construct (EFA)	Internal consistency	Frequency Quality	Team	Live
Team Emergency Assessment Measure	(Cooper et al 2010)	Critical care	Construct (EFA)	Inter-rater, Test-retest, Internal consistency	Frequency	Team	Video
Team Performance Assessment of Multidisciplinary Tumor Boards	(Jalil et al 2014)	Specificity (Tumor board meeting)	Content, Construct	Inter-rater	Quality	Individuals	Live, Video

The TENTS does not have these limitations. It can be used in multiple settings and for multiple team events. TENTS can be used to measure the team performance across healthcare professionals or of one health care professional. The tool measures the quality of multiple team behaviors. Since TENTS was developed based on the concepts of TeamSTEPPS™, this study may provide the needed construct validity by using EFA and also convergent validity by using CFA.

INITIAL INSTRUMENT DEVELOPMENT

Salas et al (2008) identified five core concepts of teamwork; team leadership, mutual performance monitoring, backup behavior, adaptability, and team orientation. Team leadership refers to the designated or situational team leaders who monitor team activities, cultivate a positive team atmosphere and provide feedback to achieve optimum team performance. Mutual performance monitoring is the ability of team members to monitor their own and other team members' performance. To balance self-monitoring with awareness of others, members must understand one another's roles and responsibilities. Backup behavior occurs when team members anticipate and provide support to other team members. Adaptability is crucial for teamwork as team members respond to rapidly changing and diverse situations. Finally, team orientation is a focus on the success of the collective team that facilitates the open sharing of knowledge and opinions while incorporating the expertise, preferences, and personal goals of all members. These five core concepts of teamwork are aligned with the four core concepts of TeamSTEPPS™; leadership, mutual support, situation monitoring and communication. An observation measurement tool also aligned with these concepts is needed.

The instrument was developed by Hohenhaus et al (2008) to measure four dimensions: communication, leadership, situation monitoring, and mutual support. It contains 21 items and five scale points ranging from "expected but not observed" (0) to "observed and good" (4). The last two of the 21 items measure overall leadership and teamwork. These items were developed using the four core concepts of the TeamSTEPPS™ program. The instrument provides detailed expressions of the scale to enable comprehensive observation. For example, when evaluating the difference between "observed and acceptable" (3) versus "observed and good"(4),the description of good (4) -"the performance is consistent and can be used as a positive example for others", provides a clear definition to distinguish between the two scores.

METHOD

Sample and Participants

Five event types were observed and evaluated using the instrument, new admissions, transfers to and from other units, rapid response team events, morning rounds, and medical procedures such as bronchoscope, stomach scope or take off ECOM, etc. (see table 2).

Each event involved at least two different health care professionals. For example, new admissions usually involved physicians and nurses familiar with each other performing an inital assessment and developing a treatment plan. Transfers to and from other units involved physicians and nurses unfamiliar with each other sharing information about the patient. Rapid response team events involved physicians, nurses and a respiratory therapist responding to urgent patient situations all over the hospital and interacting with many other unfamiliar team members. Morning rounds usually involved physicians, nurses, a pharmacist and sometimes a nutritionist gathering daily to determine treatment and care plans for patients. Medical procedures involved physicians, nurses and an anesthesiologist or technician forming a team again with a mix of familiar and unfamiliar team members.

The events were observed mostly in a pediatric intensive care unit or a surgical intensive care unit, and rapid response team events were observed all over the hospital. The final 109 events were used for data analysis. One observer was recruited to observe all the events. A program director periodically observed events alongside the observer to ensure that the observer maintained the same evaluation standard for all events. The interrater agreement was .90 at the beginning and at the middle of the observation period that spanned one year.

Table 2: Types of observed events (N= 109)

	Frequency	Percent %
New admissions	59	54.1
Medical procedures	12	11.0
Morning rounds	3	2.8
Rapid response teams	16	14.7
Transfer to and from other units	19	17.4
Total	109	100.0

Procedure

Prior to beginning the analysis, four experts were invited to examine the content validity of the tool, two of whom were clinical experts and two of whom had PhDs in nursing. Some items were deleted because of redundancy or if they had been only rarely observed.

The remaining items were confirmed using exploratory factor analysis (EFA) and confirmative factor analysis (CFA). EFA used principal axis factor analysis and promax rotation with Kaiser Normalization. All eigenvalues were greater than 1.00. Items with factor loadings greater than .40 were retained and item–item and item–total correlations were between .30 and .70 (Pett et al 2003).

Two-stage CFA, employing first- and second-order confirmatory factor models, was performed using the EFA model to confirm the structure of the subscale produced through EFA. The model was confirmed using the following criterion: items with factor loadings greater than .50 were considered significant. Goodness-of-fit was defined by a normed fit index (NFI), goodness-of-fit index (GFI), comparative fit index (CFI), and Tucker–Lewis index close to or greater than .90 (Kline 2015).

Internal consistency was confirmed using the Cronbach's alpha coefficients of the overall scale and subscales. Internal reliability was confirmed by a Cronbach's alpha greater than .70 (Nunnally and Bernstein 1967). The analyses were conducted using IBM SPSS AMOS version 18.

FINDINGS

Content Validity

Before use in the observational study and evaluation of its content validity, the TENTS tool was modified with permission from the original author (Hohenhaus et al 2008). The experts consulted in the present study indicated that "speak up" and "ask questions" are similar concepts and suggested deleting "speak up." In addition, they suggested the other three items, "support others," "secure additional resources," and "backup behavior," are similar concepts, and thus suggested deleting two of these items. "Support others" and "secure additional resources" were subsequently deleted. "Uses appropriate critical language," "employs conflict resolution," and "debrief completed" were also deleted because they could not be observed during or when applied to most of the observation events. The other two items, "overall communication" and "overall teamwork," were not included in the factor analysis because they were not necessary for determining individual factors, only for obtaining an overall rating of the events.

Event Characteristics

The following five event types were observed: new admissions (n = 59, 54.1%), transfers to and from other units (n = 19, 17.4%), rapid response team events (n = 16, 14.7%), morning rounds (n = 3, 2.8%), and medical procedures (n = 12, 11.0%).

Exploratory Factor Analysis (EFA)

The Kaiser–Meyer–Olkin test result was greater than .60 (.87) and that of the Bartlett's test of sphericity was significant ($\chi 2 = 504.92$, df = 78, $p < .001$). Both results indicated adequate sampling and a suitable correlation matrix for EFA (Pett et al., 2003). The item measures for sampling adequacy were all higher than .60, which also indicated adequate sampling (Pett et al 2003). In each subscale, all item loadings were greater than .40 and item–item and item–total correlations were all between .70 and .30; therefore, no items were deleted. The final solution was constructed based on the factors of communication, leadership, and cross-monitoring. Communication (five items) represented all attitudes, information, and skills related to team communication; leadership (four items) represented the leadership-related behavior of the leader; while cross-monitoring (four items) represented the team members' interaction behaviors. These three subscales accounted for 37.9%, 4.3%, and 4.1% of the variance respectively (see table 3)

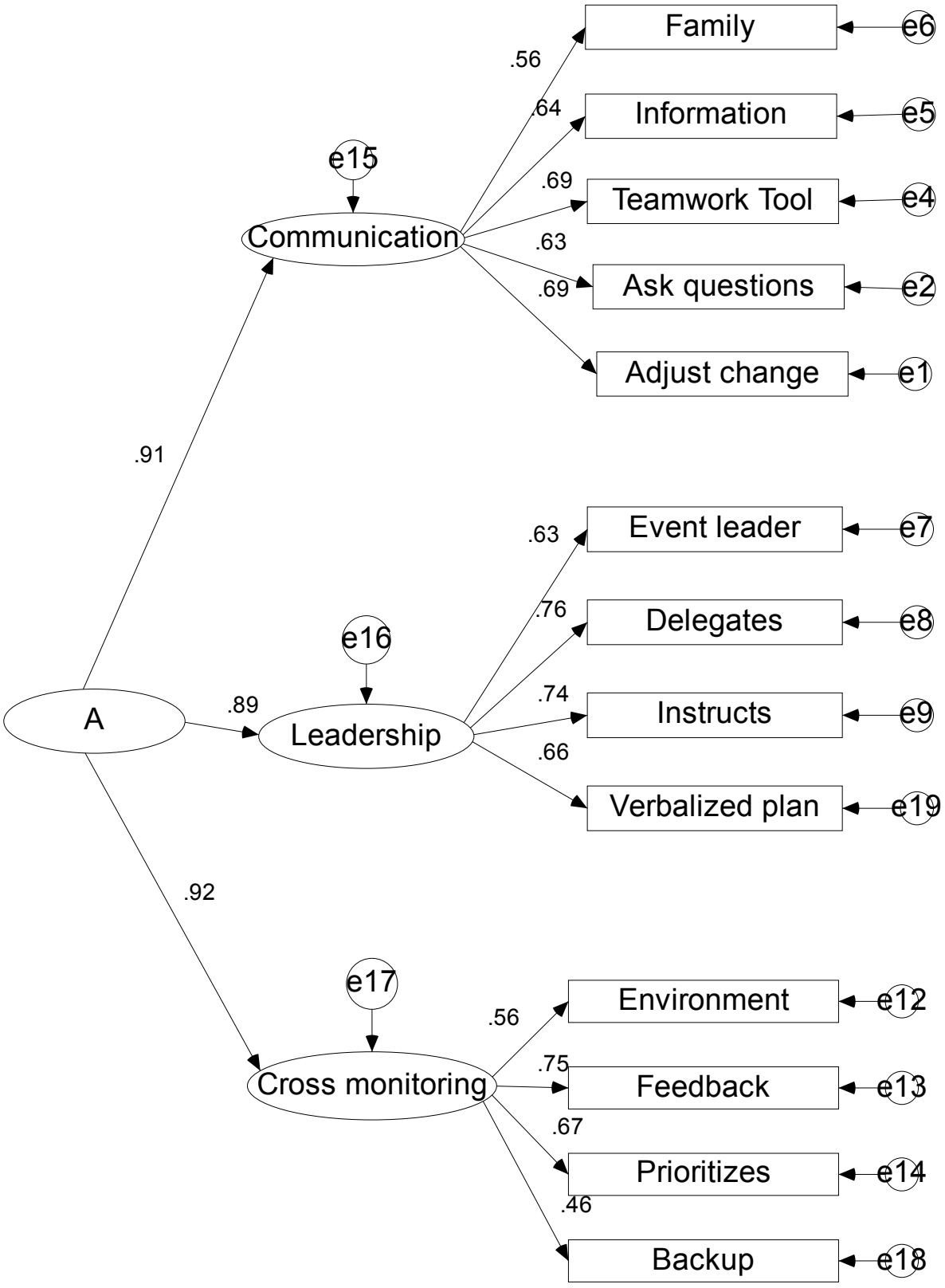
Table 3: Means, Standard deviation, and Pattern Factor Loadings of the TENTS

Original Factor	EFA factor	Mean	Standard deviation	Factor Loading	α
	Factor 1: Communication				.77
Communication	Utilizes teamwork tools	2.70	.78	.82	
Communication	Sends and receives appropriate information	2.75	.67	.64	
Communication	Sends and receives information to/ from patient/family	3.44	.77	.52	
Communication	Asks questions	3.51	.55	.45	
Situation monitoring	Verbalizes adjustments in plan as changes occur	3.13	.83	.43	
	Factor2 : Leadership				.79
Leadership	Instructs as appropriate	3.28	.68	.82	
Leadership	Delegates as appropriate	3.10	.73	.69	
Leadership	Establishes event leader	3.19	.73	.59	
Leadership	Verbalizes plan: States intentions, recommendations and timeframes	2.98	.82	.40	
	Factor 3:Cross monitoring				
Situation monitoring	Uses back-up behavior	3.48	.63	.63	
Situation monitoring	Visually scans environment	2.87	.90	.59	
Mutual support	Prioritizes appropriately	2.95	.71	.48	
Communication	Utilizes feedback between team members	3.05	.77	.41	.71
					.88

*The bold words of each item indicate the labels used in the CFA

The factor loading of "backup behavior" was lower than .50 (.46). All other items (12) were significant, with factor loadings greater than .50. The goodness-of-fit was determined using the NFI (.85), GFI (.91), CFI (.97), and Tucker–Lewis index (.96), all of which were close to or greater than .90 (figure 1).

Figure 1: A second-order confirmatory factor model of the Teamwork Evaluation of Non-Technical Skills Tool (TENTS)



Internal Consistency

The Cronbach's alpha coefficient was .88 for the overall scale, .77 for the first factor, .79 for the second factor, and .71 for the third factor. Thus, internal reliability was confirmed because all Cronbach's alpha coefficients were greater than .70.

DISCUSSION

This study evaluated the psychometric properties of the TENTS tool. Although the original design of the tool has four subscales (communication, leadership, situation monitoring, and mutual support), the EFA results in this study indicated the existence of only three because of the merging of mutual support and situation monitoring. Mutual support is defined by TeamSTEPPS™ as team members helping one another and is dependent on information obtained through situation monitoring, which is defined as the process of scanning to observe other team members and the environment. Although differentiating between mutual support and situation monitoring is simple, these concepts are related in that the interaction between situation monitoring and mutual support can be observed only when team members help or offer help. Therefore, the combination of mutual support and situation monitoring is similar to the concept of cross-monitoring, which refers to the process of scanning team members and their environment to assess their actions.

Three items—"speak up," "secure additional resources," and "support others"—all of which were in the subscale of mutual support in the Hohenhaus et al (2008) scale. "Speak up," was deleted because of the similarity with "ask questions", although "ask questions" was originally below "communication" subscale and "Speak up" was below the "mutual support/assertion" subscale. Hohenhaus et al. (2008) defined "ask questions" as team members feeling comfortable asking questions and "speak up" as team members' ability to express themselves in an appropriate manner. In the observations, a questioning sentence structure was often used to express differing views of the situation, therefore "speak up" was deleted.

"Secure additional resources" and "support others" were deleted because "backup behavior" represents these aspects of supportive behavior. In addition, "secure additional resources," "support others," and "backup behavior" were originally in the same subscale of "mutual support/assertion" and all involve asking for or offering help. "Secure additional resources" refers to asking other team members for help. "Support others" refers to providing help when help is required by another team member (Hohenhaus et al 2008), while "backup behavior" indicates team members' awareness of other team members' strengths and weaknesses and their provision of help in a timely manner (Hohenhaus et al 2008). With three slightly different concepts, team members engaged in cross-monitoring may accordingly backup each other, so "secure additional resources" and "support others" may not be necessary because team members directly offer help when required. Although the factor loading of the "back up" is .46 which is lower than .5, "back up" was retained in the model because it encompasses how team members perform situation monitoring and provide one another needed support. This is also considered an important factor related to cross-monitoring other team members' behaviors.

The CFA model identified similar underlying constructs as included in the original TENTS tool. The first construct was communication and it contained the 4 communication variables from TENTS and supported adding the additional "adjust change" variable that was originally included in situation monitoring. "Adjust change" is the behavior of team members thinking out loud to communicate while confirming a shared mental model as the event unfolds. The verbalization aspect of adjust change fits the communication construct. The construct of leadership contained the same variables as those in Hohenhaus et al (2008). The third construct, cross-monitoring, was similar to situation monitoring in the original TENTS. However, cross-monitoring considered not only situation monitoring but also all team members monitoring each other. Therefore, "prioritize" and "offer feedback" fit into this subscale.

TENTS has been successfully used to evaluate teamwork events in pediatric and surgical intensive care units and rapid response team events in a variety of hospital settings in real time. Although some items were deleted for being too similar to other items, the remaining items enabled the observer to better detect teamwork behaviors. During real-time events, a teamwork observer must immediately distinguish and score a team member's behaviors. This study's reduction of the number of items in TENTS enabled the observer to concentrate on team behavior performance rather than distinguish between various behaviors, thereby minimizing interrater bias and ensuring consistency. This study recruited only one observer and initially used interrater reliability to distinguish between the observer and program manager. The interrater agreement was .90 at the beginning and in the middle of this study.

LIMITATIONS

TENTS can only evaluate the performance of non-technical team skills and not that of clinical skills. Communication with patients or their family members is crucial for patient safety and can be enhanced through teamwork (Xu et al 2017). The original observation events were deleted when patient interaction was not possible and resulted in a smaller sample size. Most of the existing teamwork observational instruments were tested in intensive care units, the emergency care unit, or operating rooms (Hull et al 2016; Kolbe et al 2013; Weller et al 2011). TENTS also was tested mostly in intensive care units with a small number of events observed in general care units.

CONCLUSION

This paper reports on testing the TENTs using 109 event observations. A structure of content validity, reliability, EFA, and CFA was undertaken. To the best of our knowledge, this was the first study to use CFA to test a teamwork observational tool although the sample size was relatively small. The reduced number of items in the TENTS tool facilitated the observation of teamwork in this study. Findings indicate TENTS accurately measures the essential components of teamwork as described in the literature and emphasized in TeamSTEPPS™ and can be used in a variety of settings. A recommendation for future research is to test the use of TENTS as a measurement tool during interprofessional interactions with patients and their family members in general care settings.

REFERENCES

Cooper, S., Cant, R., Porter, J., Sellick, K., Somers, G., Kinsman, L. and Nestel, D. 2010. Rating medical emergency teamwork performance: development of the Team Emergency Assessment Measure (TEAM). *Resuscitation, 81(4):446-452.*

Fraino, J. and Sneha, B. 2015. TeamSTEPPS: Team Strategies and Tools to Enhance Performance and Patient Safety. *Journal of Nursing,* 1(1):11-14.

Guise, J.M., Deering, S.H., Kanki, B.G., Osterweil, P., Li, H., Mori, M. and Lowe, N.K. 2008. Validation of a tool to measure and promote clinical teamwork. *Simulation in Healthcare,* 3(4):217-223.

Hicks, C.W., Rosen, M., Hobson, D.B., Ko, C. and Wick, E.C. 2014. Improving safety and quality of care with enhanced teamwork through operating room briefings. *JAMA surgery*, 149(8), 863-868.

Hohenhaus, S.M., Powell, S. and Haskins, R. 2008. A practical approach to observation of the emergency care setting. *Journal of Emergency Nursing*, 34(2):142-144.

Hull, L., Arora, S., Kassab, E., Kneebone, R. and Sevdalis, N. 2011. Observational teamwork assessment for surgery: content validation and tool refinement. *Journal of the American College of Surgeons*, 212(2):234-243.

Hull, L., Bicknell, C., Patel, K., Vyas, R., Van Herzeele, I., Sevdalis, N. and Rudarakanchana, N. 2016. Content validation and evaluation of an endovascular teamwork assessment tool. European Journal of Vascular and Endovascular Surgery, 52(1):11-20.

Jalil, R., Akhter, W., Lamb, B.W., Taylor, C., Harris, J., Green, J.S. and Sevdalis, N. 2014. Validation of team performance assessment of multidisciplinary tumor boards. The Journal of Urology, 192(3):891-898.

Kemper, P.F., van Noord, I., de Bruijne, M., Knol, D.L., Wagner, C. and van Dyck, C. 2013. Development and reliability of the explicit professional oral communication observation tool to quantify the use of non-technical skills in healthcare. BMJ Quality and Safety, 22(7):586-595.

Kline, R.B. 2015. Principles and practice of structural equation modeling (4th ed.). New York, NY, US: Guilford publications.

Kolbe, M., Burtscher, M.J. and Manser, T. 2013. Co-ACT--a framework for observing coordination behaviour in acute care teams. *BMJ Quality and Safety,* 22(7):596-605.

Lamb, B.W., Wong, H.W., Vincent, C., Green, J.S. and Sevdalis, N. 2011. Teamwork and team performance in multidisciplinary cancer teams: development and evaluation of an observational assessment tool. *BMJ Quality and Safety*, 20(10):849-856.

Malec, J.F., Torsher, L.C., Dunn, W.F., Wiegmann, D.A., Arnold, J.J., Brown, D.A. and Phatak, V. 2007. The mayo high performance teamwork scale: reliability and validity for evaluating key crew resource management skills. *Simulation in Healthcare*, 2(1):4-10.

Mayer, C.M., Cluff, L., Lin, W.T., Willis, T.S., Stafford, R., Williams, C., Saunders, R., Short, K.A., Lenfestey, N., Kane, H.L. and Amoozegar, J.B. 2011. Evaluating Efforts to Optimize TeamSTEPPS Implementation in Surgical and Pediatric Intensive Care Units. *The Joint Commission Journal on Quality and Patient Safety*, 37(8):365-378.

Mishra, A., Catchpole, K. and McCulloch, P. 2009. The Oxford NOTECHS System: reliability and validity of a tool for measuring teamwork behaviour in the operating theatre. *Quality and Safety in Health Care*, 18(2):104-108.

Nunnally, J.C. and Bernstein, I.H. 1967. Psychometric theory. New York, USA: McGraw-Hill.

Pellegrin, K.L., Krenk, L., Oakes, S.J., Ciarleglio, A., Lynn, J., McInnis, T., Bairos, A.W., Gomez, L., McCrary, M.B. and Hanlon, A.L. 2017. Reductions in medication-related hospitalizations in older adults with medication management by hospital and community pharmacists: a quasi-experimental study. *Journal of the American Geriatrics Society*, 65(1):212-219.

Pett, M.A., Lackey, N.R. and Sullivan, J.J. 2003. Making sense of factor analysis: The use of factor analysis for instrument development in health care research. London, Untied Kingdom: Sage.

Salas, E., DiazGranados, D., Weaver, S.J. and King, H. 2008. Does team training work? Principles for health care. *Academic Emergency Medicine*, 15(11):1002-1009.

Sawyer, T., Laubach, V. A., Hudak, J., Yamamura, K., and Pocrnich, A. (2013). Improvements in teamwork during neonatal resuscitation after interprofessional TeamSTEPPS training. *Neonatal Network*, 32(1):26-33.

Sheppard, F., Williams, M. and Klein, V.R. 2013. TeamSTEPPS and patient safety in healthcare. *Journal of Healthcare Risk Management,* 32(3):5-10.

TeamSTEPPS 2.0 Online. (2018, DEC) from http://www.ahrq.gov/teamstepps/instructor/onlinecourse.html (accessed 28.01.2019).

Weller, J., Frengley, R., Torrie, J., Shulruf, B., Jolly, B., Hopley, L., Hendersdon, K., Dzendrowskyj, P., Yee, B. and Paul, A. 2011. Evaluation of an instrument to measure teamwork in multidisciplinary critical care teams. *BMJ Quality and Safety*, 20(3):216-222.

Wheeler, A.J., Scahill, S., Hopcroft, D. and Stapleton, H. 2018. Reducing medication errors at transitions of care is everyone's business. *Australian Prescriber*, 41(3):73.

Xu, J., Reale, C., Slagle, J.M., Anders, S., Shotwell, M.S., Dresselhaus, T. and Weinger, M.B. 2017. Facilitated Nurse Medication-Related Event Reporting to Improve Medication Management Quality and Safety in Intensive Care Units. *Nursing Research,* 66(5):337-349.