Teammate Familiarity, Teamwork, and Risk of Workplace Injury in Emergency Medical Services Teams

Authors: Ashley M. Hughes, PhD, P. Daniel Patterson, PhD, Matthew D. Weaver, PhD, Megan E. Gregory, PhD, Shirley C. Sonesh, PhD, Douglas P. Landsittel, PhD, David Krackhardt, PhD, David Hostler, PhD, Elizabeth H. Lazzara, PhD, Xiao Wang, MD, John E. Vena, PhD, Eduardo Salas, PhD, and Donald M. Yealy, MD, Houston, TX, Pittsburgh, PA, Buffalo, NY, Boston, MA, New Orleans, LA, Daytona Beach, FL, Charleston, SC

CE Earn Up to 5.5 CE Hours. See page 382.

Abstract

Introduction: Increased teammate familiarity in emergency medical services (EMS) promotes development of positive teamwork and protects against workplace injury.

Methods: Measures were collected using archival shift records, workplace injury data, and cross-sectional surveys from a nationally representative sample of 14 EMS agencies employing paramedics, prehospital nurses, and other EMS clinicians. One thousand EMS clinicians were selected at random to complete a teamwork survey for each of their recent partnerships and tested the hypothesized role of teamwork as a mediator in the relationship between teammate familiarity and injury with the PROCESS macro.

Results: We received 2566 completed surveys from 333 clinicians, of which 297 were retained. Mean participation was 40.5% (standard deviation [SD] = 20.5%) across EMS agencies. Survey respondents were primarily white (93.8%), male (67.3%), and ranged between 21-62 years of age (M = 37.4, SD = 9.7). Seventeen percent were prehospital nurses. Respondents worked a mean of 3 shifts with recent teammates in the 8 weeks preceding the survey (M = 3.06, SD = 4.4). We examined data at the team level, which suggest positive views of teamwork (M = 5.92, SD = 0.69). Our hypothesis that increased teammate familiarity protects against adverse safety outcomes through development of positive teamwork was not supported. Teamwork factor Partner Adaptability and Backup

Ashley M. Hughes is Health Science Specialist, Center for Innovations in Quality, Effectiveness, and Safety, Michael E. DeBakey VA Medical Center, Baylor College of Medicine, Houston, TX.

P. Daniel Patterson is Assistant Professor, Department of Emergency Medicine, University of Pittsburgh School of Medicine, Pittsburgh, PA.

Matthew D. Weaver is Post-Doctoral Fellow, Division of Sleep and Circadian Disorders, Departments of Medicine and Neurology, Brigham and Women's Hospital, Boston, MA, and Division of Sleep Medicine, Harvard Medical School, Boston, MA.

Megan E. Gregory is Post-Doctoral Fellow, Center for Innovations in Quality, Effectiveness, and Safety, Michael E. DeBakey VA Medical Center, Baylor College of Medicine, Houston, TX.

Shirley C. Sonesh is Adjunct Professor, A. B. Freeman School of Business, Tulane University, New Orleans, LA.

Douglas P. Landsittel is Professor and Director, Section on Biomarkers and Prediction Modeling, Department of Medicine, University of Pittsburgh, Pittsburgh, PA.

David Krackhardt is Professor, Heinz School of Public Policy and Management, Tepper School of Business, Carnegie Mellon University, Pittsburgh, PA.

David Hostler is Professor and Chair, Department of Exercise and Nutrition Sciences, School of Public Health and Health Professions, University at Buffalo, The State University of New York, Buffalo, NY.

Elizabeth H. Lazzara is Assistant Professor, Department of Human Factors, Embry Riddle Aeronautical University, Daytona Beach, FL.

Xiao Wang is Resident Physician, Department Emergency Medicine, Beth Israel Deaconess Medical Center, Boston, MA.

Eduardo Salas is Professor and Chair, Department of Psychology, Rice University, Houston, TX.

Donald M. Yealy is Professor and Chair, Department of Emergency Medicine, University of Pittsburgh School of Medicine, Pittsburgh, PA.

Work performed on this study was supported by a grant from the National Institute for Occupational Safety and Health (NIOSH), grant #1R21OH010025-01A1, and by Dr Patterson's career development award/KL2 training grant from the National Center Research Resources and the National Institutes of Health [NIH/NCATS grant No. KL2 TR000146] (Dr Reis, PI). Interpretations of study findings do not represent the opinions or views of NIOSH or NIH.

The views expressed in this article are those of the authors and do not necessarily reflect the position or policy of the Department of Veterans Affairs or the United States government.

Preliminary findings were presented as a poster presentation at the National Association of EMS Physicians annual meeting in New Orleans, LA, January 22-25, 2015.

For correspondence, write: P. Daniel Patterson, PhD, Department of Emergency Medicine, University of Pittsburgh School of Medicine, Iroquois Bldg, Suite 400A, Pittsburgh, PA 15260; E-mail: pattersonpd@upmc.edu.

J Emerg Nurs 2017;43:339-46.

Available online 30 March 2017
0099-1767

http://dx.doi.org/10.1016/j.jen.2016.11.007

Behavior is a likely mediator (odds ratio = 1.03, $P = .05$). When dyad familiarity is high and there are high levels of backup behavior, the likelihood of injury is increased.

Discussion: The relationship between teammate familiarity and outcomes is complex. Teammate adaptation and backup behavior is a likely mediator of this relationship in EMS teams with greater familiarity.

Key words: Team; Safety; Injury; Teamwork; Familiarity

Teams are abundant in the workplace, and thus positive and effective teamwork is essential for high-risk and time-sensitive environments. Emergency medical services (EMS) is one work environment in which teams may be formed without consideration of the experiences and time shared between teammates (familiarity).[1] Limited familiarity between teammates has been linked to inferior performance and negative safety outcomes in diverse occupations and environments.[2,3] Familiarity, teams, and team performance/safety outcomes in the prehospital EMS setting warrant further investigation.

Typical EMS work involves a team of 2 EMS clinicians dispatched to a location outside the hospital at unplanned times to care for acutely ill and injured persons. Teamwork is considered vitally important to positive outcomes for EMS clinicians and their patients and refers to attitudes, behaviors, and cognitions of teammates that engender sharing of information and team performance.[4] One study of 3 EMS organizations determined that two-thirds of scheduled shifts were staffed with clinician teammates classified as unfamiliar (meaning EMTs worked only one third of their shifts with their most frequent partner).[5] We hypothesized that increased teammate familiarity among paramedics, prehospital nurses, and other EMS clinicians deployed in dyadic teams leads to the maturation of positive teamwork behaviors and ultimately protection against adverse safety outcomes (see the Figure for hypothesized relationships).

Methods

STUDY DESIGN AND SAMPLE

We conducted a secondary analysis of data gathered from a larger study[6] of familiarity and safety to explore the relationship between teammate familiarity, teamwork, and workplace injury. We calculated the sample size necessary to detect statistical differences in the statistical model intercepts using G*Power, in accounting for best practices when the unit of analysis is dyads,[7] and determined that a sample size of 129 EMS participants was needed to detect mediation for predicting injuries using logistic regression. From January 1, 2011, to November 29, 2013, we collected archival work records and injury records from a convenience sample of 14 large EMS organizations that employed more than 100 EMS clinicians each (n = 4446 EMS clinicians total across all sites) and deployed ambulances in 37 base sites across all 4 major United States Census regions (n = 2 Northeast, n = 1 Midwest, n = 4 South, and n = 7 West). For survey purposes, we randomly selected 1000 paramedics, prehospital nurses, and other EMS clinicians employed at all participating EMS agencies and queried clinicians on perceived teamwork with their most recent partners. Institutional Review Board approval was provided for this study.

STUDY MEASURES

Measures were collected at an individual level, tested for statistical agreement, and then aggregated to a dyadic level.

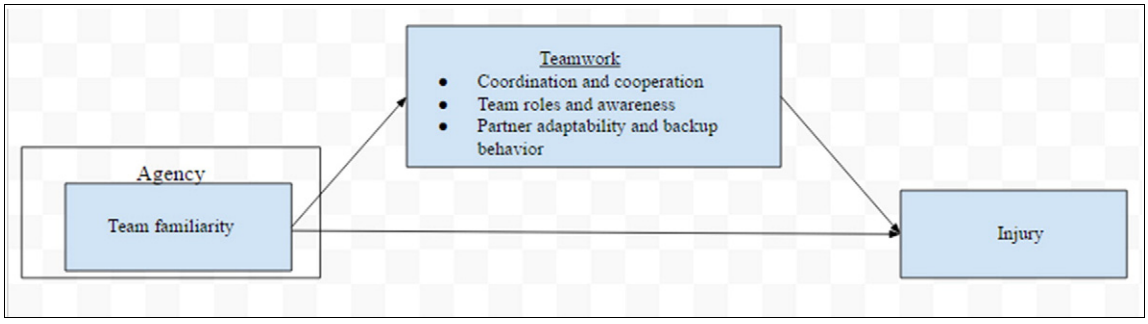

FIGURE
Team familiarity, teamwork, and fatigue mediation model.