Surgical Team Mapping: Implications for Staff Allocation and Coordination

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ABSTRACT

Perioperative team membership consistency is not well researched despite being essential in reducing patient harm. We describe perioperative team membership and staffing across four surgical specialties in an Australian hospital. We analyzed staffing and case data using social network analysis, descriptive statistics, and bivariate correlations and mapped 100 surgical procedures with 171 staff members who were shared across four surgical teams, including 103 (60.2%) nurses. Eighteen of 171 (10.5%) staff members were regularly shared across teams, including 12 nurses, five anesthetists, and one registrar. We found weak but significant correlations between the number of staff ($P < .001$), procedure start time ($P < .001$), length of procedure ($P < .05$), and patient acuity ($P < .001$). Using mapping, personnel can be identified who may informally influence multiple team cultures, and nurses (ie, the majority of team members in surgery) can lead the development of highly functioning surgical teams. *AORN J 101 (February 2015) 238-248. © AORN, Inc, 2015. http://dx.doi.org/10.1016/j.aorn.2014.03.018*

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Members of surgical teams work interdependently to perform complex and varied tasks.[1] Crucially, team performance often depends on team members' familiarity with each other and with specific surgical routines.[2] However, despite a growing body of research to support the relationship between nurse staffing and patient outcomes,[3-6] few studies have examined staffing in the OR. Several researchers have described the critical role that membership in surgical teams has in defining team performance.[7-10] To foster highly functioning surgical teams, consistency in team membership is considered important in reducing the potential for error and patient harm. However, in reality, the stability of team membership is often a luxury as teams comprising nurses, surgeons, anesthesia personnel, and surgical technicians are frequently ad hoc.[11]

Managing surgical teams that have dynamic membership can be made easier by visualizing team membership using a technique developed for sociometric analysis. Sociometry is a method that can be used to map team membership to discover existing relationships among these individuals and for disclosing the structure of the group itself.[12,13] Using data sets from the electronic health record (EHR) for purposes beyond clinical documentation, billing, and administration is rapidly increasing.[14] Best of all, these data are routinely collected as part of the OR electronic register that records surgical information about the surgical procedure details, staff attendance, and skill mix. Elements of the EHR can be used as a basis for a sociometric analysis to map team membership. Sociometric maps are useful management tools when implementing procedural or team changes as they can be enhanced to reflect people, process, and technological perspectives. We used sociometric analysis to describe team membership and staffing characteristics across four surgical specialties.

STATEMENT OF PURPOSE

This project was part of a larger multicenter observational study that described the nontechnical skills (eg, communication skills, teamwork) used by surgical teams in two metropolitan Australian hospitals. Based on the results of the structured observations, this larger study sought to develop a team training intervention to improve team members' nontechnical skills to enhance team cohesiveness and performance. We present the results of using a sociometric analysis of team structures at one of the participating hospitals. The aim of this correlational substudy was to map team membership using social network analysis and describe relationships between case-related variables across four surgical specialties.

RESEARCH QUESTIONS

We asked the following questions to guide this study:

- What proportion of individual staff members involved in surgery are RNs, anesthesia professionals, surgeons, and registrars/residents across four surgical teams?
- How many team members are shared across four surgical teams?
- What are the relationships between the procedure-related variables of start times, the total number of staff members per procedure, length of procedure, and patient acuity?

Length of procedure, patient acuity (ie, illness severity), and the number of staff members involved in each procedure are considered indicative of the complexity of the surgery[11,15] and may influence the interpersonal interactions of the team members involved and team performance.[10,15,16] Consequently, inclusion of these procedure-related variables allowed us to consider team membership in the broader context of OR staffing, the different surgical specialties and types of surgeries performed, and patient-related factors.

SIGNIFICANCE TO NURSING

There is limited research that focuses on mapping team membership and describing the interdisciplinary staffing characteristics of surgical teams using a social network analysis framework.[17] We used social network analysis to identify team structures based on the regularity of membership to gain insight into the relations among team members and social network structures. Previous research has found that team membership and the quality of intergroup and interdisciplinary communications potentially can contribute to the quality of patient care.[11,18]

LITERATURE REVIEW

All surgical procedures require a high level of coordination between various individuals from different professional disciplines.[15] The complexity of a surgical procedure affects every aspect of team performance.[15] Procedural complexity encompasses aspects such the type of surgeries performed and their associated risks (ie, postoperative complications), patient acuity and pre-existing comorbidities, and the surgical technologies used.[10,15] Further, procedural complexity determines the time to complete the procedure and who should be assigned to the surgical team.[15,19]

In relation to how team membership, roles, and tasks interface, most team members view the consultant surgeon as the team leader, while the surgical registrar or assistant surgeon, RN circulator, and scrub person follow and support the surgeon.[19] The RN circulator supports the scrub person and other team