Orthopedic Surgery Nurses’ Assessment of a Hospitalist Model of Perioperative Care

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Abstract

- **Objective:** To assess nurses’ opinions of a hospitalist-orthopedic team (HOT) model of perioperative care.
- **Design:** Paper survey distributed quarterly as a portion of a larger randomized controlled trial.
- **Setting:** Rochester Methodist Hospital (Mayo Clinic), an academic, primarily elective surgical hospital in Rochester, MN.
- **Participants:** 63 orthopedic surgery nurses who provided bedside care to patients undergoing elective hip or knee arthroplasty between 1 July 2000 and 30 June 2001.
- **Measures:** Responses to a 12-item questionnaire that asked nurses to compare a standard consultative model of perioperative medical care with a HOT model of care in terms of communication, collaboration, and perception of quality of care and state a level of preference for either model using a 5-point scale.
- **Results:** 59 nurses completed a total of 151 surveys during the academic year 2000–2001. Some nurses completed more than 1 survey, but only the most recent response of each nurse was analyzed. Nurses preferred the HOT model of integrated perioperative care in all categories, reporting that the HOT model was somewhat or much better for coordination of care (89.8%), ease of providing patient care (88.1%), follow-up on tests and laboratory results (86.4%), responsiveness to patients’ needs (93.2%), clarity of medical recommendations (83.1%), and general postoperative care (89.8%).
- **Conclusion:** Nursing personnel strongly preferred the HOT model of perioperative care to standard care. Further research is needed to determine if these preferences affect satisfaction or nursing retention.

The hospitalist model of inpatient care delivery increasingly is being implemented at hospitals throughout the United States. In this model, physicians whose primary professional focus is the care of hospitalized patients (ie, hospitalists) provide care for both medical and surgical inpatients in place of the patients’ primary physicians. Studies from academic centers, community teaching hospitals, and managed care settings have demonstrated that hospitalist care improves efficiency, is cost-effective, and enhances clinical quality by reducing readmissions and mortality in medical populations [1–8]. These improved outcomes have been achieved without negatively affecting medical education or reducing patient satisfaction. Although studies have focused on the clinical and financial outcomes associated with hospitalist care, the effect of such changes in hospital care delivery on nursing staff has not been directly evaluated. One study assessed hospitalists’ perceptions of nurses’ satisfaction with hospitalist models, with the vast majority of participants reporting that they believed nurses were “enthusiastic” about the role of hospitalists [9]. To our knowledge, there have been no published studies reporting nurses’ assessment of the attributes of a hospitalist model.

Individual institutions have developed variations of the hospitalist model to function within their own infrastructure. We created a multispecialty, multidisciplinary integrated team model of inpatient perioperative medical care delivery that partnered hospitalists, orthopedic surgeons, and surgical nurses in an effort to provide optimal patient care for medically higher-risk patients undergoing lower extremity total joint arthroplasty. The study reported here was part of a larger study evaluating a hospitalist-orthopedic team model of perioperative care. The purpose of the present study was to determine nurses’ perceptions of this new model of perioperative medical care in areas such as physician responsiveness and availability and quality of care delivered.

**Methods**

**Setting and Participants**
The study was conducted at Rochester Methodist Hospital, the main site for elective orthopedic surgical procedures...
NURSES’ PERCEPTIONS OF CARE

Table 1. Comparison of Perioperative Models of Care Practiced During the Study

<table>
<thead>
<tr>
<th>Standard Perioperative Care</th>
<th>Hospitalist-Orthopedic Team</th>
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</thead>
<tbody>
<tr>
<td>PAME by general internist, medical subspecialist, or anesthesiologist</td>
<td>PAME by hospitalian</td>
</tr>
<tr>
<td>Patients seen daily by surgical team</td>
<td>Patients seen daily by surgical team</td>
</tr>
<tr>
<td>Perioperative medical care provided by orthopedic surgical team: faculty, residents, physician’s assistant</td>
<td>Perioperative medical care provided by hospitalist: faculty only</td>
</tr>
<tr>
<td>Tests, laboratories, investigations ordered by orthopedic surgical team</td>
<td>Tests, laboratories, investigations ordered by hospitalist</td>
</tr>
<tr>
<td>Subspecialty medical consultations ordered by the surgical team</td>
<td>Subspecialty medical consultations ordered by the hospitalist</td>
</tr>
<tr>
<td>Provide written recommendations carried out by surgical team</td>
<td>Provide written recommendations carried out by hospitalist</td>
</tr>
<tr>
<td>Nursing directs all questions to surgical team</td>
<td>Nursing directs questions regarding surgical procedure or wound to surgical team</td>
</tr>
<tr>
<td></td>
<td>Hospitalist participates in multidisciplinary rounds with nursing and physical therapy</td>
</tr>
<tr>
<td>No physician attends multidisciplinary rounds (biweekly sessions to discuss discharge planning)</td>
<td>Dismissal jointly completed by surgical team and hospitalist</td>
</tr>
<tr>
<td>Dismissal planning and written summary prepared by surgical team</td>
<td>Hospitalist self-edits medical information on the dismissal summary on-line prior to patient’s dismissal</td>
</tr>
<tr>
<td>Consulting medical teams do not participate in completion of the dismissal summary</td>
<td>Hospitalist communicates with patient’s primary physician at dismissal and with any changes in medical condition</td>
</tr>
<tr>
<td>Consulting medical teams often communicate significant changes in medical condition with patient’s primary physician</td>
<td></td>
</tr>
</tbody>
</table>

PAME = pre-anesthetic medical examination.

conducted at the Mayo Clinic, Rochester, MN. This facility is a tertiary care, primarily surgical teaching hospital, with 794 beds and an average of more than 15,000 admissions per year. There were 1773 total hip and knee arthroplasties performed during the study year, accounting for the vast majority of patients seen by the nurses on this orthopedic ward.

Orthopedic surgery nurses responded to a questionnaire that was part of a larger prospective randomized controlled trial evaluating the impact of an integrated hospitalist-orthopedic team (HOT) model of perioperative care on patient outcomes. The trial was started on the first day of the initiation of the HOT model. Inclusion criteria for the patients in the prospective study were age greater than 75 years and significant medical morbidity (eg, diabetes, coronary artery disease, renal failure). There was no difference in patient characteristics between the HOT model and standard care study groups.

The paper survey was mailed quarterly to 63 orthopedic surgery nurses (59 registered nurses and 4 licensed practical nurses) providing bedside perioperative care to patients who underwent elective total hip or knee arthroplasties between 1 July 2000 and 30 June 2001. The HOT model and standard care were ongoing simultaneously; thus, all nurses had exposure to both models during the trial period. We obtained Institutional Review Board approval to conduct this study (IRB #931-00).

The HOT Model of Perioperative Care

The HOT model of perioperative medical management utilized integration and collaboration of general internal medicine faculty hospitalists with the orthopedic surgical team. The team interface was largely between the hospitalist, nurses, and surgical residents. In the HOT model, the orthopedic surgery nurses directed all medical concerns directly to the hospitalist, while in standard practice nurses directed concerns to the surgical team (Table 1). Questions regarding surgical issues in both arms were directed to the orthopedic surgeons. While the surgeons continued to actively manage the wound care and rehabilitative aspects of postoperative care, the hospitalists (rather than the orthopedic surgeons) provided all indicated postoperative medical care. Subspecialty medical consultation was available at the discretion of the physicians in both arms of the trial (including general medical consultation in the standard care arm). The hospitalists wrote daily notes, frequently saw patients more than once daily, and wrote orders (eg, laboratory tests, fluid and electrolyte management, medications). The hospitalists, orthopedic surgical team, and nurses jointly arranged posthospitalization care and together prepared an electronic document containing discharge instructions.

Care Model Assessment Questionnaire

To assess the orthopedic surgery nurses’ perceptions of the implementation of the HOT model of perioperative medical care, we developed a 12-item care model assessment (CMA) questionnaire. The survey required nurses to compare traditional consultative postoperative medical care with the new HOT model for each item and state a level of preference between the 2 models. The 12 items created for this study addressed such areas as communication, collaboration, and...
perception of quality of patient care. Responses possible for each question were: old model much better, old model somewhat better, models about the same, HOT model somewhat better, or HOT model much better. Questions were designed by the Mayo Clinic Survey Research Center based on experience with evaluating other new care models in prior investigations.

The survey was piloted during the 2-week run-in period of the trial in order to evaluate ease of survey readability. There were no changes made to the survey following this period. Data from the run-in period were not included in the analysis.

Nursing staff received the questionnaires on a quarterly basis for a period of 1 year and were encouraged to complete the CMA each time. The surveys were mailed toward the end of the second month of each quarter, with a postcard reminder mailed 2 weeks later. We used unique provider codes to keep providers’ responses confidential. Only the statisticians had the code and name matches recorded. The survey responses were entered using on-line data entry screens created within the SAS generalized system (SAS Institute, Cary, NC).

### Statistical Analysis

For simplicity of analysis, interpretation, and presentation, the 5 possible responses for each survey item were collapsed into 3 levels: old model somewhat better, models about the same, and new model somewhat or much better. The aim of the analysis was primarily descriptive and thus focused on presenting the summary results of the group of respondents. In addition, the survey responses were analyzed according to the following nurse demographic variables: primary shift (days, evenings/nights, combination), unit tenure (divided at the median 39 months), and nursing experience (divided at the median 9 years). The association between the demographic variables and the responses were analyzed using Cochran-Mantel-Haenszel tests for ordinal data. All statistical tests were 2-sided, and P values less than 0.05 were considered significant.

### Results

Of the 63 nurses who were mailed a CMA questionnaire quarterly, 59 responded to at least one survey, resulting in an overall nurse response rate of 92% and a survey response rate of 60% (151 surveys returned of 252 sent). For those nurses who completed more than one survey during the course of the trial, there was no difference in their responses over time. Therefore, only the most recent response completed by each nurse was included in the tabulation of survey responses.

The mean length of time the nurses had worked on the respective surgical hospital units was 2.6 years (range, 1.0 to 9.4 years). There were no correlations between nurses’ demographics and the survey responses.

The majority of respondents (88.1%) felt that the HOT model provided somewhat better or much better level of communication between care providers, and 83.1% felt the clarity of medical recommendations was somewhat or much better under the HOT model (Table 2). Likewise, respondents reported that the HOT model was somewhat or much better in other key aspects of patient care: 86.4% felt the physicians were more approachable; 88.1% reported enhanced ease of providing high-quality care; 89.8% believed

### Table 2. Nurse Responses to Care Model Assessment Questionnaire

<table>
<thead>
<tr>
<th>Areas Assessed</th>
<th>Old Model Much Better, n (%)</th>
<th>Old Model Somewhat Better, n (%)</th>
<th>Models About the Same, n (%)</th>
<th>HOT Model Somewhat Better, n (%)</th>
<th>HOT Model Much Better, n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level of communication</td>
<td>0 (0.0)</td>
<td>3 (5.1)</td>
<td>4 (6.8)</td>
<td>17 (28.8)</td>
<td>35 (59.3)</td>
</tr>
<tr>
<td>Clarity of medical recommendations</td>
<td>0 (0.0)</td>
<td>3 (5.2)</td>
<td>6 (10.3)</td>
<td>10 (17.2)</td>
<td>39 (67.2)</td>
</tr>
<tr>
<td>Approachability</td>
<td>1 (1.7)</td>
<td>4 (6.8)</td>
<td>3 (5.1)</td>
<td>4 (6.8)</td>
<td>47 (79.7)</td>
</tr>
<tr>
<td>Ease of providing high-quality care</td>
<td>1 (1.7)</td>
<td>1 (1.7)</td>
<td>5 (8.5)</td>
<td>4 (6.8)</td>
<td>48 (81.4)</td>
</tr>
<tr>
<td>Coordination of care</td>
<td>0 (0.0)</td>
<td>3 (5.1)</td>
<td>3 (5.1)</td>
<td>7 (11.9)</td>
<td>46 (78)</td>
</tr>
<tr>
<td>Clarity of who is in charge of care</td>
<td>1 (1.7)</td>
<td>5 (8.5)</td>
<td>7 (11.9)</td>
<td>15 (25.4)</td>
<td>31 (52.5)</td>
</tr>
<tr>
<td>Coordination of dismissal planning</td>
<td>1 (1.8)</td>
<td>2 (3.5)</td>
<td>14 (24.6)</td>
<td>15 (26.3)</td>
<td>25 (43.9)</td>
</tr>
<tr>
<td>Recognition of postoperative medical needs</td>
<td>0 (0.0)</td>
<td>2 (3.4)</td>
<td>3 (5.1)</td>
<td>13 (22)</td>
<td>41 (69.5)</td>
</tr>
<tr>
<td>General postoperative knowledge</td>
<td>0 (0.0)</td>
<td>3 (5.1)</td>
<td>7 (11.9)</td>
<td>8 (13.6)</td>
<td>41 (69.5)</td>
</tr>
<tr>
<td>Patient receives better care</td>
<td>1 (1.7)</td>
<td>3 (5.1)</td>
<td>2 (3.4)</td>
<td>8 (13.6)</td>
<td>45 (76.3)</td>
</tr>
<tr>
<td>Promptness in response to patient needs</td>
<td>1 (1.7)</td>
<td>3 (5.1)</td>
<td>0 (0.0)</td>
<td>7 (11.9)</td>
<td>48 (81.4)</td>
</tr>
<tr>
<td>Follow-up of labs, tests, and procedures</td>
<td>0 (0.0)</td>
<td>2 (3.4)</td>
<td>6 (10.3)</td>
<td>7 (11.9)</td>
<td>44 (74.6)</td>
</tr>
</tbody>
</table>

Note: The questionnaire was distributed quarterly, so nurses could respond up to 4 times throughout the year. Only the most recent response for each nurse is included in this table. HOT = Hospitalist-Orthopedic team.
coordination of care was better or much better; 78.0% reported better clarity of roles; and 91.5% felt there was a better recognition of postoperative medical needs. In terms of promptness in response to patient’s needs and follow-up of tests and procedures, 93.2% and 86.4% of the nursing staff indicated that the HOT model was somewhat or much better. Finally, 89.8% of the nursing staff perceived the patients received better care.

Discussion

The orthopedic surgery nurses in this study overwhelmingly preferred the HOT model of postoperative medical care delivery over the standard model in which care is delivered by the surgical team alone (with or without medical consultation). Other than a previous survey study of hospitalists who characterized nurses’ responses to the new model as positive [9], we are not aware of any other publication directly evaluating nurses’ perceptions of a hospitalist model.

The cornerstone of our HOT model is multidisciplinary, seamless coordination of care throughout a patient’s surgical episode. An important aspect of this approach to care is the hospitalist-nurse interface, since both caregivers are available on the hospital ward. The hospitalists did not have competing outpatient clinic or surgical duties and hence could be available to nursing staff, patients, their families, and surgeons and residents in order to aid in delivering timely and attentive perioperative medical care. The nurses’ responses in this survey suggest their appreciation regarding the availability of the hospitalist to respond in a timely fashion to patient care needs (ie, uncontrolled pain, shortness of breath, chest pain).

There is a growing body of literature regarding nursing shortages in the United States [10,11]. Retention of nurses in hospital-based practice is challenging for a number of reasons, including the high levels of stress associated with nursing responsibilities in a hospital setting. Stress correlates negatively with job satisfaction [12]. Other factors influencing retention include work schedule, group cohesion, and nurse-physician relationships [13–16]. In our study, we found that orthopedic surgery nurses strongly preferred the HOT model of care, reporting an enhanced ease in their own ability to provide patient care as well as an improved responsiveness from the physicians. Previous studies have reported improved patient outcomes related directly to nurse-physician collaboration [16,17]. Further research is required to determine if improving these relationships and enhancing these partnerships in patient care can influence nurse recruitment and retention.

A key limitation of our study is that the validity of the CMA survey was not formally assessed. There is also the possibility of reporting bias. The highly skewed distribution of answers for each survey question may suggest that the instrument was capturing something other than the nurses’ perceptions regarding components of the model (ie, changes in communication patterns, collaboration, or perception of quality of care). The nurses were aware of the study and possibly developed a close working relationship with the investigators, which could influence their responses to the survey questions. When answering the survey questions, the nurses may have compared individuals rather than the models of care. In addition, there was not a 100% response rate, and it is possible that those who did not respond may not have favored the HOT model. Another limitation of the study is that the principal investigator of the trial was one of the hospitalists in the model assessed, which could introduce an implementer bias. However, there were 2 other hospitalists providing care in rotation throughout the trial year, and they had more actual clinical time than the principal investigator.

Generalization of results outside of the study setting is always problematic, and particularly so with a new, diverse, and evolving model of hospitalist care. Programs are developed within the constraints inherent in the respective hospital setting. In our study, the model included a faculty medical physician working directly with nurses and the orthopedic surgical team. We believe the virtue of the HOT model relates as much to direct nurse-hospitalist interactions as to physician-physician relationships. The extent to which our findings are reproducible in other settings may be influenced by whether these relationships (both with physicians and with nurses) can be replicated. Instituting a HOT model of care is a major undertaking. If it is determined that the most important factor influencing the nurses’ perceptions was real-time availability of physicians to the nurses, then improvements may be achieved by other means.

In conclusion, orthopedic surgery nurses overwhelmingly preferred the active and integrated perioperative medical care provided by the hospitalists in partnership with the orthopedic surgeons. We believe the key ingredient of the HOT model was the hospitalist-nurse interface and partnership in postoperative patient care. As hospitalist programs increase in size and number, we believe the successful programs will incorporate hospital nurses as core members of collaborative health care teams.

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