

ORIGINAL RESEARCH

Nominal Group Technique: A Brainstorming Tool for Identifying Areas to Improve Pain Management in Hospitalized Patients

Adolfo Peña, MD¹, Carlos A. Estrada, MD, MS^{2,3*}, Debbie Soniat, RN³, Benjamin Taylor, MD, MPH³, Michael Burton, MD, MSPH⁴

¹Saint Joseph Hospital, Section of Hospital Medicine, London, Kentucky; ²Birmingham Veterans Affairs Medical Center, Veterans Affairs National Quality Scholars Program, Birmingham, Alabama; ³University of Alabama at Birmingham, Division of General Internal Medicine and University Hospital, Birmingham, Alabama; ⁴University of Texas Southwestern Medical Center, Division of General Internal Medicine, Dallas, Texas.

BACKGROUND: Pain management in hospitalized patients remains a priority area for improvement; effective strategies for consensus development are needed to prioritize interventions.

OBJECTIVE: To identify challenges, barriers, and perspectives of healthcare providers in managing pain among hospitalized patients.

DESIGN: Qualitative and quantitative group consensus using a brainstorming technique for quality improvement—the nominal group technique (NGT).

SETTING: One medical, 1 medical-surgical, and 1 surgical hospital unit at a large academic medical center.

PARTICIPANTS: Nurses, resident physicians, patient care technicians, and unit clerks.

MEASUREMENTS: Responses and ranking to the NGT question: “What causes uncontrolled pain in your unit?”

RESULTS: Twenty-seven health workers generated a total of 94 ideas. The ideas perceived contributing to a suboptimal pain control were grouped as system factors (timeliness, $n = 18$ ideas; communication, $n = 11$; pain assessment, $n = 8$), human factors (knowledge and experience, $n = 16$; provider bias, $n = 8$; patient factors, $n = 19$), and interface of system and human factors (standardization, $n = 14$). Knowledge, timeliness, provider bias, and patient factors were the top ranked themes.

CONCLUSIONS: Knowledge and timeliness are considered main priorities to improve pain control. NGT is an efficient tool for identifying general and context-specific priority areas for quality improvement; teams of healthcare providers should consider using NGT to address their own challenges and barriers. *Journal of Hospital Medicine* 2012;7:416–420 © 2011 Society of Hospital Medicine

Pain is considered the “fifth” vital sign, and the appropriate management of pain is fundamental for patient care. Uncontrolled pain has adverse negative physiological consequences,^{1–4} and better pain control in hospitalized patients has been associated with decreased length of stay and improved recovery and physical comfort.^{3–6} However, many patients fail to receive state-of-the-art pain relief⁷; for example, in a study of 176 hospitalized patients with cancer, 46% reported severe pain at the time of the interview.⁸ The prevalence of pain in hospitalized patients with other diagnoses besides cancer likewise remains high.⁹

Over the last 2 decades, the quality of care in pain management has gained increasing attention. In 2000, the Joint Commission unveiled an official statement for the purpose of improving the quality of pain management.¹⁰ The Joint Commission’s 6 core principles include the right of pain assessment and treatment, institution of organizational procedures to assess pain,

provision of care of persons with pain, general education, continuity of pain management after hospital discharge, and inclusion of pain management as a performance measure. Pain management is now a hospital accountability indicator. Although multiple initiatives have been undertaken to improve pain control, however, challenges still remain. Effective strategies for consensus development are still needed to prioritize interventions.

The nominal group technique (NGT) is a brainstorming tool for quality improvement; NGT is a highly structured small group discussion used to elicit and prioritize a list of answers to a specific question.^{11–15} We conducted an NGT session to identify the multiple challenges, barriers, and perspectives of healthcare providers in managing pain among hospitalized patients. The ultimate goals were to identify potential areas for pain management improvement, build consensus among caregivers, and introduce the NGT as a tool to elicit caregivers’ ideas for quality improvement.

METHODS

In a multistep process, we first identified areas for quality improvement interventions in pain management by using the NGT in hospitalized patients, then organized the information by using an iterative consensus development process, and finally displayed the main findings using a Fishbone diagram.

*Address for correspondence and reprint requests: Carlos A. Estrada, MD, MS, Birmingham Veterans Affairs Medical Center and Division of General Internal Medicine, University of Alabama at Birmingham, FOT 732, 510 20th St S, Birmingham, AL 35294; Telephone: 205-934-3007; Fax: 205-975-7797; E-mail: cestrada@uab.edu

Additional Supporting Information may be found in the online version of this article.

Received: August 4, 2011; Revised: October 19, 2011; Accepted: November 15, 2011

2011 Society of Hospital Medicine DOI 10.1002/jhm.1900
Published online in Wiley Online Library (Wileyonlinelibrary.com).

Setting and Participants

At a large university hospital, we targeted 3 inpatient services based on pain management performance data. We obtained the data from patient satisfaction and the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) surveys. They included 1 medical, 1 medical-surgical, and 1 surgical hospital unit at a large academic medical center.

Within these units we recruited participants from a convenience sample of nurses, resident physicians, patient care technicians, and unit clerks. We included patient care technicians and unit clerks as they often interface between patients and providers. To maintain anonymity of the responses, we did not record participant composition during the session. Participation was voluntary and no incentives were provided. The institutional review board at the University of Alabama at Birmingham approved the use of existing quality improvement data.

Nominal Group Technique

During 2009, we conducted an NGT session within each of the 3 inpatient units. Two of the authors (MB, DS) developed the question posed to each group: “What causes uncontrolled pain in your unit?” The NGT supports equal participation, controls the extraneous discussion that frequently occurs when groups are convened, minimizes real or perceived power differentials among members, and, in the aggregate, minimizes the process loss that exists in unstructured focus group meetings.^{11–16} Thus, the ideas generated by this process provide a valid reflection of the implicit prioritized views held by the group. The NGT also provides concise written documentation summarizing participants’ responses, rendering audiotape recording and transcription unnecessary.^{13,17}

Each NGT session, lasting 1 hour, followed the following steps.¹³ First, after a brief introduction of the purpose of the session and general instructions, the moderators (MB, DS) posed the question: “What causes uncontrolled pain in your unit?” Second, in response to the standard question, each participant in the group silently and individually generated a list of ideas and wrote them down. Third, using a round-robin approach (1 person at a time mentions the idea), each idea was concisely transcribed by the facilitator onto a flip-chart for all participants to see; debate was not allowed during this step. Fourth, each recorded idea was then discussed for the sole purpose of clarification, and not for evaluation or argument as to the relative importance. The proposer of the idea did not need to defend the idea. During this step, participants were prompted to combine those ideas that were perceived to be substantively similar. Finally, during the voting phase, participants privately selected what they considered to be the 3 most important reasons for uncontrolled pain in their unit. Each participant prioritized

their choices on their own and without discussing with other participants, giving a rank of 3 to the most important idea and 1 to the least important idea. The moderator recorded the votes onto the flip-chart in front of all participants and then tallied the votes for each idea. We discarded a small number of idiosyncratic suggestions, which is a standard procedure in the nominal group technique. The main results were the top 5 suggestions identified within each group; the secondary results were all other suggestions. A more detailed description of the NGT steps is available elsewhere.¹¹

Ishikawa (Fishbone) Diagram

Fishbone diagrams are designed to organize contributing factors to a particular outcome in a pictorial display. This is a common tool used to identify areas for improvement by facilitating brainstorming and graphically displaying the relationship of the causes to the effect. Through an iterative process, 3 of the authors (AP, MB, CAE) categorized all of the generated ideas into common themes until consensus was reached. The top 5 and all other suggestions within each service were organized into the Fishbone diagram.

RESULTS

The 27 health workers representing the 3 units completing the nominal group sessions generated a total of 94 ideas. The Fishbone diagram shown in Figure 1 shows each service’s top 5 rankings of the elements perceived contributing most to uncontrolled pain; the elements were organized into 3 main factors and 7 priority themes identified during the iterative process.

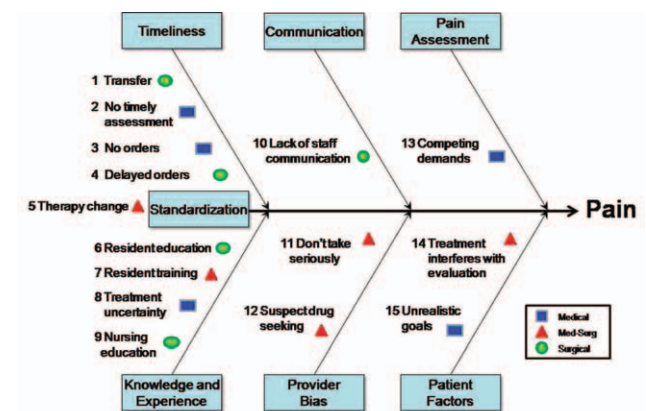


Exhibit 1. Top 5 Reasons for Uncontrolled Pain in 3 Inpatient Units.

1. Transfer from post-anesthesia unit to floor
2. RN/MD assessments inadequate and not timely
3. No orders for pain meds
4. Delayed medication orders for patients
5. Patients come in on scheduled pain meds and are placed on PRN pain meds
6. Limited education for residents re: pain control
7. Training for pain is not good for residents.
8. Uncertainty of physicians on medication dosages for this pt population
9. Limited education of nurses/techs re: pain control
10. Communication between staff (residents, nurses, techs) re: patient's pain
11. Don't take complaints of pain seriously sometimes because of drug seeking behavior
12. Staff suspicious of patient's possible drug abuse/drug seeking behavior
13. Competing demands of the nurse
14. Patient population/diagnoses put patients at risk for pain. Doctor's hesitate to give pain meds because they need to evaluate patient's neurologic status regularly
15. Patient/family have unrealistic goals for pain control

FIG. 1. Top 5 reasons for uncontrolled pain in 3 inpatient units. Abbreviations: PRN, as needed; pt, patient.

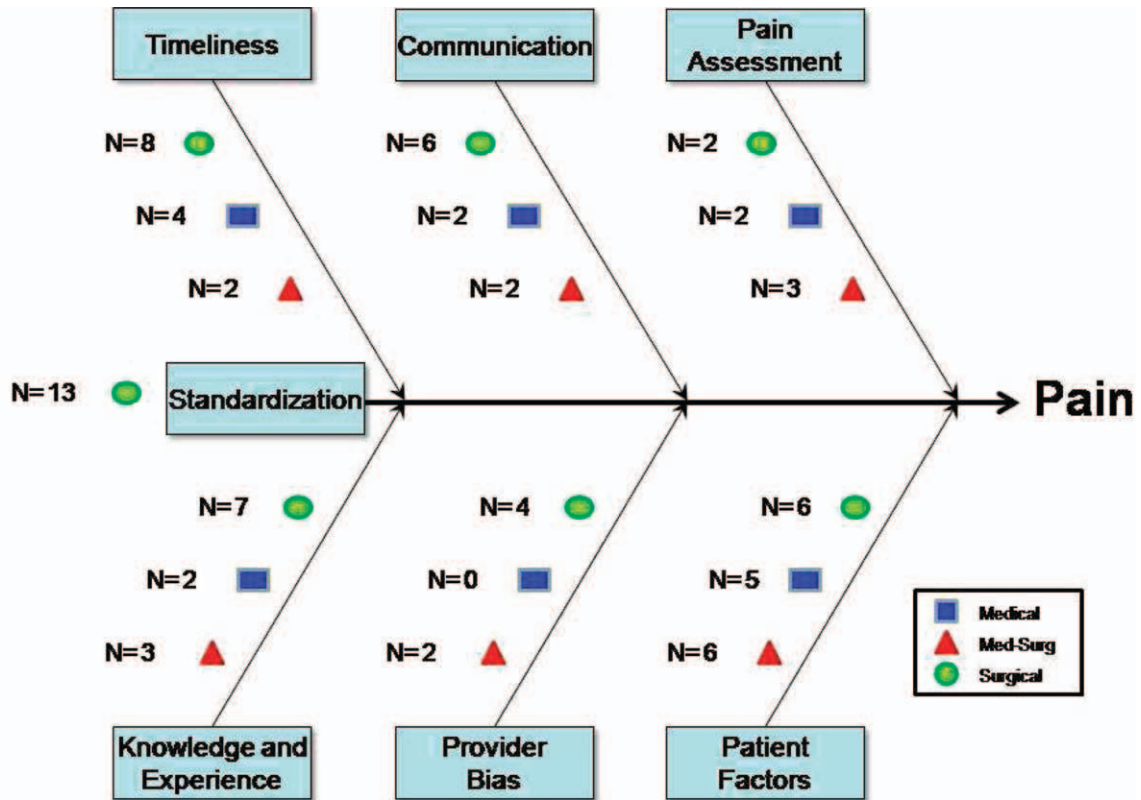


Exhibit 2. Other Reasons for Uncontrolled Pain in 3 Inpatient Units (n=79). Representative examples:

Timeliness (n=14)

Patient delay, nurse unable to get help, competing demands, not a priority, MD unavailable.

Communication (n=10)

Communication with anesthesia/ surgery staff/ patients, MD unavailable to discuss, teamwork dynamics, phone call responsiveness, on call days.

Pain Assessment (n=7)

Lack of assessment/ knowledge of pain scores, unclear pain scores, electronic health record documentation.

Knowledge and Experience (n=12)

Lack of knowledge/ training/ education (medication, pain treatment), limited use of consultation services, patient education.

Provider Bias (n=6)

Suspicion (doctor shopping, narcotics), staff anxiety re: narcotics, prejudices in use of PRN medications.

Patient Factors (n=17)

Stoic, high pain tolerance/ dependence, older more reluctant, psychosocial/ comorbidities, surgery type, drug metabolism and side effects

Standardization (n=13)

Policies for verbal orders, different protocols, PRN protocols, PCA pumps, handoffs between units.

FIG. 2. Other reasons for uncontrolled pain in 3 inpatient units (n = 79). Abbreviations: PCA, patient-controlled analgesia; PRN, as needed.

The main categories illustrate system factors (timeliness, communication, pain assessment; Figure 1, top portion), human factors (knowledge and experience, provider bias, patient factors; Figure 1, bottom portion), and an interface between system and human factors (standardization; Figure 1, center left). The remaining 79 ideas, non-top 5 for each unit, fell into the following priority themes: provider bias (n = 6), knowledge and experience (n = 12), pain assessment (n = 7), communication (n = 10), timeliness (n = 14),

standardization (or policies and practice variation) (n = 13), and patient factors (n = 17); the ideas and representative examples are shown in Figure 2.

DISCUSSION

Using a brainstorming tool for idea generation (NGT) in quality improvement, we identified almost 100 causes of uncontrolled pain management in hospital units. We identified 7 priority themes along 3 main factors: system factors, human factors, and an

interface of system and human factors. Timeliness and education emerged from 2 of the 3 services as top priorities, though they were unique and specific to the providers and patient populations within each service. The third service yielded surprisingly different priorities, with patient issues and provider bias foremost in the minds of the staff caring for these patients.

In the decade since *To Err Is Human* was released by the Institute of Medicine,¹⁸ healthcare improvement work has become commonplace and routine. Projects start by soliciting staff views about possible areas for improvement, usually during group meetings; however, this process is informal and not systematic. Unstructured group meetings and brainstorming have some limitations when used to uncover creative ideas for healthcare improvement.¹⁹ The literature has consistently reported that groups produce fewer ideas than an equivalent number of individuals working alone.²⁰ In a meta-analysis, Mullen et al²¹ found that interacting groups usually produced ideas of poorer quality than did nominal groups. Interpersonal interactions in a multidisciplinary team may be influenced by perceived roles and dominant personalities, and can impede a collaborative, critical discourse.²²

In contrast, in NGT sessions, the weight of each member's opinion is the same, and it appears that process loss is less likely to occur.¹⁷ Moreover, the highly structured format of NGT provides an opportunity for group members to achieve a substantial amount of work in a relatively short time. Another advantage of NGT is the deliberate avoidance of interference or interpretation from a moderator or facilitator who, in the case of NGT, has the responsibility to explore but not interfere with or influence the members of the group.¹³ However, the NGT has some limitations. The composition and representativeness of participants may limit the generalizability of the findings. Also, it requires training and preparation, restricts the discussion to a single topic, and may not allow further elaboration of other ideas.¹³ Despite its potential benefits, NGT is relatively underutilized in quality improvement initiatives. To the best of our knowledge, this is the first study that has utilized NGT to elicit ideas about potential areas for pain control improvement. NGT is a good method for achieving local solutions to local problems; teams of healthcare providers should consider using NGT to address their own challenges and barriers.

In our study, timeliness, knowledge, and experience were considered the top priorities to improve pain management. Our findings are similar to a Canadian study, where delay of more than an hour to administer analgesia was considered one of the most important factors to provide good pain control management.²³ Also our findings are coherent with a recent survey of 225 hospitals in the United Kingdom, where perceived lack of training was a highly ranked contributing factor for suboptimal postoperative pain management.²⁴

Our study also identified other interesting observations that deserve comment. Examining the top priorities among the 3 services, there is some dissonance of reasoning underlying the inadequate pain control. We can speculate several reasons. First, pain control management, like any other condition, happens within a specific context with unique problems or barriers that prevent the delivery of the best care for each service. The other possible explanation is a "silo effect." It is possible that workers of the same service represent a relatively homogenous social group despite differing training and backgrounds; they live the same experiences and face similar problems. Workers of one "silo" may work in parallel but do not interact with members of another "silo," so they do not have opportunities to share their experiences or compare their beliefs. Finally, it is possible that the greater number of groups used in this study resulted in a broader array of issues. Studies have confirmed that the presence of several groups using NGT can produce a larger pool of issues, with more variation.¹⁶ Thus, the ideas generated in our NGT can be easily grouped into 2 broader categories: human factors (knowledge, experience, provider bias, and patient factors) and system factors (timeliness, communication, and pain assessment).

Our study has some limitations. The study was conducted in a single institution and in a limited number of inpatient units. The list of potential areas for improvement generated in this study may require further confirmation and validation at other institutions and with other sources of information (actual pain assessments, timeliness, knowledge, patient satisfaction). Importantly, the study design only involved healthcare providers and did not involve other stakeholders such as the patients or their families.

Despite these limitations, we propose that the NGT is a good alternative to unstructured brainstorming to systematically identify, characterize, categorize, and prioritize ideas behind inadequate pain management. The NGT is a valuable tool in conducting a robust formative assessment to better understand the multiple challenges, barriers, and perspectives of healthcare providers in guiding quality improvement interventions in a systematic and less biased manner.

CONCLUSIONS

In conclusion, healthcare workers have clear ideas about potential areas for improvement in pain management. Using the NGT, we identified 7 potential areas for improvement encompassed within human and system factors. Knowledge and timeliness emerged from 2 of the 3 clinical services as top priorities, whereas the third group identified disparate concerns suggesting provider bias and patient issues. We believe the nominal group technique is an efficient tool to uncover general and context-specific priorities and to guide quality improvement work.

Disclosure: Drs. Pena, Burton, and Estrada were supported by the Veterans Affairs National Quality Scholars Program. The opinions expressed in this article are those of the authors alone and do not reflect the views of the Department of Veterans Affairs.

References

- Roe MT. Success stories: how hospitals are improving care. *Am Heart J*. 2004;148(5 suppl):S52-S55.
- Carr DB, Goudas LC. Acute pain. *Lancet*. 1999;353(9169):2051-2058.
- Morrison RS, Meier DE, Fischberg D, et al. Improving the management of pain in hospitalized adults. *Arch Intern Med*. 2006;166(9):1033-1039.
- Whelan CT, Jin L, Meltzer D. Pain and satisfaction with pain control in hospitalized medical patients: no such thing as low risk. *Arch Intern Med*. 2004;164(2):175-180.
- Sawyer J, Haslam L, Daines P, Stilos K. Pain prevalence study in a large Canadian teaching hospital. Round 2: lessons learned? *Pain Manag Nurs*. 2010;11(1):45-55.
- Sawyer J, Haslam L, Robinson S, Daines P, Stilos K. Pain prevalence study in a large Canadian teaching hospital. *Pain Manag Nurs*. 2008;9(3):104-112.
- Institute of Medicine. *Crossing the Quality Chasm: A New Health System for the 21st Century*. Washington, DC: National Academy Press; 2001.
- Wells N. Pain intensity and pain interference in hospitalized patients with cancer. *Oncol Nurs Forum*. 2000;27(6):985-991.
- Donovan MI, Dillon P. Incidence and characteristics of pain in a sample of hospitalized cancer patients. *Cancer Nurs*. 1987;10(2):85-92.
- Phillips DM. JCAHO pain management standards are unveiled. Joint Commission on Accreditation of Healthcare Organizations. *JAMA*. 2000;284(4):428-429.
- Castiglioni A, Shewchuk RM, Willett LL, Heudebert GR, Centor RM. A pilot study using nominal group technique to assess residents' perceptions of successful attending rounds. *J Gen Intern Med*. 2008;23(7):1060-1065.
- Crenshaw K, Shewchuk RM, Qu H, et al. What should we include in a cultural competence curriculum? An emerging formative evaluation process to foster curriculum development. *Acad Med*. 2011;86(3):333-341.
- Brief 7. Gaining Consensus Among Stakeholders Through the Nominal Group Technique. Available at: <http://www.cdc.gov/HealthyYouth/evaluation/pdf/brief7.pdf>. Accessed October 19, 2011.
- Van de Ven AH, Delbecq AL. The nominal group as a research instrument for exploratory health studies. *Am J Public Health*. 1972;62(3):337-342.
- Safford MM, Shewchuk R, Qu H, et al. Reasons for not intensifying medications: differentiating "clinical inertia" from appropriate care. *J Gen Intern Med*. 2007;22(12):1648-1655.
- Miller D, Shewchuk R, Elliot TR, Richards S. Nominal group technique: a process for identifying diabetes self-care issues among patients and caregivers. *Diabetes Educ*. 2000;26(2):305-310, 312, 314.
- Gallagher M, Hares T, Spencer J, Bradshaw C, Webb I. The nominal group technique: a research tool for general practice? *Fam Pract*. 1993;10(1):76-81.
- Institute of Medicine. *To Err Is Human. Building a Safer Health System*. Washington, DC: National Academy Press; 2000.
- Nelson EC, Batalden PB, Godfrey MM. *Quality by Design: A Clinical Microsystems Approach*. San Francisco, CA: Jossey-Bass Wiley; 2007.
- Lamm H, Trommsdorff G. Group versus individual performance on tasks requiring ideational proficiency (brainstorming): a review. *Eur J Soc Psychol*. 1973;3(4):361-388.
- Mullen B, Johnson C, Salas E. Productivity loss in brainstorming groups: a meta-analytic integration. *Basic Appl Soc Psychol*. 1991;12:3-23.
- Diehl M, Stroebe W. Productivity loss in brainstorming groups: toward the solution of a riddle. *J Pers Soc Psychol*. 1987;53:497-509.
- Yanuka M, Soffer D, Halpern P. An interventional study to improve the quality of analgesia in the emergency department. *CJEM*. 2008;10(5):435-439.
- Chang SH, Maney KM, Mehta V, Langford RM. Pain assessment and management in medical wards: an area of unmet need. *Postgrad Med J*. 2010;86(1015):279-284.