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Clinical Scholars Review

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| | |
|--|----|
| From the Editor | 2 |
| <i>Jennifer Smith</i> | |
| Health Care Reform and Comprehensive Care: Where Are the Nurses? | 3 |
| <i>Mary O'Neil Munding</i> | |
| Who Defines Advanced Nursing Practice in an Era of Health Care Reform? | 5 |
| <i>Connie M. Ulrich</i> | |
| Control Practice Growth: Maximize First Visits, See Fewer Patients, and Improve Practice Income..... | 8 |
| <i>Thomas A. Mackey</i> | |
| Health Care on Aisle 7: The Growing Phenomenon of Retail Clinics..... | 10 |
| Disseminating Evidence-Based Practice Projects: Poster Design and Evaluation..... | 14 |
| <i>Diane McNally Forsyth, Tracy L. Wright, Cindy A. Scherb, and Phyllis M. Gaspar</i> | |
| An Evidence-Based Review on Guided Imagery Utilization in Adult Cardiac Surgery | 22 |
| <i>Jesus (Jessie) Casida and Suzanne A. Lemanski</i> | |
| Long QT Syndrome: A Case Report, Genomics, and Clinical Implications | 31 |
| <i>Jiaming Yao and Kathleen Hickey</i> | |
| Evaluating the "Innovativeness Quotient" (IQ) in a Collaborative Model..... | 36 |
| <i>Juli C. Maxworthy</i> | |
| Medication Safety in the Elderly: Translating Research Into Practice | 43 |
| <i>Julie A. Lindenberg</i> | |

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From the Editor

What a difference a year can make. During the past 12 months, much has happened to the world economy that will affect the ongoing health care debate in the nation. With the unemployment rate hitting record highs and increasing numbers of Americans unable to afford health insurance or even the most basic health care, policymakers and the public will grapple with the difficult decisions intended to ensure and expand coverage.

As Doctorate of Nursing Practice (DNP)-prepared clinicians, we have an opportunity to tell policy makers in Washington and in our state capitals that we are capable and ready to help meet the growing demand for comprehensive care providers across the country. This is not the time to assume someone else will speak for us—we must seize every opportunity to inform stakeholders that we are a resource that could, and should, be utilized for the benefit of all.

The results from the second DNP graduate certification examination will be announced soon. The *Clinical Scholars Review* editorial board continues to believe that this credential is the gold standard for doctorally prepared clinicians, for both the public and the profession. This

examination, offered by the National Board of Medical Examiners (NBME) and the American Board of Comprehensive Care (ABCC) remains controversial to some, both inside the field and out, but the boards' resolve to promulgate this certification is unwavering. Along with the American Association of Colleges of Nursing (AACN) and the Council for the Advancement of Comprehensive Care (CACC), dialogue will continue about issues concerning the ABCC examination and how to inform others of its importance.

We are looking forward to celebrating the results of those who took the examination in October and hope that all DNP graduates from programs with a clinical focus will plan on taking the examination, offered again in October.

Clinical Scholars Review continues to publish contributions from clinical scholars across the country who believe this journal is an appropriate forum in which DNP faculty and graduates may focus on subjects relevant to today's doctorally prepared nurse clinicians.

Jennifer Smith, MBA, MPH, DNP
Editor

Health Care Reform and Comprehensive Care: Where Are the Nurses?

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As the nation marches carefully—and in deep political division—toward health care reform that includes expanded insurance coverage, the cost and content of covered care have been the major concerns. Those who have been closest to this momentous advancement know that “reform” is not necessarily the correct term for what is happening. The only thing that may be reformed is whether individuals are required to have insurance.

We will still have a diverse system of choices subsidized by federal and state tax dollars, and meaningless penalties for opting out. Indeed, some states may be able to do so legally. We will not have a system “reformed” to assure the right care at the right time for those who need it.

Although evidenced-based-practice (EBP), which embodies this right care/right time/right purpose, has been considered necessary for cost containment in this new system, Americans are not yet ready to conform to such decisions. The same week that EBP was written into legislative drafts, scientific studies were published showing that mammograms should not be used liberally for young women. This caused a national outpouring of disapproval complete with anecdotes from those who had cancer discovered by this test at an age now being considered too young for routine screening. EBP is okay theoretically. But it will be a difficult process to implement, especially for the aging baby boomers, many of whom have been empowered and entitled (and reimbursed) for procedures not based on EBP their entire lives.

What could we have expected in true health reform? Certainly expanded coverage is a start. Subsidies for those who cannot afford the premiums is essential. And yes, we can save money to help fund this new system by ensuring

early treatment, preventive care, and by changing the place where care is delivered. Much of emergency room care today is not care requiring the expensive resources needed to be ready for a real emergency. However, those without insurance to access a primary care provider, and those who may not have transportation or child care coverage to fit within conventional 9-5 appointment slots of outpatient practices, show up in the ER. Their care, which could be appropriately managed in low-technology primary care settings, is inordinately expensive in an ER; and the ER is not equipped or organized for necessary follow-up care to ensure adoption of healthful behaviors or compliance with treatment. This leads to further expensive care that could and should have been avoided. No access to care at all is also a major reason that late-stage expensive care occurs. Clearly it is cost effective—for the system and for the patient—to have a source of comprehensive primary care.

This is not a new observation. It is a financial reason as well as the ethical one in terms of why we must expand access to routine care (and specialist care when needed). So far, so good. But who, exactly, is going to meet this huge new demand for comprehensive primary care? Physicians have been fleeing primary care for decades. Even those few who initially take a primary care residency tend to move on to specialty training. The nature of the practice, which requires expert diagnostic skills, but which also requires teaching, coaching, monitoring, and resource development for patients, is not what most physicians desire, or are reimbursed for, in their careers. This personal health advancement paradigm, however, is central to advanced practice nursing goals and expertise. Nurses have been paid (at a discount) for basic site-specific (outpatient

setting) for more than 40 years. But they have not been viewed as a full replacement for physician practice, in part because of the cross-site practice authority and skills needed to follow patients wherever their care is needed, and in part because more sophisticated diagnostic and treatment expertise has not been taught in nursing curricula.

Enter the Doctor of Nursing Practice. Not only do these graduates fulfill the needs of patients, and have the requisite skills to be equivalent to physicians in comprehensive care practice, but they also have those coaching/teaching/resource development attributes that make for such a preferred contribution to patients seeking primary care.

This is a message that *Clinical Scholars Review* readers know well, but we have not communicated the urgency of this solution to those who are still crafting “health reform.” Shakespeare had it right in *King Henry IV*, in which Glendower says, “I can call spirits from the vasty deep” and Hotspur answers, “Why so can I, or so can any man, but will they come when you do call for them?”

There will be a call for primary care providers, and indeed nursing is ready to respond, but the system is too fragmented and burdened with regulatory barriers to allow

the full contribution that could be made. Insurers must recognize (and reimburse fully) nurses with the requisite skills to become fully authorized comprehensive primary care providers. Certification from the American Board of Comprehensive Care (ABCC) can provide this assurance to insurers and their clients. States must take down the barriers to practice authority to allow Diplomats of Comprehensive Care (DCC) full access to provision and payment for care. Without these steps, health reform will be empty words, leading to bitter recriminations. We will as a nation have changed nothing in the cost saving areas, continue to provide care too late and in the wrong place at untenable costs, and develop a costly system that has inadequate provider resources.

Nursing is a critically needed answer to health reform’s goals. The profession, at its most sophisticated level of practice, is the preferred answer to resolving the health resource deficit in comprehensive primary care. We must have funding and regulatory reform to fully contribute. Who will make the case?

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Who Defines Advanced Nursing Practice in an Era of Health Care Reform?

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Health care reform has piqued the interest of almost every constituent group in the United States—academicians, politicians, professionals, skilled laborers, and everyday citizens. All people in this country have a significant stake in the outcome, but it seems especially true for the increasing number of underinsured and uninsured patients and those without a medical home. In fact, 56 million Americans have limited or no access to basic health care services due to primary care physician shortages (National Association of Community Health Centers, 2007). Unfortunately, health care reform has been politicized to the degree that, depending on one's political persuasion, it is perceived as either "morally just" or a "sweeping governmental takeover." In a roundtable discussion on health care issues at a national meeting that I recently attended, one of the attendees asked a simple yet provocative question to the group: "What would 'better care' look like?" This question evoked many responses, but the essence of the conversation centered on the value of nursing to the public. And, more specifically, how can nursing responsibly address disparities in care, including the unmet health care needs of the chronically ill and aging segments of the population? Indeed, nursing is one of the most trusted professional groups in society; but to some degree, the public remains unaware of nursing's inimitable talents.

The discipline has long struggled to define its identity and convey the distinct contributions it makes to the health and well-being of the nation. Today, this is even more challenging for nurse practitioners (NPs) and other advanced practice nurses as they legitimately assert their autonomous role within a practice field that is fraught with regulatory, professional, economic, and political in-

terests—both within and outside the discipline. But who defines advanced practice nursing in an era of health care reform? Who determines the type and range of services that are delivered to the public and whether advanced practice nurses are uniquely qualified to deliver them? And importantly, who controls the delivery of health care to those in need when "the demands of justice in health care may pose a threat to the economic interests and power of physicians?" (Daniels, 1985, p. 134). As argued by a prominent nurse historian at the University of Pennsylvania, "clinical decision making, diagnosis, and prescription are now the domains of several different health professionals, and should no longer be considered solely in the medical domain" (Fairman, in press).

In the American Medical Association Scope of Practice Data Series (AMA, 2009), an entire issue was dedicated to the role of NPs, including an extensive background on their education and training, specialization, professional journals of interest, billing, and state licensure requirements. By all accounts, this was a thorough review. Unfortunately, it does not help the public, policymakers, physicians, or others understand the critical role of advanced nurse providers and their value to the common good. Much of the concerns raised by the AMA focused on the educational preparation of NPs, comparing and contrasting them to their physician colleagues. Certainly, all professional disciplines are open to critical reflection, dialogue, and critique on the processes that guide their intellectual growth and development; but why are our medical colleagues so concerned about scope-of-practice expansions or how wisely nursing uses its resources to educate nurses?

To argue against scope-of-practice expansions for advanced NPs because it *may* endanger the health and

safety of patients (as stated by the AMA) or that the profession is “siphoning off” bedside nurses to educate them for advanced practice in light of hospital labor shortages, requires empirical evidence to justify such conjectures. These claims, however, remain unsubstantiated. Nonetheless, as reported in the AMA document, Hart and Macnee (2007) found that half of the NP respondents in their survey did not feel substantively prepared for clinical practice in several areas. This ranged from complementary and alternative medicine to issues of financial management, including billing and coding for services. The study is important because it provides a baseline for future inquiry and necessitates a conversation on the educational gaps that may exist. It should not be interpreted negatively, however, as one study is not usually generalized beyond the sample surveyed. Additionally, no data currently exists that indicates a causal relationship between perceived educational preparation of NPs and quality of care or other health-related patient care outcomes. A more robust research design and statistical analysis is needed to determine the reliability of the findings across people, items, and time.

Nonetheless, all disciplines need to think more broadly about the academic educational requirements that will prepare practitioners for the challenges that lie ahead. This includes not only the content areas outlined by Hart and Macnee (2007), but also other important skill sets that impact clinical practice, such as basic genomics, risk communication, and ethical decision-making. Both professional groups—physicians and advanced NPs—will need to be prepared “to practice safely, accurately, and compassionately, in varied settings, where knowledge and innovation increase at an astonishing rate” (Benner, Sutphen, Leonard, & Day, 2010, p. 1).

Some may question if it is ethical or simply fair for others to exert a powerful influence on the professional boundaries of another discipline. In fact, Kuhse (1997) argues that nurses fail both themselves and their patients if they continually allow role misperceptions—“physicians make decisions and nurses carry them out”—to influence nursing’s agenda for the public good or dominate public discourse. However, this should not preclude interdisciplinary collaboration between professional groups; there is an expectation that all health care providers will work together to improve the care of any patient who enters the health care system. Today, many individuals in our society are chronically ill with co-morbid conditions needing integrative solutions, thus making it unlikely that a single provider can address all aspects of a patient’s care. Nevertheless, all professional groups are essentially self-

regulating and must determine for themselves what good ends they serve. Important attributes of definition for any profession include an epistemological body of inquiry; professional authority and credibility; civic mindedness; ethical codes of conduct; and the fundamental beliefs, values, and norms that underlie its existence (Greenwood, 2008; Sullivan, 2005).

Tensions will continue to exist between physicians and advanced practice nurses and may even appear heightened during health care reform because although each group is conceptually distinct, overlap exists within the realm of everyday practice. Moreover, the boundaries of who can rightfully care for patients within our health care system are sometimes unclear to the public. Friends, family, colleagues, and others have asked: “What are an NP’s capabilities?” Or, “How do they differ from physicians?” To that end, for NPs and other advanced nurses “to function well, they need room for discretion in how they apply their knowledge and craft” (Sullivan, 2005, p. 80). Additionally, they must actively convey this knowledge and authority to the public, and do this in a way that is memorable (McIntyre, in press). Advanced practice nurses graduate from accredited schools of nursing, receive national certification for their level of expertise, and are prepared to address a range of health problems across the health-illness continuum. Who then defines advanced practice nursing in an era of health care reform? We do; and in doing so, we must continue to exhibit exemplary technical, ethical, and professional competence in the provision of humanistic care in a complementary and collaborative fashion with our physician colleagues. Increased public awareness of the benefits and expertise of advanced practice nurses needs to be addressed, as does the educational requirements for all those who share care responsibilities in our society if we are to meet the ethical and scientific challenges of the human condition and the overall health care needs of the public.

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Control Practice Growth: Maximize First Visits, See Fewer Patients, and Improve Practice Income

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Recently, a nurse practitioner with a Doctorate of Nursing Practice (DNP) degree started a new practice. The practice was located in a small rural southern town in a state friendly to nurse practitioners. Prior to opening the primary care office, the DNP worked very hard to establish excellent community relations, build solid business infrastructure (billing, physician collaboration, referral base, electronic health records, policies and procedures, managed care contracts, credentialing, etc.), and a hospitable clinic environment.

The local population was thrilled to have health care services close to home and pledged to support the DNP. Likewise, the DNP was excited to provide population-centered care. After all, one essential of DNP practice relates to population-centered care. Now was the time to actualize the knowledge learned in school.

During the first month of opening the practice the DNP was overwhelmed when the phone rang and patients booked appointments. In fact, most days of the first month were already half full. "What a gold mine! I never thought in my wildest dreams I would be this successful," she thought. "I am so glad my DNP program gave me the knowledge, skills, and confidence to open up my own practice. At last, I am using my skills to their fullest and have my own business. This is great."

As the month progressed, more appointment slots filled and the DNP started to double book time slots just to keep up with the demand. Rushing to deliver health care services to a population in need, the DNP failed to realize how much revenue was being lost by double booking patients in a new practice. How could seeing more patients result in lost revenue?

Most insurance carriers allow providers in a primary care setting to charge a new patient current procedural

terminology (CPT) code (99201-99205) at the first visit and again if the patient has not visited the practice in 3 years. Otherwise, subsequent visits fall into the established patient category (CPT codes 99211-99205). For the DNP described above, more office visits were being billed at lower new patient code levels because the work required to document at a higher level was not performed. Consequently, the first-visit CPT code was not being maximized.

Additionally, the DNP did not use the preventive medicine services code permitted to be used once a year or, as in the case above, at the first visit. Despite the fact patients might visit the DNP on the first visit for a particular illness, preventive medicine services can still be provided and reflected with the CPT code and charged.

If an abnormality/ies is encountered or a preexisting problem is addressed in the process of performing this preventive medicine evaluation and management service, and if the problem/abnormality is significant enough to require additional work to perform the key components of a problem-oriented EM service, then the appropriate Office/Outpatient code 99201-99215 should also be reported. Modifier 25 should be added to the Office/Outpatient code to indicate that a significant, separately identifiable Evaluation and Management service was provided by the same physician on the same day as the preventive medicine service. The appropriate preventive medicine service is additionally reported. (American Medical Association, 2005, p. 29)

As shown in Table 1 the CPT codes for a new patient and new preventive patient visit with the subse-

TABLE 1. CPT Codes, Medicare Allowable (Example), and Work Documentation

| CPT Code | Medicare Allowable (Example) | Work Documentation |
|--------------------|------------------------------|---|
| New Patient | | |
| 99,202 | US\$64.19 | Expanded problem-focused history and exam plus straightforward medical decision making |
| 99,203 | US\$93.30 | Detailed history and exam plus medical decision making of low complexity |
| 99,204 | US\$143.80 | Comprehensive history and exam plus medical decision making of moderate complexity |
| New Preventive | | |
| 99,385 (18–39 y/o) | US\$107.34 | Age- and gender-specific history, exam, counseling/anticipatory guidance/risk factor reduction interventions, and ordering of appropriate immunization(s), labs/diagnostics |
| 99,386 (40–65 y/o) | US\$125.63 | Same |
| 99,387 (>65 y/o) | US\$137.56 | Same |

quent Medicare-allowable rates are quite different from one another. When the DNP opening a new practice fills the schedule with four patients per hour (15-minute visit) and then documents and charges at the 99,202 level, the income is US\$256.76. On the other hand, when the DNP sees only three patients per hour (20-minute visit) provides some preventive care, and documents a new preventive visit (99,386), the income increases to US\$376.89. Thus, when the DNP sees four patients at the 99,202 level rather than three patients at the 99,386 level per hour, seeing more patients would result in a lower income (US\$120.13 less) for the practice. Over an 8-hour day such a practice stands to potentially lose US\$961.04 per day, US\$4,805.20 per week, US\$19,220.80 per month, and US\$230,649.60 per year. Such a scenario demonstrates numbers of patients are not the key to increasing charges. Rather, the CPT code charged determines the charges generated by the DNP.

Once the patient is seen in clinic, the next visit must be billed as an established patient visit and will be reimbursed at a much lower rate. Usually, the occasion to code a new patient preventive visit only knocks once: the first time a patient visits the practice. Take advantage of the opportunity.

Mind your nursing business. Learn and practice.

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Health Care on Aisle 7: The Growing Phenomenon of Retail Clinics

RAND Health is the nation's most trusted source of health policy research, with an international reputation for conducting policy-relevant research of the highest quality. At any given time, Health's more than 200 professionals are working in more than 300 projects across the health policy spectrum. Health highlights some key findings in short, user-friendly Research Highlights, which are intended to disseminate research to professionals both inside and outside the Health arena.

Dr. Robert Brook, RAND vice president and director of RAND Health, has encouraged us to include Research Highlights of particular relevance in our journal. The Highlight in this issue focuses on health and medical care spending of the elderly. All of RAND Health publications and Research Highlights are available at www.rand.org/health.

Key findings:

- Most (88%) U.S. retail clinics are located in major metropolitan areas, and one-third of the U.S. urban population can easily access a clinic.
- Retail clinics typically serve younger adult patients who do not have a regular health care provider.
- For a selected group of conditions, retail clinics deliver lower-cost care of equivalent quality compared with other settings.
- Approximately 1 in 5 visits to a primary care physician and 1 in 10 visits to an emergency department (ED) are for a problem that can be treated at a retail clinic.

Retail clinics are medical clinics located in pharmacies, grocery stores, and “big box” stores, such as Target. They offer care for simple acute conditions, such as bronchitis, and preventive care. The care is typically delivered by a nurse practitioner. Retail clinics emphasize convenience,

with extended weekend and evening hours, no appointments, and short wait times. Retail clinics are becoming increasingly widespread. The first retail clinics opened in 2000, and by 2008 they numbered close to 1,000.

Retail clinics have also generated controversy. Provider groups, such as the American Medical Association, have raised concerns about quality-of-care issues, including the overprescribing of antibiotics, the lost opportunities for preventive care, and the disruption of existing patient-physician relationships. Conversely, champions of the retail clinic model have pointed to their potential benefits: Retail clinics provide a less costly alternative to care for patients who otherwise would go to EDs.

To date, the controversy over retail clinics has occurred without much factual grounding: There has been little empirical analysis of clinic characteristics and activities. To improve understanding of these issues, RAND Health researchers conducted several studies of retail clinics. The research focused on three areas:

1. A profile of retail clinics: Where are retail clinics located, what services do they offer, and who owns them?
2. Patient characteristics and service use: Who uses retail clinics, and what services do patients obtain?
3. Costs, quality, and preventive care delivery: How do retail clinics compare on these dimensions with other health care settings?

Most Retail Clinics Operate in Large Metropolitan Areas

In two different projects, RAND researchers examined the characteristics of retail clinics. Using cross-sectional data from industry and foundation sources, the team identified

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982 retail clinics operating in the United States (as of August 2008). Analysis of these clinics revealed the following:

Geographic Distribution

- The majority of retail clinics were located in the South (43%) and Midwest (31%). Nearly half (44%) of all clinics were located in five states (Florida, California, Texas, Minnesota, and Illinois; see Figure 1). An estimated 35.8% of the U.S. urban population lived within a 10-minute driving distance of a retail clinic.
- Retail clinics were more likely to be located in regions of metropolitan areas that had lower poverty rates and higher median incomes. Census tract analysis of 930 clinics indicated that only 14% of clinics were located in medically underserved areas. Even after adjusting for the location of pharmacies and supermarket chains, clinics were less likely to be located in medically underserved neighborhoods than in other areas.

Services

- All clinics offered treatment for pharyngitis (sore throat). More than 95% offered treatment of skin

conditions, immunizations, pregnancy testing, and lipid or diabetes screening.

- Nearly all accepted private insurance (97%) and Medicare fee-for-service (93%); 60% accepted some form of Medicaid.
- For an uninsured patient, the average cost for a sore throat visit was US\$59.

Ownership

- Three organizations—CVS, Walgreens, and Target—operated 73% of the clinics. More than half of the 42 organizations that operated retail clinics were existing hospital chains or physician groups, such as the Mayo Clinic, Aurora Health Care, and Sutter, but these organizations operated only 11% of the clinics.

The results showed that retail clinics are widespread and easily accessible to large numbers of Americans, but the results did not support the claim that these clinics are improving access to care for underserved populations, since most of the clinics were located outside medically underserved areas.



Figure 1. Location of retail clinics in the United States. *Source.* Rudavsky, Pollack, and Mehrotra (2009). Reprinted with permission.

Typical Retail Clinic Patients Are Younger Adults With No Regular Provider

Another study examined the characteristics of patients who use retail clinics and the medical services they receive. RAND researchers analyzed details of more than 1.3 million visits to retail clinics from 2000 to 2007 and compared information from that analysis with national data on visits to primary care physician offices and EDs. According to the study's findings:

- The largest group of clinic users was young adults, age 18–44, who accounted for 43% of patients. Nationally, this group made up only 23% of patients who visit primary care physicians (see Figure 2).
- Retail clinic patients were less likely to have a personal doctor: 39% said that they had a primary care physician, compared with 80% of patients nationally who reported a usual source of care.
- Two-thirds of retail clinic visits were paid for with health insurance, compared with 90% of visits to primary care physicians.
- About 90% of visits to retail clinics were for 10 simple acute conditions and preventive care: upper respiratory infections, sinusitis, bronchitis, sore throat, immunizations, inner ear infections, swimmer's ear, conjunctivitis, urinary tract infections, and screen blood tests. The same conditions accounted for 18% of visits to primary care physician offices and 12% of ED visits.

Though the research did not examine the impact of retail clinics on existing patient–physician relationships, it is notable that the majority of retail clinic patients did not have a regular provider, so there was no relationship to disrupt. The

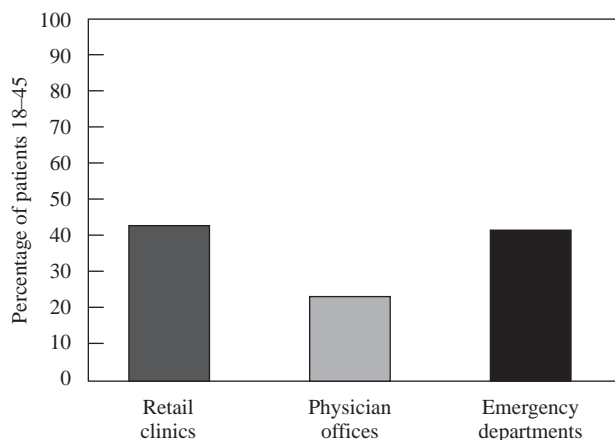


Figure 2. Adults under 45 were the heaviest users of retail clinics. *Note.* Data are drawn from authors' analyses of claims data obtained from retail clinic companies and survey data from the National Ambulatory Medical Care Survey and the National Hospital Ambulatory Medical Care Survey.

results provided some support for the view that retail clinics are attractive to patients who do not seek care at doctor's offices. The profiles of ED and retail clinic users were similar, and thus it is possible that retail clinics could be a substitute site of care for some patients who now seek care in EDs.

Retail Clinics Offer Lower-Cost, Similar-Quality Treatment for Some Medical Conditions

Another study examined the costs and quality of care at retail clinics and compared these with costs and quality in other health care settings. Analysts used claims data from enrollees in a large Minnesota health plan who received care for one of three common conditions: otitis media (inflammation of the middle ear), pharyngitis, or urinary tract infection. Treatment was aggregated into care episodes (including initial and follow-up visits, pharmaceuticals, and ancillary tests) in which these illnesses were treated first in retail clinics, physician offices, urgent care centers, or EDs.

- **Costs of care.** Overall, costs of care for episodes initiated at retail clinics were substantially lower than those of matched episodes initiated at physician offices, urgent care centers, and EDs (see Figure 3). Average prescription costs were similar in retail clinics, physician offices, and urgent care centers (US\$21, US\$21, and US\$22, respectively); ED average prescription costs were slightly higher (US\$26).
- **Quality of care.** Using 12 quality-of-care measures, researchers developed quality scores for the four provider settings. The aggregated scores were similar for retail clinics, physician offices, and urgent care centers, and lower for EDs (see Figure 3). The only exception was that a smaller proportion of high-risk patients received a urine culture at retail clinics.
- **Antibiotic prescribing.** Despite concerns that retail clinics would overprescribe antibiotics, the share of patients who were prescribed antibiotics was similar for retail clinics (68% for otitis media, 26% for sore throat), physician offices (73% and 29%), urgent care centers (75% and 36%), and EDs (58% and 31%).¹
- **Preventive care.** There have been concerns that retail clinic visits represent missed opportunities for primary care doctors to identify and provide missing preventive care. Despite this concern, the proportions of patients who received preventive care within 3 months of their first visit did not vary significantly across the 3 non-ED settings (retail clinics, 14.5%; physician offices, 14.2%; urgent care centers, 13.7%; see Figure 3).

The results did not support concerns that retail clinics deliver poor quality care, overprescribe antibiotics, or ad-

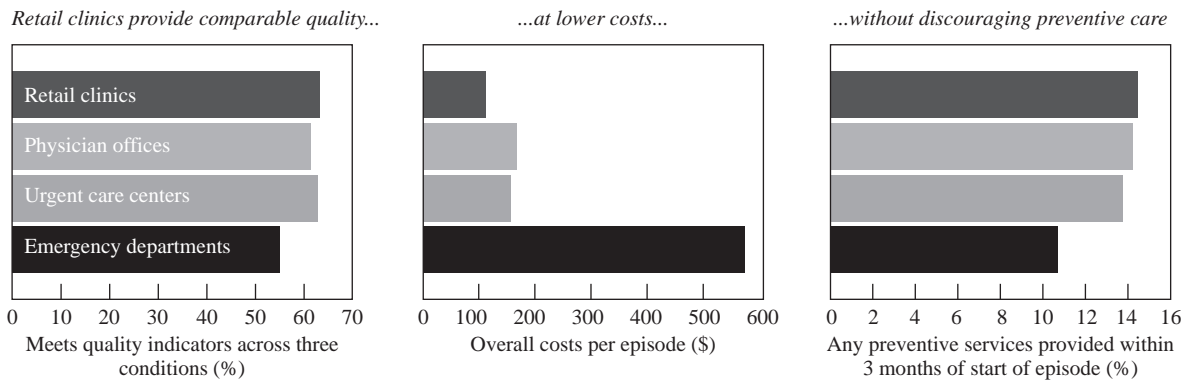


Figure 3. Retail clinics provide comparable quality at lower costs without discouraging preventive care.

Source. Based on data presented in Mehrotra, Liu, et al. (2009).

Note. Conditions studied were otitis media (inflammation of the middle ear), pharyngitis (sore throat), and urinary tract infection.

versely impact preventive care. Retail clinics had similar quality of care compared with physician offices and urgent care clinics and surpassed that provided in EDs. However, the researchers caution that their findings might not generalize to care provided at all retail medical clinics. The study was conducted only in Minnesota, among insured patients, and among patients of only one retail clinic chain.

Concluding Thoughts

These studies uncovered little evidence to bear out concerns about retail clinics. Clinics frequently serve a population that lacks access to a regular primary care provider. They treat a limited number of conditions at lower cost and equivalent quality relative to other settings. However, the research also did not support the claim by some champions of the retail clinic model that these clinics are improving access to care for the medically underserved, since retail clinics are more likely to be located in relatively affluent sections of large urban areas. The analysis did not determine whether patients who might otherwise have gone to EDs used retail clinics instead.

Further research is needed to examine this issue. Retail clinics represent a growing segment of the health care industry, based on a new model of care that emphasizes patient convenience. A good deal more study will be required to understand their impact on the U.S. health care system across all dimensions. RAND Health is now conducting some of this work, examining more closely the patient populations and geographic areas that retail clinics serve.

This Highlight Summarizes RAND Health Research Reported in the Following Publications

Mehrotra, A., Liu, H., Adams, J. L., Wang, M. C., Lave, J. R., Thygeson, N. M., et al. (2009). Comparing costs and quality of care

at retail clinics with that of other medical settings for 3 common illnesses. *Annals of Internal Medicine*, 151(5), 321–328.

Mehrotra, A., Wang, M. C., Lave, J. R., Adams, J. L., & McGlynn, E. A. (2008). Retail clinics, primary care physicians, and emergency departments: A comparison of patients' visits. *Health Affairs*, 27(5), 1272–1282.

Pollack, C. E., & Armstrong, K. (2009). The geographic accessibility of retail clinics for underserved populations. *Archives of Internal Medicine*, 169(10), 945–949.

Rudavsky, R., Pollack, C. E., & Mehrotra, A. (2009). The geographic distribution, ownership, prices, and scope of practice at retail clinics. *Annals of Internal Medicine*, 151(5), 315–320.

Note

1. For the third condition studied, urinary tract infection, antibiotics were prescribed in almost all cases at each site.

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Disseminating Evidence-Based Practice Projects: Poster Design and Evaluation

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The international emphasis on evidence-based practice (EBP) as a basis for quality care has elevated the importance of EBP dissemination. The doctor of nursing practice (DNP) degree has created opportunities for nurses to implement EBP projects in collaboration with academic and clinical teams. Findings from such innovative efforts ought to be widely distributed, yet such projects have unique dissemination needs that are not readily met by traditional research-based presentation venues. Current literature focuses on presentation approaches for research-based poster content and evaluation rather than EBP posters. To facilitate timely and quality dissemination of EBP projects, there is a need for clear criteria identifying the essential information to be shared, how to share it effectively, and how to evaluate the end product. Thus far, the challenge to better accommodate EBP poster presentations has been unmet. The purposes of this article are to provide suggestions for EBP poster creation and to describe the process of developing a Poster Evaluation Rubric for Evidence-Based Practice (PER-EBP). The PER-EBP tool, developed by the authors, provides a guide for EBP poster creation and criteria for EBP poster evaluation by self and others. Examples of an EBP literature review and a DNP student poster are provided.

Keywords: evidence-based poster; poster evaluation; evaluation rubric; EBP dissemination

It is vital to disseminate evidence-based practice (EBP) findings to stakeholders and other health care professionals so that innovations for practice can be replicated or applied in other settings. According to Matchar et al. (2005), “the real benefits of an evidence report are achieved through dissemination . . . aimed at some specific objective, such as practice improvement” (p. 1120). Despite a breadth of information regarding how to create posters for research dissemination (Burns & Grove, 2009; Bushy, 1991; Garrison & Bushy, 2004; Johnson & Green, 2007; Maltby & Serrell,

1998; McDaniel, Bach, & Poole, 1993; Sexton, 1984) there is a lack of thorough direction in the literature regarding dissemination of EBP efforts via poster format. For instance, Miracle (2008) provided guidelines for research poster presentations at professional meetings or in clinical settings. Miracle noted that new policy information might be provided to staff in a poster format. However, Miracle did not mention approaches for presenting the synthesis of the literature and other documents from which the new policy is based. Synthesis of existing evidence is imperative

for EBP dissemination. Betz, Smith, Melnyk, and Rickey (2004) provided an array of options to disseminate evidence, including posters. While Betz et al. outlined pragmatics of general poster content and construction, mechanisms for EBP poster evaluation were absent.

As previously stated, a gap in the EBP literature exists regarding how to evaluate EBP posters. A few tools are available for evaluating research posters (Bushy, 1991; Garrison & Bushy, 2004; Hess, n.d.; Russell, Gregory, & Gates, 1996). However, upon a search of the literature, no tools were found for evaluation of EBP posters. The authors of this article, who are faculty teaching in a doctorate of nursing practice (DNP) consortium program, had the immediate need to provide guidance to DNP students regarding dissemination of EBP projects via a poster and to determine a mechanism for evaluating EBP posters as a part of the doctoral students' final capstone projects. Since resources were void in the literature, the faculty developed guidelines to assist the students in preparing their EBP poster content. An evaluation tool for EBP posters was also created by the authors. The purposes of this article are to provide some suggestions for EBP poster creation and to describe the process used to develop the Poster Evaluation Rubric for Evidence-Based Practice (PER-EBP).

Evidence-Based Practice Dissemination

Importance of Dissemination of Evidence

As with the research process, the final phase for EBP is the dissemination of findings. Knowledge synthesis, translation, and exchange are vital to strengthen health care, inform policy, and improve practice decisions based on current clinical evidence (Waters & Armstrong, 2007). Stevens (2005) differentiated how clinical changes are transformed into practice using a two-stage process. The first stage includes translation of evidence into practice where summarized evidence is readily provided to clinicians via clinical guidelines, pathways, or protocols. The second stage involves integration of these recommendations into actual practice and addresses the efficiency of change adoption into the practice of individual care providers and organizations. Posters are a means of addressing both the translation and integration of EBP.

Posters as an Evidence-Based Practice Dissemination Method

Numerous methods are appropriate for EBP dissemination to stakeholders, consumers, or other health care professionals and are thoroughly presented by Betz et al. (2004).

A poster serves as a storyboard to share information in a concise way (Jackson & Sheldon, 2000). Posters are relatively easy to construct and provide a helpful means for nurse clinicians to present their EBP projects in a forum.

Posters broadly disseminate findings to a variety of people. Posters are used at professional conferences to share up-to-the-minute information and are displayed at health care facilities to inform health care professionals about practice changes, findings, outcomes, or policies. This form of dissemination is a rapid method to educate others. Posters are also helpful in educating the public and informing stakeholders about the processes and products from EBP efforts. Information provided in a poster format enhances the credibility of the project for consumers who are a part of the project. Additionally, posters are a method of keeping communication flowing to interested parties when a project is on-going. Finally, poster formats are also distributed electronically to list servers, posted to websites that target key audiences, and displayed in specific units or public places in health care settings.

Advantages of posters presented at a conference or in an open forum include the ability of the poster presenters to efficiently and succinctly disseminate knowledge (Sexton, 1984) as well as share in-depth, individualized information about the EBP project (Betz et al., 2004). For example, the ability to ask questions of the poster presenter about literature reviews or outcomes from EBP projects may allow a viewer to take information back to the work area for further dissemination. Unlike podium or oral presentations, the poster setting is less formal and not bound by time restrictions. Usually, those viewers who stop to dialogue with the poster presenter are those most interested in the poster, most likely to engage in a rich discussion, and most apt to provide feedback to the presenters. Miracle (2008) noted that posters are effectively shared with small groups of staff to circulate current research or evidence, thus creating a nonthreatening atmosphere for dissemination, active participation, and learning.

Halligan (2008) found only a few empirical studies (Horn, Kopser, & Carpenter, 1993; Moore, Augspurger, King, & Proffitt, 2001; Smith, Fuller, & Dunstan, 2004) related to poster presentations. The foci of these studies were diverse. One study (Horn et al., 1993) found that posters attracted more staff participation than short oral presentations and there was a significant increase in learning ($t = 10.20$, $p < .001$) from pre- to post-tests of knowledge regarding content. The second study (Moore et al., 2001) surveyed poster presenters at a conference to determine what they had learned from the processes of creating and presenting a poster. The participants indicated that limiting information

on the poster was the most challenging, as well as the importance of relating to others during the presentation. A third study (Smith et al., 2004) explored the ratings of posters at a scientific conference. These authors reported that a detailed assessment guideline is necessary in the scoring of posters. Additionally, Halligan noted that posters can assist the world of nursing to narrow the research-practice gap and promote continuous learning in a creative and effective manner. Johnson and Green (2007) explored the response of undergraduate students who completed poster presentations in class ($n = 19$). They found that students preferred poster presentations to individual oral presentations and that the poster format decreased their nervousness. Provision of a less stressful and inviting environment to disseminate EBP project information is essential to ensure active involvement of clinically-based health care professionals.

Creating a Poster for EBP Dissemination

Basic Elements of Research and EBP Posters

There are many sources outlining the esthetics of poster creation (Bauldoff & George, 1999; Betz et al., 2004; Duchin & Sherwood, 1990; Jackson & Sheldon, 2000; Maltby & Serrell, 1998; Miracle, 2008; Russell et al., 1996; Sexton, 1984; Thompkins, 1995). Basic principles noted by these authors are important to follow in any type of poster (research or EBP). Elements essential for poster development include: (a) early planning with a clear focus; (b) following conference guidelines, such as poster size and type (hanging or freestanding); (c) using bullet points or abbreviated wording; (d) incorporating pictures or graphics; (e) balancing content with white space; and (f) using a large font size for viewing at a distance. It is also important to consider who the target audience is for the poster presentation. For instance, if public or lay

stakeholders will view the poster, health care jargon and complex data analysis should be avoided. The space limitations of a poster may require that handouts be used to assist in providing information to the viewers. Additional materials, such as clinical pathways or project outcomes, may be appropriate especially for clinically-based viewers. A three-or-four column display is recommended. The rule of thirds (Duchin & Sherwood, 1990) is common, where the poster space is divided into three columns. The poster is organized to reflect a newspaper-like reading sequence with the title at the top and the content presented in the columns that are read in a downward sequence from left to right. The poster title, along with the project author(s), is vital (Russell et al., 1996) and should be at the top center of the poster. The background, significance, and purpose are normally at the top left with the conclusions (findings/product/outcomes) presented at the bottom right. At professional conferences, an abstract is already provided in the program; therefore, it does not need to be provided on the poster itself. Handouts, in addition to the poster, are also an option. Handouts are especially helpful to educate others about the project minutiae that are too detailed for the actual poster display. Additional fine points, such as the process of literature review, information about the theoretical framework, instruments, references, and/or contact information (Betz et al., 2004) provide reminders to assist the audience and make the poster memorable.

EBP Specific Poster Formatting

Table 1 shows examples of common content for an EBP poster as derived from 2009 Midwest Nursing Research Society's guidelines for EBP posters (MNRS, 2009) and Betz et al. (2004). The 2009 MNRS criteria for EBP posters (for students) provided specific guidelines to follow

TABLE 1. Common Content for EBP Posters

| MNRS Criteria (MNRS, 2009) | General Suggested Content (Betz, Smith, Melnyk, & Ricky, 2004) |
|--|--|
| Purpose is clearly stated | Statement of the problem—background, rationale, data to note importance of the problem |
| Synthesis of evidence guiding practice change is reflected in abstract, strength of evidence addressed, link between nursing implications and best practices | Clinical question stated |
| Proposed change in practice discussed | Search for evidence/accepted practice—methods, sources used to collect evidence |
| Strategies to be used for implementation outlined | Presentation and critical appraisal of the evidence—summary of conclusions drawn from evaluation of evidence |
| Stakeholders identified | Describe clinical practice implications |
| Method for evaluation of change discussed | |
| Significance of the work to this conference | |

for posters accepted at their annual conference. As noted previously, it is important to follow the specific criteria provided by conference organizers. The content suggested by Betz et al. is general and may be used for various EBP posters, including education for staff or stakeholders.

Statements regarding the significance of the clinical problem and the clinical question are included in a prominent place, such as the top left side, as these should drive the entire EBP project and are of interest to viewers. This information assists the reader in determining whether examination of the poster in more detail is warranted. The format of the clinical question may depend on the method used for the EBP project. For instance, the PICO format, which addresses “population, intervention or interest area, comparison intervention or group, and outcome of interest” (Melnik & Fineout-Overholt, 2005, p. 50), is common for EBP work. The theoretical basis of the project should also be included.

Synthesis of the literature is a vital component of any EBP project and reflects the critical thinking of the presenter(s). EBP literature synthesis requires detailed organization, thorough understanding of the research process, and excellent writing skills. However, this synthesis of the literature is complex and difficult to capture concisely in a poster, which is mainly visual and allows minimal content. As Miracle (2008) stated, “Remember, posters do not tell; they show” (p. 123). There are many ways to show the literature in a concise manner. A decision is needed regarding the approach for organizing the multifaceted EBP literature synthesis. Table 2 is an example of a DNP student’s literature review for poster presentation wherein themes are grouped by level of evidence and key references noted (Thackeray, 2009). Another approach for succinct display of evidence is to briefly outline the process and types of evidence searched. Depending on the clinical issue, it may be important to depict ranked levels of evidence. When showing the development of the evidence foundation, another organizing approach is to list publications chronologically. A further tactic is to use existing tools to summarize the evidence, such as the AGREE instrument, (Appraisal of Guidelines for Research and Evaluation) which assesses the quality of clinical guidelines (AGREE Collaboration, 2003).

Other content within an EBP poster may be similar to a research poster, such as the method(s) used to gather data, findings or outcomes of the project, and major conclusions (Betz et al., 2004; Sexton, 1984). Implications for nursing practice should be included at a level of detail appropriate for the intended audience.

Customization of the Poster for the Target Audience

Since the poster is a storyboard, one should consider how the project’s story should unfold (Jackson & Sheldon, 2000). What makes the most sense to a prospective audience? Do they want more about research evidence or do they want to know about the process? Are the outcomes of the project the most important element? Whatever elements are deemed a priority to the audience, components of the entire project should still be noted. For example, if the audience consists of clinicians who will be implementing the suggested changes from the project (e.g., a clinical guideline), some content about the literature review and the process of obtaining the outcome is needed to lend credence to the suggested practice change. However, the main focus of the poster can be on the implementation process. If administrators are the primary audience, elements such as cost analyses, regulations guiding the project, and/or utility information should be highlighted.

Usually, the purpose of a poster in a clinical arena is to provide a summary for care providers to translate a practice change. Those viewing the poster want the key information about the process. The target audience of the poster will change the focus and details of the process presented. Those reviewing the poster for possible implementation of the practice change in their organization would be interested in factors that facilitated and hindered the process. If the purpose is to promote the adoption of the project within the organization, the details are specific to the adoption process and the benefits of adoption. The poster is merely one step toward promoting individuals and the organization to widely and sustainably integrate the EBP into practice. The content of the poster will depend on the audience and purpose. If the purpose is to provide other professionals the opportunity for critical review of the project, the rigor needs to be conveyed. If the purpose is to convey rationale for the implementation of a change in policy to unit nursing staff, the evidence and change in quality of care is essential content. According to Betz et al. (2004), “substance and design, when combined well in a poster, can serve as an effective vehicle for conveying information to colleagues” (p. 368).

Evidence-Based Practice Poster Evaluation

Process of Evaluation Tool Development

The PER-EBP tool was developed by the authors of this manuscript for the purpose of evaluating DNP student posters. The development was necessary since, after a lit-

TABLE 2. Example of Synthesis of Evidence for Poster Display

| Activity of Interest | Level of Effectiveness | References |
|--|---|--|
| 1. Create a Succession Planning Framework | | |
| • Align program with strategic direction | Effective | Bolton and Roy (2004); Bower (2000); Byham, Smith, and Pease (2002); Corso (2002); Day (2000); Gandossy and Verma (2006); Goudreau and Hardy (2006); Groves (2006); LeBoeuf (2007); McConnell (2006); National Center for Healthcare Leadership (2005); Nursing Executive Center (2006); Redman (2006); Rollins (2003); Soares (2002) |
| • Assess critical positions | SOE VII ($n = 10$) | |
| • Identify and develop talent | SOE VI ($n = 4$): RQR (1; | |
| • Target the development of bench strength and advancement | .75 × 2; .5) | |
| • Firm commitment to execution | SOE V ($n = 1$): RQR (.5) | |
| • Measure program and placement of protégés | | |
| 2. Develop a Senior Nurse Leader Fellowship Program | | |
| • 360-degree feedback multisource rating of performance | Effective | Bellack and Morjikian (2005); Bower (2000); Byham et al. (2002); Cadmus (2006); Conger and Fulmer (2003); Day (2000); Gandossy and Verma (2006); Garman and Tyler (2004); Groves (2006); Mahaffey, Kaplan, and Triolo (1998); Magnum (2006); National Center for Healthcare Leadership (2005); Noyes, McNally, Tourville, and Robinson (2002); Ponte, Galante, Gross, and Glazer (2006); Redman (2006) |
| • Mentoring of protégés | SOE VII ($n = 7$) | |
| • Executive coaching | SOE VI ($n = 7$): RQR (1; | |
| • Action learning | .75 × 4; .5 × 2) | |
| • Job assignments | SOE V ($n = 1$): RQR (.5) | |
| 3. Determine a Succession Planning Process | | |
| • Identify high-potential candidates through a rigorous selection process | Effective | Bolton and Roy (2004); Byham et al. (2002); Collins and Collins (2007); Collins and Holtan (2004); Corso (2002); Gandossy and Verma (2006); McConnell (2006); LeBoeuf (2007); National Center for Healthcare Leadership (2005); Nursing Executive Center (2006); Redman (2006); Rollins (2003); Soares (2002) |
| • Diagnose developmental opportunities and recommend solutions | SOE VII ($n = 10$) | |
| • Ensure development takes place | SOE VI ($n = 2$): RQR (.5 × 2) | |
| | SOE I ($n = 1$): RQR (1) | |
| 4. Identify Senior Leader Competencies to Develop Through a Fellowship Program | | |
| • Align competencies with strategic direction | Effective | Bellack and Morjikian (2005); Bolton and Roy (2004); Byham et al. (2002); Cadmus (2006); Fralic and Morjikian (2006); Goudreau and Hardy (2006); National Center for Healthcare Leadership (2005); Thomas and Herrin (2008) |
| • Congruent with performance management | SOE VII ($n = 5$) SOE VI ($n = 2$): RQR (1; .75) | |

Level V: Evidence from systematic reviews of descriptive or qualitative studies.

Level VI: Evidence from a single descriptive or qualitative study.

Level VII: Evidence from the opinion of author and/or reports of expert committee.

Modified from Guyatt and Rennie (2002); Harris et al. (2001); Melnyk and Fineout-Overholt (2005, p. 10).

Source: Thackeray (2009).

Note. SOE = Strength of Evidence; RQR = Research Quality Review Score.

erature review, no published tools were found to evaluate EBP posters. Bushy's (1991) R-PAT (Research Poster Appraisal Tool) was used as a beginning template for an EBP poster evaluation tool. The R-PAT is a well-known 30-item tool for appraising research posters, but was not originally developed for application to EBP posters. Bushy, the R-PAT author, was contacted and granted permission to adapt the tool for EBP poster evaluation.

Several steps were involved in developing the PER-EBP. First, criteria for creating an EBP poster were developed for a course assignment based on the literature for EBP dissemination. Next, these criteria were compared with Bushy's (1991) R-PAT and items were added or deleted based on the student assignment criteria and EBP content. These criteria were developed into a rating scale that was congruent with the evaluation criteria schema used in the DNP Consortium Program and a useable draft was developed.

After the authors refined the tool, other graduate nursing faculty members teaching in the DNP Consortium Program were asked to provide feedback. This feedback was used in revision of the criteria. Next, graduate nursing faculty consented to participate in the evaluation of student posters using the draft PER-EBP tool. Formal university IRB was secured. During the student capstone poster event presentation, DNP faculty evaluated the student EBP posters. The use of the PER-EBP tool and scoring by multiple faculty provided feedback about content validity, feasibility, and usability of the tool. Comments from faculty regarding PER-EBP tool utility and suggested changes were solicited. An advantage of the consortium program was having access to faculty members who may not have been involved in the course and therefore could lend insight and new perspectives to the PER-EBP tool and process. Preliminary validity and reliability mea-

Poster Evaluation Rubric for Evidence-Based Practice (PER-EBP)

Directions: Rate each of the scale items using the rating descriptors provided below.

| Category A: Essentials | Identify if the poster display contains: | Present 2 pts | Weak/Absent 0 pts |
|-------------------------------|--|----------------------------|----------------------|
| | Author's name, affiliation, and funding sources (if applicable). | | |
| | Correct spelling, grammar, and APA. | | |
| | Information regarding protection of human subjects. | | |
| | Appropriate focus on intended audience. | | |
| SUBSCORE A: | | | |
| | Category B: Overall Appearance Rate the level at which the: | Exemplary 2 pts | Average 1 pt |
| | Display holds the viewer's attention and provides overall attractiveness. | | Weak/Absent 0 pts |
| | Text, graphics, pictures, and charts are relevant/contribute to the topic and the audience. | | Not Applicable |
| | Text is legibly readable from 5 feet. | | |
| | Overall content is logically arranged/organized to depict the process. | | |
| SUBSCORE B: | | | |
| | Category C: Content Rate the level at which the: | | |
| | Title reflects the essence of the project. | | |
| | Purpose/aim/goal is clearly stated. | | |
| | Clinical question is clearly stated. | | |
| | Current evidence (including the rating of the evidence) related to the clinical problem is succinctly presented. | | |
| | Theoretical and/or EBP framework are identified. | | |
| | Cost analysis is provided and adequate. | | |
| | Methods/procedures for project implementation are clearly stated. | | |
| | Relevant processes of project implementation are noted (e.g., key stakeholders, barriers, facilitators of change). | | |
| | Concise analysis of data collection and relevant project information are provided with results in a sequential/logical manner. | | |
| | Project recommendations/outcomes/findings are highlighted in manner appropriate for the audience. | | |
| | Clinical practice implications are described. | | |
| | Future plans for project are detailed. | | |
| | Handouts enhance/adjunct the poster content. | | |
| | Information appears applicable to the clinical problem, setting, and identified population. | | |
| SUBSCORE C: | | | |
| | Category D: Presentation/Professionalism Rate the level at which the: | | |
| | Author was available to respond to viewer's questions. | | |
| | Author was knowledgeable about the subject matter and able to answer questions. | | |
| | Author professionally presented him/herself. | | |
| SUBSCORE D: | | | |
| | | TOTAL POINTS: _____ | |
| | | *PERCENTAGE: _____ | (Total Points x 2) |

*If the not applicable selection was used, divide total points earned by the total points possible to determine the percentage. (e.g., if three items were marked not applicable, the total points would be divided by 22 to determine the percentage)

Figure 1. Draft of Poster Evaluation Rubric for Evidence-Based Practice (PER-EBP).

tures and item analysis were run on the tool based on this scholarly event rating for the purpose of tool refinement. Major changes have since been made to PER-EBP based on the feedback from others and statistical review.

Numerous content changes in the categories and question stems as well as shifting of points have evolved through many drafts of the tool. The current draft of the PER-EBP tool (see Figure 1) includes the revisions made based on the determined level of agreement between the manuscript authors and comments from other faculty who used the tool. The tool has four categories of evaluation criteria: essentials, overall appearance, content, and presentation/professionalism. These are similar to the three categories in Bushy's (1991) rating scale. A total of 25 draft items are currently included within these four categories.

Conclusion

The PER-EBP evaluation tool can also be used in multiple settings, such as clinics, conferences, or professional meetings where EBP posters are used. It can also serve as a guide for students as they develop posters, serving as a means to self-evaluate the appearance and content for the poster.

In summary, there is a need to further define the unique nature of EBP dissemination via use of posters. The authors have offered recommendations for EBP poster creation and provided a draft tool for evaluating EBP poster quality. Ongoing refinement of the PER-EBP is in process. It is hoped that this information will assist health care facilities, faculty, and students in disseminating the many unique EBP efforts underway that have the potential to broadly change practice and positively impact patient care.

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An Evidence-Based Review on Guided Imagery Utilization in Adult Cardiac Surgery

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This article illustrates a comprehensive review, synthesis, and critical appraisal of the research evidence surrounding guided imagery utilization in cardiac surgery. By adding guided imagery in the “usual care” of adult cardiac surgery patients, pre- and postoperative anxiety and pain, as well as hospital length of stay *may* be reduced. However, in spite of fairly strong “level” of evidence, the limited number of studies and low research quality deter the full acceptance of guided imagery as a standard therapeutic modality in this population. Acute and critical care nurses can offer guided imagery to their patients based on the documented safety of its use and clinically significant findings that it *may* have a direct impact on patients’ recovery outcomes. Higher quality, methodologically rigorous, and larger-scale studies are warranted to establish the efficacy and standard utilization of guided imagery during perioperative and rehabilitative periods. Future studies should also address long-term outcomes, specifically on physical and psychological health, well-being, and overall quality of life after cardiac surgery.

Keywords: guided imagery; cardiac surgery; evidence-based review; mind-body intervention

The utilization of complementary and alternative medicine (CAM) in the United States is on an upward trend. In recent years, the rate of CAM use among adults in the United States has increased from 36.0% in 2002 to 38.3% in 2007 (National Center for Complementary and Alternative Medicine [NCCAM], 2007). Similarly, CAM use has become more prevalent among adult cardiac surgery patients. In survey studies conducted in two large academic medical centers, CAM utilization rates were high among adults who had undergone cardiac surgical procedures: 75% ($N = 188$) of 263 participants in the Northeast and 80.9% ($N = 182$) of 225 participants in the Midwest confirmed use of CAM, including guided imagery (Ai & Bolling, 2002; Liu et al., 2000). A report published by the NCCAM at the National Institutes of Health suggests that guided imagery, a mind-body intervention technique, is one of the major CAM modalities frequently used by

surveyed respondents for the purposes of maintaining health and well-being (NCCAM, 2007).

Guided imagery is defined as a “therapeutic process that facilitates working with the power of the imagination to positively affect mental attitude and potentiate positive outcomes” (Ezra & Reed, 2008, p. 6). Research outcomes surrounding guided imagery utilization in the adult cardiac surgical population typically have included reduction of anxiety and pain (Deisch, Soukup, Adams, & Wild, 2000; Kshetry, Carole, Henly, Sendelbach, & Kummer, 2006; Tusek, Cwynar, & Cosgrove, 1999). The mechanism of action by which guided imagery achieves these outcomes is through *purposeful* use of imagination or visualization of tranquil or peaceful sceneries, enabling the patient to enter into a relaxed state and/or directing attention away from unpleasant or undesirable sensation (Tusek et al., 1999).

The method of administration of guided imagery varies from one-on-one interaction with an imagery practitioner to the use of recorded media. In the hospital setting, the common method employed by nurses in administering guided imagery is the use of a structured, commercially prepared script, recorded on a compact disc (CD; Ezra & Reed, 2008; Sendelbach, Carole, Lapensky, & Kshetry, 2003). Patients are usually advised and encouraged to listen to or use the guided imagery program in a portable CD player before, during, and after the surgery (Ackley, Swan, Ladwig, & Tucker, 2007). Studies have shown that nurses are proactive about integrating or recommending guided imagery as a complementary therapeutic modality, in conjunction with pharmacologic agents, for treating anxiety and pain experienced by patients during the perioperative period (Ackley et al., 2007). Despite the prevalent use of CAM, the positive outcomes associated with guided imagery (Deisch et al., 2000; Kshetry et al., 2006; Tusek et al., 1999), and the increasing trend of guided imagery utilization in many hospitals in the United States (Ezra & Reed, 2008), our experience shows many nurses and other health care providers are still skeptical or resistant about using or incorporating guided imagery in the standard of care for cardiac surgery patients.

The reluctance to partially or fully integrate guided imagery into the nursing care of these patients is primarily due to nurses' lack of knowledge and skill to perform the intervention, even though it can be done easily in acute and critical care areas and requires little time (generally 5–10 min). Our experience with nurses who have expressed skepticism or resistance to embracing the utilization of guided imagery in cardiac surgery, and in critical care in general, indicates that the negativity is primarily due to cultural background, work ethic, and values, including assumptions that such therapy is "just fluff." The beliefs and discomforting attitudes of nurses toward guided imagery, although anecdotal in nature, have been partially supported by research findings from a survey of 726 critical care nurses in the United States. Only 58.1% of the surveyed participants had positive perception of the legitimacy of guided imagery, while 38.5% did not have knowledge about or propensity to use its legitimate utilization in nursing practice. It is worth noting that the majority of respondents indicated they would like to know more about the evidence of CAM, such as guided imagery, before using it for personal reasons or integrating and/or recommending its use in practice. The preferred evidence for guided imagery, cited by over 40% of the surveyed participants, includes proven mechanism of action, successful use in practice, and evidence derived from clinical trials (Tracy et al., 2005).

To date, there exists no published comprehensive information available to acute and critical care nurses as a source of scientific knowledge supporting the utilization of guided imagery in the adult cardiac surgical population. To fill this gap of knowledge, we conducted a systematic review, synthesis, and appraisal of the research literature, as featured in this article. The Johns Hopkins Nursing Evidence-Based Practice Model (JHNEBP; Newhouse, Dearholt, Poe, Pugh, & White, 2007), which illustrates *practice, education, and research* as three elements that form the foundation of professional nursing practice, guided the article's conceptualization and development. The model delineates the process of identifying a clinical problem or intervention as well as appraising and translating evidence into practice. Additionally, the model suggests that decisions about developing or changing a patient care protocol or a nursing intervention must be based on the strongest type of evidence, such as research findings.

Methods

We conducted a comprehensive, systematic search of published literature related to utilization of guided imagery in adult cardiac surgery programs within the databases of MEDLINE, Pubmed, PsycINFO, Cochrane Library, and the Cumulative Index of Nursing and Allied Health Literature. Search terms included *guided imagery, guided visualization, guided relaxation, self-hypnosis, CAM, and integrative therapies* with the sub-categories of *coronary artery bypass graft surgery (CABG), "ON and OFF pump" CABG, cardiac/heart valve surgery, minimally invasive surgery, and robotic cardiac surgery*. Comprehensive terms were combined in various arrangements to search for research articles and reviews. We sought assistance from the College of Nursing reference librarian to ensure that a comprehensive search was completed.

The search generated a total of 364 titles with and without abstracts. As a response to the preferences of critical care nurses described in the above survey, inclusion criteria for the present review were limited to peer-reviewed research and review articles. The articles included in the present review were written in English, had subjects older than the age of 18 years, and were published between January 1985 and November 2009. Only eight research articles met the inclusion criteria (Ashton et al., 1995, 1997; Deisch et al., 2000; Halpin, Speir, Capobianco, & Barnett, 2002; Hattan, King, & Griffiths, 2002; Kshetry et al., 2006; Tusek et al., 1999). One of these, however, was a preliminary report (Ashton et al., 1995), which we excluded, thus yielding a total of seven articles.

Next, articles were clustered and tabulated according to themes and outcomes. Each article was summarized and aggregated according to conceptual framework (if indicated), variables, sample, design, methodology, intervention, results, and conclusion. We implemented a quality control strategy during the review process through a simultaneous review of each section of a particular article with consensus between the two authors on a specific section achieved first before proceeding to the next section of the article. Iterations of this process were done at least twice for each article. This step-wise, iterative review process provided us with a comprehensive, systematic, critical review, and appraisal of the research articles. Finally, we evaluated overall strengths and weaknesses of each article, and determined the strength (i.e., hierarchical level) and quality of evidence of each article using the JHNEBP Rating Scale, assigning letter grades of “A” (high) to “C” (low/major flaw; see Table 1) (Newhouse et al., 2007). Percentage of agreement between two raters (authors) was calculated by dividing the number of same ratings by the total number of responses for each rating scale category, yielding an inter-rater reliability of 92.8%.

Results

The seven research articles in the present review focused on evaluation of the effects of adding a guided imagery program to the usual care of adult cardiac surgical patients before, during, and after surgery (Table 2). In these articles, we found variety of terms used to describe guided imagery, including guided relaxation, relaxation technique, and self-hypnosis. The use of these terms is consistent with related publications cited in the health sciences literature (Astin, Shapiro, Eisenberg, & Forsys, 2003; Van Kuiken,

2004). Variations were found in conceptualizations, sampling, designs, outcome variables, and procedures. Unfortunately, only two research teams (Deisch et al., 2000; Tusek et al., 1999) provided a conceptual framework for their studies.

Findings reported in the seven articles were mixed. A diverse sample of surgical techniques and procedures was noted, as well as representations of the adult cardiac surgical patient population during the years of publication, historically consisting of 55- to 65-year-old White males. The research design reported in these articles (Table 2) included experimental ($N = 5$), quasi-experimental ($N = 1$), and descriptive/nonexperimental ($N = 1$) methods, with the primary aims of evaluating effects of therapy, health care utilization, and patient satisfaction outcomes. All studies used audiotapes (i.e., cassette and CD players) as a method of delivering the intervention (i.e., the guided imagery). However, inconsistencies were found in authors’ descriptions of intervention dosages (amount and frequency) and durations (time frame). For example, a wide range of the duration (e.g., 18–60 min) and frequency (e.g., 20 min daily, continuous during surgery, several times daily, and hourly at night) of intervention administration were observed. All but two studies (Halpin et al., 2002; Ikedo, Gangahar, Quader, & Smith, 2007), compared guided imagery to usual care. Of the two studies not using this design, one compared two groups of patients receiving guided imagery with a placebo group (Ikedo et al., 2007), while the other compared a “usual care + CAM package” (i.e., guided imagery + light massage) group with “usual care” (Kshetry et al., 2006). Patients in the placebo group (Ikedo et al., 2007) listened to a blank CD in a portable CD player with headphones, continuously “ON” (i.e., playing) during the intervention

TABLE 1. Strength and Quality of Research Evidence Rating Scheme

| Level (Strength) | Type of Evidence | Grade (Quality) | Type of Evidence |
|------------------|---|--------------------|--|
| I | Evidence obtained from an experimental study/randomized controlled trial (RCT) or meta-analysis of RCTs | A (High) | Consistent results with sufficient sample, adequate control, and definitive conclusions; consistent recommendations based on extensive literature review that includes thoughtful reference to scientific evidence. |
| II | Evidence obtained from a quasi-experimental study | B (Good) | Reasonably consistent results; sufficient sample, some control, with fairly definitive conclusions; reasonably consistent recommendations based on fairly comprehensive literature review that includes some reference to scientific evidence. |
| III | Evidence obtained from a nonexperimental study, qualitative study, or meta-synthesis | C (Low/Major flaw) | Little evidence with inconsistent results; insufficient sample size; conclusions cannot be drawn. |

Adapted from Newhouse et al. (2007, p. 90).

TABLE 2. Studies on Guided Imagery Utilization in Adult Cardiac Surgery

| Authors and Year | Aim/Purpose of the Study | Sample Size and Characteristics | Study Design and Outcome Variables | Significant Findings | Level of Evidence | Quality of Evidence |
|----------------------|--|---|---|--|-------------------|---------------------|
| Ashton et al. (1997) | Evaluated the effects of self-hypnosis (i.e., guided imagery) on patient's mental and physical condition following CABG. | $N = 32$ ($N = 20$ <i>intervention</i> , $N = 12$ <i>control</i>) CABG patients | RCT (single-blind) Pain, tension/anxiety, depression, anger, vigor, fatigue, confusion, LOS , mortality, and morbidity | Experimental group showed reduction in overall use of pain medication ($p = .046$), tension/anxiety ($p = .032$) postoperatively. No significant difference in ICU ($p = 0.56$) and hospital ($p = 0.86$) LOS compared to controlled group. | I | C |
| Tusek et al. (1999) | Determined the effects of guided imagery on anxiety, pain, and LOS during the perioperative period. | $N = 100$ ($N = 51$ <i>intervention</i> , $N = 49$ <i>control</i>) CABG, valve, LVAD, and "other" cardiac surgery patients | RCT (single-blind) Pain, anxiety, LOS | A significant reduction in postoperative pain, anxiety, and hospital LOS were found in experimental group versus control group ($p < 0.001$). | I | B |
| Deisch et al. (2000) | Replicated Tusek et al. study with additional outcome measures. | $N = 94$ ($N = 47$ <i>intervention</i> , $N = 47$ <i>control</i>) first-time CABG patients | Quasi-experiment Pain , narcotic consumption, anxiety , fatigue, LOS , patient satisfaction | Patients in the guided imagery group had higher satisfaction ratings pre- and postoperatively. Their pain, anxiety, and fatigue levels, LOS were significantly reduced ($p < .05$) when compared to the "usual care" group. No difference in narcotic consumption was found between groups ($p > .05$). | II | B |
| Halpin et al. (2002) | Evaluated outcomes of integrating guided imagery in a cardiac surgery program. | $N = 789$ ($N = 134$ <i>with guided imagery</i> , $N = 655$ <i>without guided imagery</i>), CABG, valve, and patients undergone ASD repairs | Descriptive, nonexperimental Anxiety, pain, LOS, cost, patient satisfaction | Reduced anxiety scores were reported by 41.3% of patients using guided imagery with resultant benefits of feeling calm, comforted, confident, hopeful, and sleepy. Also, a significant difference in hospital LOS ($p = .000$), direct cost per procedure ($p = .001$) and pharmacy direct cost ($p = .002$) were found. No significant difference in mean pain medication direct cost ($p = .462$) and patient satisfaction were found between groups ($p > .5$). | III | B |

(Continued)

TABLE 2. Studies on Guided Imagery Utilization in Adult Cardiac Surgery (Continued)

| Authors and Year | Aim/Purpose of the Study | Sample Size and Characteristics | Study Design and Outcome Variables | Significant Findings | Level of Evidence | Quality of Evidence |
|-----------------------|---|---|--|---|-------------------|---------------------|
| Hattan et al. (2002) | Investigated the impact of foot massage and guided relaxation (i.e., imagery) on the well-being of postoperative CABG patients. | $N = 25$ ($N = 9$ <i>guided relaxation</i> , $N = 9$ <i>massage</i> , $N = 7$ <i>control</i>) CABG patients | RCT (nonblind) Physiological variables (BP, pulse, respiration) Psychological variables (pain , anxiety , tension , relaxation, rest, calm) | No significant difference in all physiological and majority of psychological variables ($p > .05$) within and between groups. Feeling of calm ($p = .014$) was significant in the guided imagery/relaxation group. | I | C |
| Kshetry et al. (2006) | Investigated the impact of CAM package (guided imagery + light massage) on postoperative outcomes. | $N = 104$ ($N = 53$ <i>with guided imagery + massage</i>), $N = 51$ <i>without guided imagery</i>) postoperative CABG patients | RCT (single-blind) Pain , tension , BP, heart rate | Average postoperative pain and tension scores were lower in experimental group versus control group ($p < .001$). No significant difference in BP and heart rate between groups ($p > .05$). | I | B |
| Ikedo et al. (2007) | Evaluated the effect of prayer and relaxation technique (i.e., guided imagery) as adjunct intervention during intra-operative period. | $N = 78$ ($N = 27$ <i>relaxation</i> , $N = 24$ <i>prayer</i> , and $N = 27$ <i>placebo</i>) patients undergone CABG (“ON” and “OFF” pumps), valve, CABG + valve, and “other” surgical procedures | RCT (double-blind, placebo-controlled) Tension/anxiety , depression, anger, vigor, confusion, fatigue, intra-operative outcomes, post-op complications, intubation time, LOS, narcotic consumption | No difference found across outcome variables ($p > .05$). | I | C |

Note. ASD, atrial septal defect; CABG, coronary artery bypass graft; valve, mitral, aortic, tricuspid valve replacements, or repairs; other, major cardiac and aortic surgery, left ventricular modeling; LVAD, left ventricular assist device; LOS, length of stay; RCT, randomized controlled trial.

periods. All studies with two groups used “usual care” as the control group and guided imagery as the intervention/experimental group.

Each article described the administration of the intervention during a pre- and postoperative period, but patients in three studies received the intervention during the intra-operative period as well (Ashton et al., 1997; Halpin et al., 2002; Ikedo et al., 2007). Instructions about indications, benefits, and how to use guided imagery were consistently described in all articles. In one study, patients in the experimental group were instructed to use guided imagery up to 1 week before surgery and 1–2 weeks after surgery, and again up to 1 month after surgery (Ikedo et al., 2007). Outcome measurements were done during each of these time periods. Despite the mixed picture formed by

the reported studies, three variables were found to impact patient care outcomes when guided imagery was added to usual care: *anxiety/tension*, *pain*, and *length of hospital stay*. Other clinically significant outcome variables reported, although not measured in all studies, were fatigue, patient satisfaction, narcotic consumption, and cost (see Table 2).

Anxiety/Tension Reduction

All seven articles (Table 2) reported anxiety/tension as a variable of interest, operationally defined and measured in several ways. Investigators in two studies (Ashton et al., 1997; Ikedo et al., 2007) defined anxiety/tension as a single concept and measured it as one variable, while the majority of the investigators defined anxiety and tension

interchangeably. This is reflected by different approaches of measurements employed, including use of the following tools: profile mood scale, anxiety numeric rating scale, anxiety visual analog scale, and open-ended questions. Overall, a significant reduction in patients' anxiety levels during pre- and postoperative periods was observed in five studies ($p < .05$). Additionally, "feeling of calm" was a significant outcome for patients using guided imagery when compared to those who did not in a very small study that compared guided imagery with foot massage and usual care only ($p < .01$). The anxiety-reducing effect of guided imagery reported by Tusek et al. (1999) was impressive. Using a 0 to 10 rating scale, with 0 = *no anxiety* and 10 = *worst anxiety*, the median scores of patients in the imagery group were significantly lower preoperatively (3.0 vs. 8.0) and on postoperative (POD) days 1 through 5 (3.0–0.0 vs. 6.5–5.0, $p < .01$, respectively) when compared to patients who received usual care only. These results were partially supported by a replication study (Deisch et al., 2000) in which the difference in anxiety levels was high in the usual care group but not statistically significant ($p > .05$), except on POD 2 ($p < .05$). Most importantly, Tusek et al. (1999) found that anxiety can be significantly reduced (–6%) with guided imagery before and after cardiac surgery regardless of the patient's age ($p < .01$).

Some notable descriptive and qualitative findings obtained from patients who used guided imagery included 41.3% of 134 patients reporting an overall improvement in their anxiety levels (Halpin et al., 2002), "reduction in stress," and "a means to help cope post-op" (Ashton et al., 1997, p. 72). However, the mechanism by which guided imagery helped patients create a relaxed state and feeling of calm, as well as the benefit of helping patients cope with stress pre- and postoperatively, was not clearly explicated by the majority of investigators in these studies. The quality of the five studies (Ashton et al., 1997; Deisch et al., 2000; Halpin et al., 2002; Kshetry et al., 2006; Tusek et al., 1999) showing significant reduction in patients' anxiety levels during pre- and postoperative periods varies from "good (B)" to "low or major flaw (C)," and the strength of evidence for using guided imagery to reduce anxiety ranges from "strong/level I" to "weak/level III" (Table 2).

Pain Reduction

Pain was operationally defined and measured by numeric and visual analog rating scales, and an open-ended questionnaire was developed by one research team (Halpin et al., 2002). Six out of seven studies (Table 2) measured

pain as an outcome variable, and three of the six reported a statistically significant reduction in pain levels of patients who used guided imagery postoperatively ($p < .05$); however, findings were mixed. Tusek et al. (1999) reported a remarkable difference in POD 1 through 5 pain scores (0 = *no pain* to 10 = *worst pain*) for patients in the guided imagery group (2.0 to 0.5) versus the control group (7.5 to 5.0; $p < .01$). Moreover, the mean increase in pain scores, expressed as percent (%) change, was significantly lower for the guided imagery group in comparison to the control group (218% vs. 627%, $p < .01$). These results were not fully supported by findings from a replication study by Deisch et al. (2000), which showed a significant difference in pain scores on POD 2 only ($p < .05$), but no significant difference in postoperative pain scores between two groups across time periods ($p > .05$). Pain scores were also significantly lower on POD 1 ($p < .01$) to POD 2 ($p < .04$) for patients who received a CAM package (i.e., guided imagery + usual care) when compared to a group of patients receiving usual care only (Kshetry et al., 2006).

Surprisingly, in Halpin and colleagues (2002) program evaluation study (121 out of 134 participants), a descriptive, nonexperimental research offering a weak evidence showed that 17.9% ($N = 22$) of patients benefited from guided imagery as an effective pain management compared to 70.9% ($N = 86$) who favored pain medication over guided imagery. However, interesting qualitative findings revealed that feelings of calm, comfort, and sleepiness were the common resultant effects of pain reduction in those patients engaged in guided imagery (Deisch et al., 2000; Halpin et al., 2002). Lower pain level, or relief of pain with guided imagery, was frequently associated with a reduction in analgesic (narcotic or non-narcotic agent) consumption (Ashton et al., 1997; Kshetry et al., 2006) and an increase in patient satisfaction (Deisch et al., 2000; Kshetry et al., 2006). Unfortunately, none of the authors provided an explanation of the mechanism of action in which guided imagery alleviates or reduces postoperative pain. The quality of the three studies (Deisch et al., 2000; Kshetry et al., 2006; Tusek et al., 1999) demonstrating significant results on the pain-reducing effects of guided imagery postoperatively is "good (B)" associated with "strong evidence/levels I and II" (Table 2).

Length of Stay Reduction

Five of the seven studies (Table 2) evaluated the effect of guided imagery on hospital *length of stay* (LOS). Three studies (Deisch et al., 2000; Halpin et al., 2002; Tusek et al., 1999) showed a significant reduction in hospital-

ization days in patients who used guided imagery when compared to patients who did not ($p < .01$, $p = .00$, $p < .5$, respectively). The reduction in LOS was associated with increase in patient satisfaction and overall reduction in cost. Halpin et al. (2002) reported a remarkable reduction in mean LOS of patients in the guided imagery group (4.9 days) versus no guided imagery group (6.4 days), $p = .00$. This reduction in LOS was also associated with a reduction in pharmacy and procedure direct costs. The mean direct costs for pharmacy and per procedure for the guided imagery group were US\$942.91 and US\$9,761.00, while the usual care group incurred costs of US\$1,231.42 and US\$11,743.85 ($p = 0.002$ and $p = 0.001$, respectively). The quality of the three studies (Deisch et al., 2000; Halpin et al., 2002; Tusek et al., 1999) supporting the reduction in patients' LOS with guided imagery is "good (B)" but varies in strength of evidence, ranging from "strong/level I" to "weak/level III" (Table 2).

Other Variables of Interest

Some findings, although derived from lower quality studies and not supported by strong evidence, are notable. For example, fatigue was reduced and sleep enhanced with guided imagery (Deisch et al., 2000; Tusek et al., 1999). Moreover, some patients reported feeling calm, comfortable, and relaxed enough to fall asleep after listening to a guided imagery tape (Halpin et al., 2002). A greater sense of well-being was also reported by a small number of patients ($N = 9$) who used guided imagery when compared to those who had a massage as a complementary therapy following cardiac surgery (Hattan et al., 2002). These findings, although not statistically significant, may have clinical significance and impact overall patient recovery, physically, and psychologically.

Discussion

Based on the criteria delineated in the JHNEBP Rating Scale for evaluating strength/hierarchy of evidence in clinical research, the majority of the evidence discussed regarding the effect of a guided imagery program on anxiety, pain, and length of stay in cardiac surgery is fairly strong. However, the marginally low quality of the research can be linked to the mixed results and questionable validity of the findings. Although five studies demonstrated statistically significant differences in anxiety/tension outcomes when guided imagery was added to usual care, only two studies with satisfactory research qualities showed consistent results. Also, of note, the effect of guided imagery in conjunction with other CAM therapy (e.g., light mas-

sage) is not clear. The current evidence for adding guided imagery to usual care in adult cardiac surgery, or combining it with other CAM therapies, is not yet adequate to make a clear determination of its effects on anxiety/tension and/or pain. In addition, links between guided imagery and hospital LOS and cost reduction have yet to be established. The inconsistent findings and lack of definitive conclusions, specifically from a statistical validity standpoint, can be attributed to poor conceptualizations and methodological flaws found in the majority of the research articles.

The majority of the seven studies, with the exception of Tusek et al. (1999) and Deisch et al. (2000), either did not provide a clear conceptualization or the framework selected for the research was not clearly explicated, in which case methodological congruence is obscure. Furthermore, common problems found in these articles include sampling, randomization, duration and method of delivery of the intervention, measurement, and analytical procedure. Sampling consisted of less stringent inclusion and exclusion criteria, exemplified by "mixing and matching" several cardiac surgical procedures in a particular unit of analysis (e.g., group). Most of the investigators failed to report the group difference(s), if any, among the studies consisting of participants with different cardiac surgical procedures (e.g., CABG, valve, ON and OFF pump) in comparison groups. Therefore, interpretation of intervention outcomes (i.e., effect of guided imagery) on a specific type of cardiac surgery cannot be drawn, and a generalization that guided imagery has an impact on anxiety/stress, pain, and length of stay regardless of the nature and type of cardiac surgery cannot be made or denied at this point. Moreover, four out of seven studies consisted of a small sample size for those types of research designs and number of variables studied (Ashton et al., 1997; Deisch et al., 2000; Hattan et al., 2002; Ikedo et al., 2007), producing a low statistical power. Randomization procedure was not clearly described by most of the studies and not specified in one study (Ashton et al., 1997). Variation in the amount/duration and frequency of the intervention was also problematic. Inconsistencies with the "timing" of measurement of outcome variables were common across studies. Problems with analytic techniques were common in some of these studies. For example, one experimental study (Hattan et al., 2002) employed a multivariate analysis in a very small sample. This would not have been an issue for a pilot study, but we cannot make such a determination when we rely solely on the report. Finally, a publication bias, the possibility of having positive results published, cannot be ruled out as most of the investiga-

tors in these studies were key personnel in their hospitals' CAM programs.

Implications for Clinical Practice and Research

This review offers an assessment of the state of the science regarding guided imagery utilization in adult cardiac surgery. Although the evidence supporting its effects on anxiety/tension and pain during the perioperative period and associated impact on hospital LOS is limited, implications for clinical practice and research can be drawn.

We recommend using guided imagery as a nonpharmacologic therapy to complement anxiety and pain medications commonly used in cardiac surgery. This recommendation is based on the fact that there are no known adverse effects associated with guided imagery, whether used as a stand-alone therapy or combined with other CAM modalities (Ackley et al., 2007). Nurses caring for cardiac surgery patients elect to develop a patient care protocol using a commercially prepared guided imagery program in conjunction with usual care to reduce anxiety and pain during the perioperative period. Based on the evidence today, we cannot recommend a specific program (i.e., content/script) or the duration and frequency of the intervention. Further testing involving all types of cardiac surgical procedures, geriatrics/older adults, members of ethnic minorities, and women is needed to firmly establish such a protocol in adult cardiac surgery.

Future research must address the conceptual and methodological problems of the studies discussed in this review for the purposes of limiting threats to internal validity, providing statistically valid and significant results, and enhancing generalizability of the findings. Meeting these conditions are imperative in facilitating the advancement of science surrounding utilization of guided imagery in cardiac surgery. A coherent conceptual framework, along with a clear statement of the mechanism of action by which guided imagery influences a particular clinical phenomenon or variable of interest, must be carefully and thoughtfully crafted during research plan development. Investigators must move beyond comparing guided imagery to "usual care" and embrace a commitment to proving the effectiveness of its mechanism of action. The current lack of methodological precision can be resolved by developing a detailed procedure including randomization, duration and frequency of the intervention, and consistent measurement of time periods. These quality control strategies are paramount for producing valid results and high quality research products. Finally, future studies must include longitudinal designs beyond the hospitalization

period in order to determine long-term effects of guided imagery on the rehabilitation and quality of life outcomes for these patients.

Conclusion

Using guided imagery to reduce or alleviate anxiety and pain as well as decrease hospital LOS in adult cardiac surgery is an increasing prospect that requires further investigation. The science underpinning its use in this population is limited and evolving. Thoughtful conceptualization, design, and rigorous implementation of the research plan are warranted to advance the knowledge. It is imperative for clinical scholars (e.g., doctorally prepared advanced practice nurses) interested in this area of inquiry to move the current knowledge to a more grounded and scientifically sound state, so that research findings can be translated into clinical practice at a faster pace. Based on this review, other clinical nursing phenomena (e.g., depression, fatigue, and sleep disruption) that may be responsive to the effect of guided imagery are also worth investigating. These phenomena and other variables, such as locus of control, self-efficacy, and self-care capability, may have a significant impact on the recovery outcomes, well-being, and overall quality of life of cardiac surgery patients. Research consumers, such as acute and critical care nurses, should exercise sound judgment before translating evidence into practice or changing an existing standard of care based on limited studies. This evidence-based review, the first to address the state of the science for guided imagery utilization in cardiac surgery, provides some answers to the lingering questions and hesitancy to use guided imagery in cardiac surgery and in critical care in general. We hope this review will not be a deterrent factor in continuing to use guided imagery, but instead will stimulate dialogue and interest to further investigate this promising intervention that has potential to significantly impact patient care quality, cost, and recovery outcomes.

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Long QT Syndrome: A Case Report, Genomics, and Clinical Implications

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Long QT syndrome (LQTS) is a hereditary disorder in which the majority of affected individuals present with QT prolongation on electrocardiograms (ECGs), arising from delayed ventricular repolarization. This commonly arrhythmia-associated genetic syndrome can lead to sudden cardiac death (SCD) and increased propensity for arrhythmogenic syncope. The authors describe the case of a young patient who presented with episodes of syncope, prolonged QTc interval on ECG, and family history of SCD. He subsequently received an ICD for protection against SCD based on his prior clinical history. The article discusses the clinical manifestations, electrocardiographic (ECG) findings, management of LQTS, and role of the clinician in testing, teaching, and counseling the affected patients and families.

Keywords: long QT syndrome; genetics; DNP; sudden cardiac death

Long QT syndrome (LQTS) is a hereditary disorder in which the majority of affected individuals present with QT prolongation on electrocardiograms (ECGs), arising from delayed ventricular repolarization (Moss, Schwartz, Crampton, Locati, & Carleen, 1985). This syndrome is commonly associated with sudden cardiac death (SCD) and an associated increased propensity for arrhythmogenic syncope (Collins & Van Hare, 2006; Goldenberg, Zareba, & Moss, 2008). The prevalence of LQTS in the United States is assumed to range from 1/20,000 to 1/2,000; and in fact is one of the leading causes of sudden death in children and young adults (Goldenberg et al., 2008; Moss & Robinson, 2002; Schwartz et al., 2009; Vincent, 2002). While the median age of persons who die of LQTS is 32 years, adolescents and young adults have the highest incidence of SCD (Meyer, Mehdiraz, Salem, Kulikowska, & Kulikowski, 2003). Key to the diagnosis is a resting ECG showing a prolonged QTc interval that generally ranges above 460 millisecond (ms) for women and 440 ms

in men (Roden, 2008). Beta-blockers comprise the mainstay therapy for most LQTS, whereas implantation of an cardioverter-defibrillator (ICD) is another therapeutic option for high-risk patients who experience recurrent cardiac events despite beta-blockers therapy (Moss & Goldenberg, 2008).

This is a case of an otherwise healthy young patient who presented with episodes of syncope, prolonged QTc interval on ECG, and family history of SCD. He subsequently received an ICD for protection against SCD based on his clinical history.

Case Report

The history of this 36-year-old White male included experiencing his first syncope episode at the age of 9. The event was thought to be a seizure and was treated with phenobarbital. At the age of 13, he suffered an out-of-hospital cardiac arrest with ventricular fibrillation being documented

on the ECG after taking a phenothiazine drug. Phenothiazine is known to be one of the QT-interval-prolonging drugs and might have further exacerbated this patient's underlying condition. After he was resuscitated from the cardiac arrest, he was found to have a prolonged QT interval of more than 550 ms on the ECG. He was placed on a beta-blocker by his cardiologist after the event; however, he discontinued use after a year because of excessive fatigue.

He remained symptom-free without medications until he was 29 years of age when he experienced a brief loss of consciousness lasting several seconds. His family called 911 after they witnessed the event. The Emergency Medical Services found his heart rhythm was torsade de pointes, and defibrillated him immediately with a successful restoration of normal sinus rhythm. After this event, his ECG showed a QTc of 445 ms, and a second ECG a few months later revealed a QTc of 474 ms (Figure 1), which led his treating cardiologist to suspect and investigate the possibility of an underlying inherited arrhythmia. His clinical presentation was consistent with a high probability for LQTS using the Schwartz criteria (Schwartz, Moss, Vincent, & Crampton, 1993). The Schwartz criteria is a widely employed scoring system used for the diagnosis of LQTS. The score is based on the total value of related points assigned to ECG features, clinical, and familial history (Schwartz et al., 1993). The higher the total value, the higher the probability of LQTS (Schwartz et al., 1993).

The patient was started on a beta blocker, nadolol 40 milligram (mg) daily by his cardiologist. At the age of 34, when he was still on this regimen, he experienced another episode of loss of consciousness (syncope) with sustained

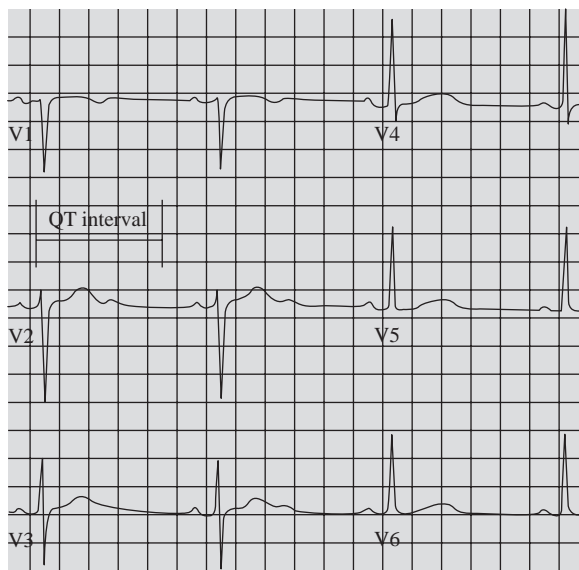


Figure 1. Prolonged QT/QTc on patient's ECG, taken a few months after his out-of-hospital cardiac arrest, the QT is measured as 520 ms.

ventricular tachycardia (VT), being documented on an ECG rhythm strip. Also, because of his further prolonged QT interval of 500 ms and QTc of 540 ms on ECGs, the risk of SCD was deemed to be very high. Finally, after the last event the patient received an implantable cardioverter defibrillator (ICD), which subsequently effectively detected and terminated another episode of ventricular tachycardia (Figure 2).

The family history of this patient highlights the importance of such information in unmasking an underlying inherited arrhythmia. Of note, this patient's sister died at the age of 33 from head trauma sustained during an episode of syncope (Figure 3). She had a history of multiple episodes of syncope and had a borderline QTc on her ECG. Her history is suggestive of LQTS, although she was never treated with any medication. She has an 8-year-old son and 6-year-old daughter, whose QT/QTc intervals were noted to be prolonged. In fact, if she was affected with LQTS, the practitioner would need to be aware that there is a 50% chance of her children inheriting this autosomal dominant condition (Moss & Robinson, 2002).

The patient's first-degree relatives also include a 34-year-old brother with a history of borderline QTc, and two older sisters (20 and 35 years old) both of whom have normal ECGs and no history of syncope. The patient's mother is 64 years old with a reportedly normal ECG. His father is 70 years old with a history of myocardial infarction at the age of 54. Notably, the patient's maternal grandmother died at the age of 93. She had a history of multiple episodes of syncope that usually occurred during emotional stress, hearing a loud noise, or being startled; highly suspicious for LQTS 2 (Table 1).

The patient has a 9-year-old son and a 7-year-old daughter, both of whom had screening ECGs. The son has a QT interval of 480 ms, and the daughter has a QT interval of 463 ms. Although both are asymptomatic, they are taking nadolol 20 mg orally daily and restricted from competitive sports.

Discussion

Long QT syndrome can be either congenital (inherited) or acquired because of drugs or certain clinical conditions. LQTS refers to the inherited version of LQTS that is transmitted from the parent who carries the mutation to a child as an autosomal-dominant disorder. When either parent has the disorder, each child has a 50% chance of being affected (Moss & Robinson, 2002). Approximately four out of five of the identified cases of LQTS are inherited from the parent, with the remaining cases con-

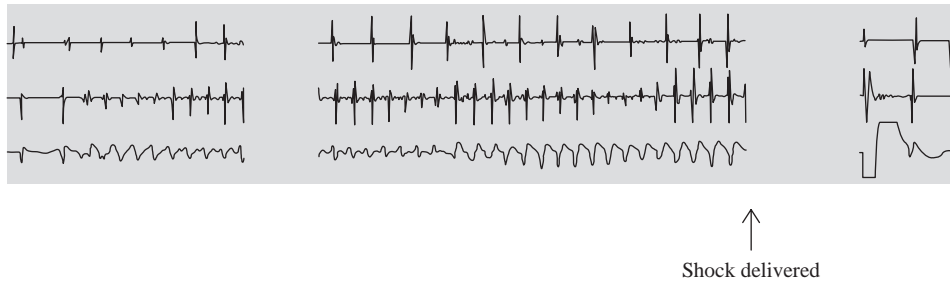


Figure 2. Sustained ventricular tachycardia detected and terminated by the ICD.

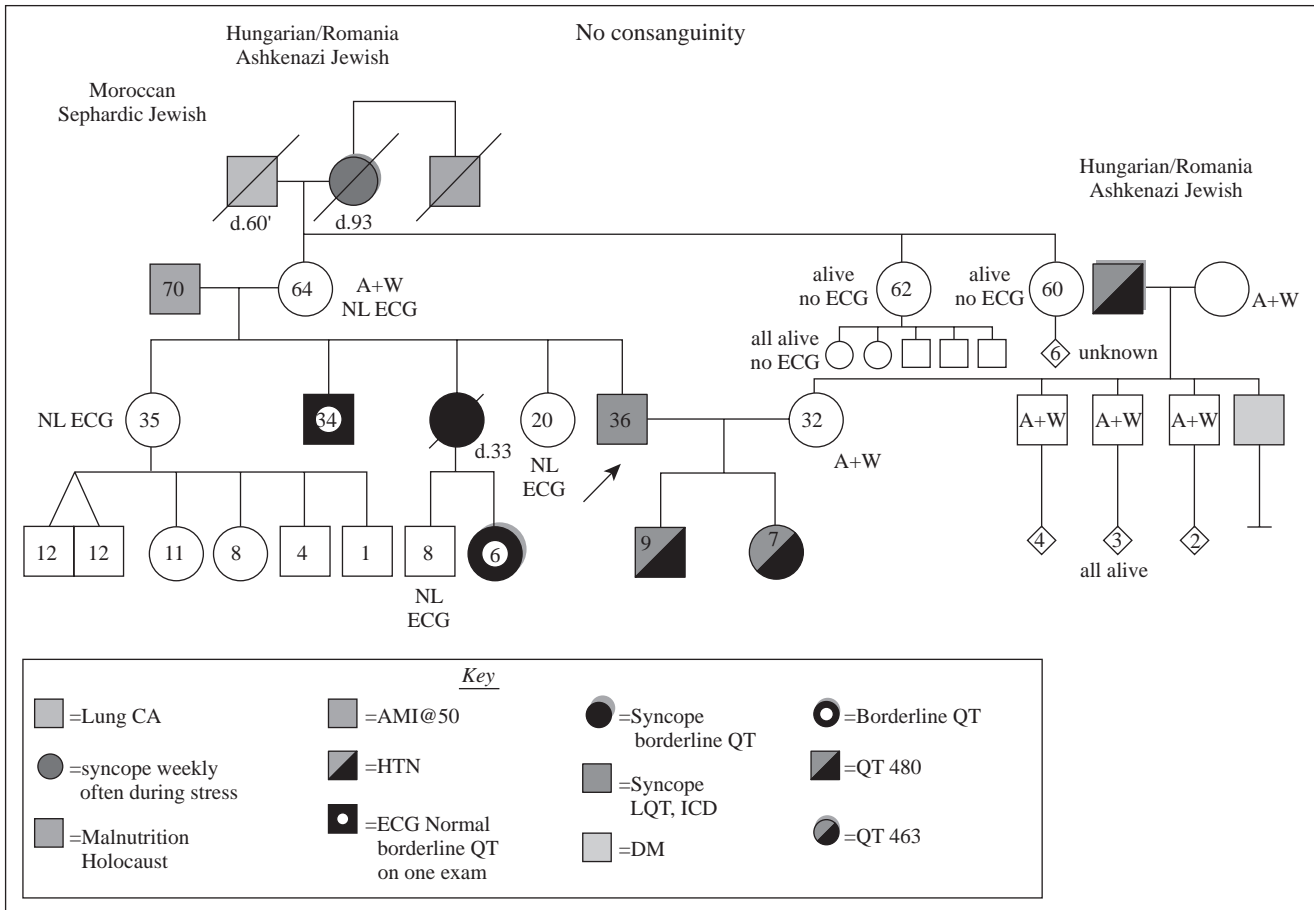


Figure 3. Proband's Pedigree.

Note. A+W, alive and well; AMI, acute myocardial infarction; CA, cancer; DM, diabetes mellitus; ECG, electrocardiogram; HTN, hypertension; NL, normal.


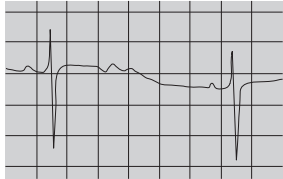
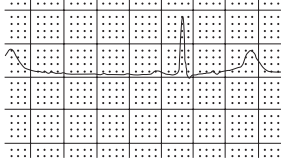
tributed to de novo mutations (Goldenberg et al., 2008). LQTS is found to link to at least 500 mutations of 10 genes that encode for cardiac ion channels important for ventricular repolarization (Moss & Kass, 2005).

An increased duration of the QT interval in the ECG reflects the prolongation of the action potential, and causes the affected individual to be susceptible to life-threatening cardiac arrhythmias. It may arise from (1) a reduction in the outward potassium current caused by either the slowly activating potassium repolarization channel (KCNQ1; LQT1) or the rapidly activating po-

tassium repolarization channel (KCNH2; LQT2) during phase 3 of the action potential; or (2) an increase in the late inward sodium current caused by malfunctioning of sodium channels (SCN5A; LQT3) (Goldenberg et al., 2008; Moss & Kass, 2005).

While most LQTS cases were identified to be type 1, type 2, or type 3, more genetic abnormalities are expected to be discovered in the future to account for some of the remaining quarter or more LQTS patients who have negative genetic testing currently (Collins & Van Hare, 2006; Roden, 2008; Schwartz, 2006).

TABLE 1. Common Forms of the Long-QT Syndrome (Goldenberg, 2008; Moss, 2008; Roden, 2008)

| Variable | LQT1 | LQT2 | LQT3 |
|---------------------------------------|---|--|--|
| Typical resting ECG |  Broad T wave |  Low-amplitude T wave with notching |  Long isoelectric ST segment |
| Chromosome | 11 | 7 | 3 |
| Disease-associated gene | KCNQ1 | KCNH2 | SCN5A |
| Prevalence (% of all genotyped cases) | 45 | 45 | 7 |
| Setting of arrhythmia | Emotional or physical stress, swimming, diving | Emotional or physical stress, sudden loud noise | Rest, sleep |
| QT change with exercise | Failure to shorten | Normal | Supranormal |
| QT shortening with mexiletine | No | No | Yes |
| Beta-blockers | +++ | ++ | Uncertain |
| ICD in high risk patients | +++ | +++ | +++ |

The number of plus signs indicates the relative benefit of therapy in minimal (+), moderate (++), and marked (+++) effectiveness categories. Copyright © 2008 Massachusetts Medical Society. All rights reserved. Reprinted with permission.

The most common symptoms of LQTS include palpitations, dizziness, presyncope, syncope, seizures, and cardiac arrest. Diagnosis is often made after a patient presents with a cardiac event. According to Schwartz et al. (2001), triggers of event are different by genotype. Patients with LQT1 usually have cardiac events during exercise or swimming. Patients with LQT2 may have arrhythmic events preceded by an emotional event, exercise, or exposure to auditory stimuli (i.e., door bells, telephone ring). LQT3-affected patients oftentimes have events while at rest or sleeping (Schwartz et al., 2001). In some situations, LQTS is diagnosed after sudden death of a family member or an accidental finding of QTc prolongation on routine ECG. The value of QTc is QT interval corrected for heart rate using Bazett's rate-correction formula ($QT_c = \frac{QT}{\sqrt{RR}}$) (Bazett, 1920). The upper limits of the QTc are 460 ms for women and 440 ms for men (Roden, 2008).

ECG signs of LQTS include borderline or abnormal QTc and torsade de pointes. The morphologic pattern of the ST segment and T wave largely depends on the time course of the ion-channel currents. LQTS1 heterozygote Romano-Ward syndrome (RWS) patients generally show moderately prolonged QTc with normal to tall amplitude of and a broad-based T wave without a distinct T-wave onset (Moss, 2002). QTc intervals greater than 550 ms and an extremely broad based T-wave are more commonly seen in individuals with LQTS1 homozygote Jervell, Lange-Nielsen (JLN). LQTS2 patients usually have moderately prolonged QTc intervals and low-amplitude

T wave with bifid T waves in the majority of the affected individuals. LQTS2 patients can also sometimes have notched, double-hump T waves. LQTS3-affected individuals often present with late-onset, peaked T waves preceded by prolonged QTc intervals and long, isoelectric ST segments (Moss, 2002). A summary of the ECG manifestation, genetic variation, prevalence, and treatment for the LQT1–LQT3 genotypes is presented in Table 1.

This patient received ICD implantation for protection against SCD. He was subsequently referred for and agreed to genetic counseling and testing. He opted to defer the test when insurance coverage became an issue. However, his clinical symptoms suggest a likely diagnosis of LQTS2. Per geneticist recommendations, if the patient undergoes testing and the mutation is identified, his children will be tested for that particular mutation, as well as his parents, siblings, and his niece and nephew of his deceased sister. His children will continue their beta blockers; as they get older, ICD implantation may be considered. The patient and his family will be counseled regarding genetic testing for the family members. They will be asked to be actively involved in decision making in terms of a treatment plan.

LQTS patients may be initially evaluated by a cardiologist, or cardiac electrophysiologist. Typically, a clinical geneticist or a health care professional trained in the evaluation and treatment of those with inherited arrhythmias or primary electrical disturbances is consulted when patients/families with LQTS are evaluated. In families of patients with genotypically confirmed LQTS, genetic

counseling and further genetic testing of other family members should be discussed as well as the treatment, managements, and triggers to avoid.

Summary

As primary care clinician, the DNP plays an important role by providing the initial ECG screening, collecting useful information, and offering proper referral. He or she can work closely with the clinic genetic specialist, reinforcing education, providing support, detecting alarming issues, and promoting the best outcome of the patient. During an initial encounter with a patient with undiagnosed LQTS, the clinician should be able to recognize the key characteristics of ECG and clinical presentations of this disorder. As part of routine practice, the clinician should always be cautious when prescribing drugs that can cause QT prolongation, especially in those who present with a QT/QTc at the upper limits of normal. (Information on such high-risk drugs may be found at <http://www.azcert.org>.)

When a family member is suspected of having LQTS, the proper individualized interventions—such as providing information regarding useful resources and support groups—need to be delivered in a timely manner. When the diagnosis is made, special education needs have to be evaluated and recognized. As an independent care provider, the DNP has a unique role in coaching, teaching, ongoing monitoring, and resource development. The DNP should educate family members of patients with LQTS regarding the nature of this disorder, factors that trigger cardiac events, and especially noting its genetic basis, advise family members and school teachers to learn the basics of cardiopulmonary resuscitation (CPR). Patients and their families should be involved in the development of the treatment plan and as active care partners.

Since the disease affects all races and ethnic groups, clinicians need to take into account patients' cultural and religious beliefs, personal preferences, and when patients decline genotyping, appropriately counsel patients on the potential consequences and options. New information on LQTS continually emerges in the literature, informing the provider's role in care and management of individuals and families with LQTS.

The prognosis for patients with LQTS treated with beta-blockers (and other therapeutic measures if needed) is good overall. Patients at high risk (i.e., those with aborted cardiac arrest or recurrent cardiac events despite beta-blocker therapy) have a markedly increased risk of sudden death. Their prognosis after implantation of ICDs is excellent.

The role of the DNP as a comprehensive care provider underlines the importance of detecting, treating, and managing LQTS.

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Evaluating the “Innovativeness Quotient” (IQ) in a Collaborative Model

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The health care quality and patient safety movement has evolved rapidly during the past 10 years largely as a result of the Institute of Medicine (IOM) report, “To Err is Human.” Patient safety teams are using a collaborative model to improve patient outcomes. Diffusion of improvement-oriented innovations is a major challenge facing health care. Utilizing a tool to measure innovativeness, a 39-hospital patient safety collaborative was evaluated for their “Innovativeness Quotient.” Findings showed that 75.5% of the members of the collaborative who completed the survey were innovators/early adopters compared to 16% as described for the general population. The application and implications of this project are described.

Keywords: innovation; Rogers’ theory of diffusion of innovation; diffusion; collaborative; collaborate; DNP; innovativeness

The field of health care quality and patient safety has evolved rapidly over the past 10 years as a result of the Institute of Medicine’s report, “To Err is Human” (IOM, 2000). Patient safety teams throughout the United States utilize collaborative models to improve patient outcomes. Many of the teams report success with initiatives while others report difficulty. An innovation can be embraced and diffused quickly throughout one unit while another unit struggles, even in the same hospital. Diffusion of innovations is a major challenge facing health care (Berwick, 2003).

Diffusion of innovations theory describes the spread of new ideas through social systems as they are adopted or rejected by individuals. Researchers have developed the theory for many years in fields outside of health care, primarily in the social sciences. Innovativeness refers to interindividual differences in how people react to these new ideas and accounts for much of their success or failure. Innovators may welcome new ideas; the majority may gradually adopt new ideas; laggards either slowly or never adopt new ideas.

This study reviews the application of the Innovativeness: Openness of Information Processing tool to members of a patient safety collaborative at Beacon, a 39-hospital San Francisco Bay Area Patient Safety Collaborative, with a view toward determining their “Innovativeness Quotient.”

Background

Challenge in Team Building

The challenge of putting together a team committed to innovation confronts leaders of organizations. How does a leader choose team members likely to take an innovation and diffuse and disseminate it throughout the organization, and ensure that it becomes “hardwired” and sustained? A gap was noted in reviewing the health care literature on team development and the identification of innovators. In a systematic review of the literature on diffusion of innovation in service organizations, Greenhalgh, Robert, MacFarlane, Bate, and Kyriakidou (2004) described a body of literature on individual traits

associated with the propensity to use innovations (e.g., tolerance for ambiguity, intellectual ability, motivation, values, learning styles). However, the traits and characteristics of innovators in health care have been largely ignored. A proactive tool to identify innovators in health care was not available.

Developing a tool that would measure an individual's openness to innovation would help leaders in health care quality initiatives. To that end, this project sought to determine if the members of a patient safety collaborative (Beacon) was composed of more innovators/early adopters than the normal percentage within a population as defined by a diffusion of innovation theory developed by Everett Rogers, a major contributor to this field.

One could assume that someone with a higher "Innovativeness Quotient" score would have a more positive attitude toward the innovation, and thus more likely to adopt the innovation, than someone with a lower score. Thus, having a team composed of individuals with high "Innovativeness Quotient" scores would increase uptake of the new idea. Finding a tool to measure openness of information processing would be helpful.

Utilizing a proactive assessment tool can potentially ensure the formation of a group of individuals who by nature are innovators or early adopters of concepts or ideas. This innovative personality type can provide valuable information and assist in getting an initiative off the ground quickly, efficiently, and effectively.

Review of Innovativeness Literature

The literature review revealed little information related to the determination of innovativeness as a global trait of participants of successful quality improvement projects in health care. Most of the studies identified were from business, psychology, management, and marketing.

The interest in innovativeness started in the 1960s when advertising researchers originated the concept of lifestyle (Goldsmith & Foxall, 2003). These researchers developed surveys to determine different lifestyle dimensions.

According to Rogers (2003), the innovation-decision process is one through which an individual or other decision-making unit passes. The stages include: (1) first exposure to an innovation, (2) forming an attitude toward the innovation, (3) deciding to adopt or reject, (4) implementing the new idea, and (5) confirming the decision.

In 1975, Leavitt and Walton (Ohio State University) constructed a scale to measure innovativeness. Their premise was that innovativeness is a psychological trait under-

lying the adoption of new ideas, services, and products. These researchers were from the business and marketing schools of thought. The hope and interest in developing this global tool was to predict time-of-adoption behavior, which is dependent on information utilization and influenced by personality traits (Leavitt & Walton, 1975). One study did show that four of the most commonly utilized scales generally exhibited convergent validity indicating that they were measuring either the same or highly related constructs (Goldsmith, 1986).

Definitions of Innovativeness

There are similarities and differences between the definition of innovativeness by Leavitt and Walton, and Everett Rogers. The authors of the *Innovativeness: Openness of Information Processing* study (Leavitt & Walton, 1975, 1988) defined the trait of "innovativeness" as a person who is open to new experiences and often goes out of their way to experience different and novel stimuli, particularly of a meaningful sort (not just thrill seeking). They have a low threshold for recognizing the potential application of ideas and do not apply suggestions mechanically. The individual is responsive and objective to communication in a selective and constructive way when they see the relevance to their own perceived experience (Leavitt & Walton, 1975, 1988).

Rogers (2003) defined innovativeness as the degree to which an individual or other unit of adoption is relatively earlier than other members of a system. Venturesomeness is almost an obsession with innovators. Their keen interest in new ideas leads them out of a local circle of peer networks. Communication patterns and friendships (even though geographically challenged) among a clique of innovators are common. Having access and control of financial backing is helpful when possible losses from an unprofitable experience occur. The innovator has a propensity for the rash, daring, and risky. Such individuals play a key role in the diffusion of innovation process in that they launch new ideas into systems from outside their boundaries and act as gatekeepers of the flow of new ideas into a system (Rogers, 2003).

The similarities between the definitions are that the degree of adoption is earlier than others in the same system and that they go out of their systems to bring in new ideas. They also both have elements related to the importance of communication channels to obtain the new concepts. One of the differences between the definitions is that the financial aspect emphasized in Rogers's definition is not discussed at all in Leavitt and Walton's. The other

major difference is the transformation of information for their own use, which is present in Leavitt and Walton's definition, but is somewhat inferred in Rogers by the use of venturesomeness.

Innovativeness: Openness of Information Processing

Leavitt and Walton's innovativeness scale is used to predict an individual's adoption of new services. The appeal of using this validated tool in the health care setting was its ease of use (score is the sum of answers). The construct of the tool is that innovativeness is assumed to be a personality trait underlying the adoption of new ideas. Over time the construct was redefined as "openness to information processing" (Leavitt & Walton, 1975, 1988). Innovators are described as individuals open to new experiences and novel stimuli; possessing the ability to transform information about new concepts, ideas, products, or services for their own use; and having a low threshold for recognizing the potential application of new ideas (Bearden & Netemeyer, 1999).

Based on one of the original samples using intercept interviews from ~300 women, the means scores for non-innovators and innovators were reported to be 76.5 and 84.1, respectively (Leavitt & Walton, 1988). Internal consistency reliability was .72 for the form used in the survey (Form B). Goldsmith (1984) reported an internal consistency reliability estimate of .78 for Form B of the scale (Table 1). Craig and Ginter (1975) factor analyzed Leavitt and Walton's (1975) version and identified seven factors: new is wasteful, social desirability, novelty seeking, risk aversion, style consciousness, satisfaction with the status quo, and other directedness.

Methods

Beacon Patient Safety Collaborative

The Bay Area Patient Safety Collaborative, otherwise known as Beacon, was formed in June 2005 with funding from the Gordon and Betty Moore Foundation. The 39 participating hospitals are committed to improving the quality of acute health care and ending harm to patients. By working collaboratively through several mechanisms (e.g., webinars, convening, workshops), hospitals are accelerating the implementation of high impact, evidence-based clinical, and operational practices.

The leadership team of Beacon was approached to participate in the innovativeness survey. After sufficient discussion, tentative approval was obtained from Beacon's

management. The study was approved by the Institutional Review Board of the University of San Francisco. The Beacon Leadership team (eight individuals) was initially surveyed to perform a "small test of change" (Langley, Nolan, & Nolan, 1993) and to address any issues with the tool. It was decided to exclude the language of innovativeness from the consent letter because it was thought that the term may affect individual responses. After the initial findings were shared with the team and all concerns were answered, approval was given to send the survey to the entire Beacon Collaborative membership (1,026 e-mail addresses). The collaborative consists of physicians, nurses, pharmacists, therapists, and others interested in improving patient outcomes.

After the survey was sent to the entire membership, assessment of the "Innovativeness Quotient" of the Beacon collaborative was evaluated using Leavitt and Walton's (1975, 1988) tool titled "Innovativeness: Openness of Information Processing." The survey utilized the same questions, title, and scoring systems as the original survey to allow for direct comparison. The results were compared with Rogers's percentages of innovators and early adopters in groups.

The use of a web-based survey vehicle to administer a questionnaire has been shown to be an effective and efficient way to obtain important information. The names and e-mail addresses remained private from the researcher as the link was sent out by the administrative staff at Beacon using the Constant Comment software that they use to contact members.

The survey was distributed one time to the collaborative members with a 2-week window to complete the survey (October 17–30, 2008). There was minimal cost to utilize the web-based tool, and the results were easily obtained through the website. The web-based survey tool allowed building reports and exporting data to an SPSS worksheet.

All the members of the Beacon collaborative were invited to participate in the survey. Information provided by Constant Contacts confirmed that of the 1,026 e-mails sent to members, 334 were opened (32.5%). Data from Survey Monkey indicated that 134 (13.1%) members started answering the survey and 127 (12.4%) completed the survey. Thus, 40.1% of members that opened the e-mail began the survey and 94.8% of those that began the survey completed it.

A confounder that was considered related to this project was whether those who answer surveys are more likely to be innovators or early adopters than those who don't answer a survey. However, this variable could not be tested

TABLE 1. IRB Application

Study Title: Openness of Information Processing in a Patient Safety Collaborative

1. Background and Rationale:

Innovativeness: Openness of Information Processing (Leavitt & Walton 1975, 1988).

Construct: Innovativeness is assumed to be a personality trait underlying the adoption of innovations. The construct, as involved in the research on which the following measures are based, has been redefined to be termed “openness of information processing” (Leavitt & Walton 1975, 1988). Innovators are described as individuals open to new experiences and novel stimuli; as possessing the ability to transform information about new concepts, ideas, products, or services for their own use; and as having a low threshold for recognizing the potential application of new ideas. The quality and patient safety challenges health care is currently addressing are often led by individuals who appear to be innovators by their embracement of various ways to improve patient care and ensuring positive outcomes. By assessing basic personality traits of individuals who participate in a patient safety collaborative, one can determine whether they are innovators. However, this assessment has not been validated. The findings of this survey can shed light on assumptions made about the types of people associated with the patient safety movement in health care.

2. Description of Sample: The subject population will initially be the Beacon Patient Safety Leadership team and may be expanded to include the entire Beacon Collaborative membership, which includes individuals throughout the San Francisco Bay Area.

3. Recruitment Procedure: Convenience sampling by utilizing the Beacon leadership team and potentially members of the entire Beacon collaborative.

4. Subject Consent Process: The survey will be e-mailed initially to members of the Beacon leadership team. After review of initial results, it will be determined whether to expand the survey to the entire Beacon collaborative.

The survey (Survey Monkey) will have a cover page with a letter that explains the need for the survey, addresses confidentiality, and addresses consent to participate.

5. Procedures: The procedure will be to send e-mail requests to contacts provided through convenience sampling. An electronic survey with 24 multiple choice questions will be provided to participants through a URL link within the e-mail. The 24 basic questions (either Form A or B) are attached, and there may be several “filler” questions added. Each statement of the survey is evaluated in terms of “how well it fits the respondent’s own view” the 5 place scales associated with each statement are labeled as follows: 1. *Strongly Disagree*; 2, *Disagree*; 3, *Undecided*; 4, *Agree*; and 5, *Strongly Agree*. In the original form, item scores are summed to form an overall index. Both positively and negatively worded statements along with several social desirability filler items are included in each form.

The results of the survey will be accessed via the password of the primary investigator. No demographic questions that would reveal the identity of the participants are included.

6. Potential Risks to Subjects: The study presents no risk or inconvenience to subjects other than the inconvenience of time spent answering the survey. Respondents are assured of confidentiality.

7. Minimization of Potential Risk: See above.

8. Potential Benefits to Subjects: Findings from this study will contribute to the body of knowledge related to innovation personality types in patient safety collaborative.

9. Costs to Subjects: None.

10. Reimbursements/Compensation to Subjects: None.

11. Confidentiality of Records: All records will be kept in a secure file in the home of the Primary Investigator. After the data are aggregated and analyzed, the data set will be destroyed.

| | |
|------------------------|------|
| Signature of Applicant | Date |
|------------------------|------|

Signature of Faculty Advisor*

Date

*Your signature indicates that you accept responsibility for the research described, including work by students under your supervision. It further attests that you are fully aware of all procedures to be followed, will monitor the research, and will notify the IRPBHS of any significant problems or changes.

Survey of Members of Beacon Collaborative on Openness of Information Processing

Primary Investigator: Juli Maxworthy, RN, MSN, CNL, MBA, CPHQ

Innovativeness: Openness of Information Processing

Form A

1. I like to take a chance.

2. I don't like to talk to strangers.

3. The unusual gift is often a waste of money.

4. I enjoy looking at new styles as soon as they come out.

5. Buying a new product that has not yet been proven is usually a waste of time and money.

6. Often the most interesting and stimulating people are those who don't mind being original and different.

7. I would like a job that requires frequent changes from one kind of task to another.

8. If people would quit wasting their time experimenting, we would get more accomplished.

9. If I got an idea, I would give a lot of weight to what others think of it.

(Continued)

TABLE 1. IRB Application (*Continued*)

10. I like to try new and different things.
11. In hunting for the best way to do something, it is usually a good idea to try the obvious way first.
12. I like to wait until something has been proven before I try it.
13. When it comes to taking chances, I would rather be safe than sorry.
14. I like people who are a little shocking.
15. When I see a new brand on the shelf, I often buy it just to see what it is like.
16. I feel that too much money is wasted on new styles.
17. I often try new brands before my friends and neighbors do.
18. I enjoy being with people who think like I do.
19. At work, I think everyone should work on only one thing, thereby becoming more of an expert.
20. I like to experiment with new ways of doing things.
21. In the long run, the usual ways of doing things are the best.
22. Some modern art is stimulating
23. I like to fool around with new ideas even if they turn out later to be a total waste of time.
24. Today is a good day to start a new project.

Form B

1. I like to experiment.
2. I like to try new products to see what they are like.
3. The changes in styles, especially in clothes, are a waste of money.
4. I like a great deal of variety.
5. I don't like to take chances if I don't have to.
6. Sometimes original and different people make me uneasy.
7. Unless there is a good reason for changing, I think we should continue doing things the way they are being done now.
8. I start up conversations with strangers.
9. I feel that the tried and true ways of doing things are the best at work and in my life.
10. I like to spend money on unusual gifts and toys.
11. New products are usually gimmicks.
12. I generally like to try new ideas at work and in my life.
13. I like to see what my friends and neighbors think of a product before I try it.
14. I like new styles in clothes, especially those that are really different.
15. I dread having to start another new project.
16. I take chances more than others do.
17. I can enjoy being with people whose values are very different than mine.
18. People who are shocking are usually trying to impress someone.
19. In hunting for the best way of doing something, it is usually a good idea to look at the situation from a completely different angle—one that wouldn't occur to someone.
20. I would like a job that doesn't require me to keep learning new tasks.
21. I like to look at strange pictures.
22. When I see a new brand on the shelf, I usually pass right by.
23. I would not risk my position at work by putting into effect some new idea that might not work.
24. I'm the kind of person who is always looking for an exciting, stimulating, active life.

Note. Although not specified by the original authors, items requiring reverse coding apparently are items 2, 3, 5, 8, 9, 11, 12, 13, 16, 18, 19, and 21 on Form A, and items 3, 5, 6, 7, 9, 11, 13, 15, 18, 20, 22, and 23 on Form B. Recording these items would reflect a higher level of innovativeness. Also, the “filler” items are not included in the above scales.

since it would be unethical to mandate that those who chose not to take the survey would be forced to take it so that their results could be compared to those who took the survey voluntarily. A limitation of the study was the validity of late adopters waiting until there is adequate evidence to make it clear that adoption was worthwhile.

Results

Survey Findings

The findings of the survey were dramatic. Of those who completed the survey, 75.5% (96/127) scored in the inno-

vator/early adopter category according to the validated tool utilized. A sensitivity analysis assumed that all subjects that opened but did not complete the survey (334-127 = 207) were noninnovators. In the sensitivity analysis the percentage of innovators/early adopters was 28.7% (96/334). The Rogers model, which is a broader cross-section of the population, concluded that the 2 sigma percentage of innovators/early adopters is 16%. The findings of the study indicate that the patient safety collaborative consists of a higher proportion 28.7% to 75.5% of innovators/early adopters than Rogers found in the general populations (~16%). The breakdown of other elements can be found in Table 2.

TABLE 2. Survey Data Results

| Results | | | | | | |
|---|-----------|-------------|-------------|-------------|-------------|-------------|
| <ul style="list-style-type: none"> • 75.5% (96/127) of those that completed the survey scored in the innovator/early adopter category according to the validated tool utilized. • Sensitivity analysis 28.7% (96/334) assuming all who opened and did not complete survey are noninnovators. • The Rogers model, which is a broader cross-section of the population, concluded that the 2 sigma percentage of innovators/early adopters is 16%. • The findings of the study indicate that those involved in the patient safety collaborative consists of a higher proportion 28.7%–75.5% of innovators/early adopters than Rogers found in general populations (~16%). • No control group due to the inability to predetermine or define a select group of innovators or noninnovators in any field. | | | | | | |
| Data from Participants of Survey | | | | | | |
| 84 or greater 96/127 75.5% | | | | | | |
| Licenses of Survey Participants | | | | | | |
| License | MD | Pharm | PT | RN | RT | None/Other |
| | 1/3 33.3% | 4/4 100% | 1/1 100% | 61/74 82.4% | 1/2 50.0% | 34/43 79.0% |
| Degrees of Survey Participants | | | | | | |
| Degree | Associate | Bachelor | Master | Doctorate | None/Other | |
| | 7/8 87.5% | 32/36 88.9% | 48/62 77.4% | 5/6 83.3% | 10/15 66.6% | |

Note. Low response rate partially due to incorrect e-mail addresses (2.2% bounce back) and broad e-mail database targeting even those loosely associated with Beacon group (only 30.2% of e-mails opened by recipients, e-mail in previous 3 months). This assumes that only 30.2% of recipients would open any given Beacon e-mail, then response rate among actively engaged Beacon members is 127/1048 (.302) = 40.1% response rate.

Discussion

Benefits of Knowing Team Members “Innovativeness Quotient”

Knowing the “Innovativeness Quotient” of individuals makes it possible to put together quality improvement teams that will have a higher chance of success. The likelihood of rapid change occurring, new ideas generated, and quicker uptake and transfer of information is more likely if the Innovativeness Quotients of the individual team members are known.

For the purposes of developing an effective team, it would be beneficial to identify personnel with the highest “Innovativeness Quotient.” Obtaining the information about “Innovativeness Quotient” of an individual member or an entire team takes only a few minutes and can be done via a convenient on-line survey. The findings of the survey indicate that many who work on patient safety issues are innovators or early adopters. The use of this tool during the formation of performance improvement teams will likely have value for identifying the right people for the team (innovators/early adopters).

This proactive assessment of individuals in a team could provide a great deal of savings in preventive loss of improvement team time. There are also savings in efficiency when implementing performance improvement activities because the right people are likely to be at the table from the beginning. The time required to send the

survey and analyze the results is small, particularly in relation to the potential time savings. This survey is inexpensive to administer and easy to use. Effective performance improvement teams need to be intraprofessional since issues encompass many functions.

Implications for Leadership

The essentials of DNP education were defined by the American Association of the Colleges of Nursing (AACN, 2006). DNP Essential #2 describes the need for organizational and systems leadership for quality improvement and systems thinking. There is an element in Essential #2 that suggests screening of other fields for new approaches to issues in health care.

DNP Essential #4 relates to the interprofessional collaboration for improving patient and population health outcomes (AACN, 2006). Health care professionals must function as highly collaborative teams for safe, timely, effective, efficient, equitable, and patient-centered care in complex environment (IOM, 2001). Advanced preparation a in the interprofessional dimension of health care allows the DNP to facilitate collaborative team functioning.

There are implications for the DNP working in a systems leadership role. Nurses should be prepared with sophisticated expertise in assessing organizations, identifying systems’ issues, and facilitating organization-wide changes in practice delivery (AACN, 2006). Because of its ease of

use and the simplicity of the scoring, the “Innovativeness Quotient” tool could be used by a team leader to identify individuals who have high “Innovativeness Quotients.”

Conclusion

For respondents, the online survey of “Innovativeness Quotient” was considered intuitive and easy to complete. As a tool, the survey and the analysis of the results were simple, quick, and inexpensive. Determining the “Innovativeness Quotient” may have value to organizations interested in building more effective teams. Knowledge of a team’s “Innovativeness Quotient” could potentially increase the potential for diffusion, dissemination, and sustainability of patient-centered initiatives and ultimately save lives.

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Medication Safety in the Elderly: Translating Research Into Practice

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In 1999, the Institute of Medicine (IOM) reported that medication errors are the most common error in health care. If medication-related problems were ranked as a disease by cause of death, it would be the fifth cause of death in the United States. The elderly, a rapidly increasing segment of the population, are at greatest risk for adverse drug events. Suboptimal prescribing in the elderly may involve overuse (poly-pharmacy), the use of inappropriate drugs, and/or omission of drugs that are indicated. The provision of quality care requires that clinicians recognize and prevent drug-related problems in the elderly.

Keywords: Beers criteria; health literacy; medication adherence; potentially inappropriate prescribing in the elderly (PIPE); rational prescribing; quality indicators

Two out of every three patients who visit a health care provider leave with at least one prescription for medication. This is an increase of nearly 60% since 1995. In fact, 81% of adults in the United States take at least one medication during a given week and 27% take at least five (Health Research & Educational Trust, Institute for Safe Medication Practices, and Medical Group Management Association [HRET, ISMP, & MGMA], 2008a). If medication-related problems were ranked as a disease by cause of death, it would be the fifth cause of death in the United States (Lazarou et al., 1998).

The U.S. population aged 65 and older is estimated to increase from 35 million in 2000 to 78 million in 2,050, and the number of those aged 85 and older will increase from 4 million to 31.2 million (The American Geriatrics Society, 2010). The need for geriatricians will increase. As the geriatric patient population increases, there will added responsibility on Doctor of Nursing Practice (DNP) clinicians to enhance their knowledge of medication safety in the elderly.

The Institute of Medicine's (IOM) 1999 study of "To Err Is Human: Building a Safer Health System" stunned many with its conclusion that between 44,000 and 98,000 inpatients die each year from medical errors (IOM, 2000).

Recognizing the growing problem of medication safety in the elderly, the National Committee on Quality Assurance revised its Healthcare Effectiveness Data and Information Set (HEDIS) in 2006, which contains quality measures related to high-risk drugs for the elderly. REF Research continues in this area.

The aim of this review is to discuss factors affecting medication safety in the elderly (health literacy, medication adherence, safety culture, and rational prescribing) and approaches for the clinician to consider (Beers criteria, quality indicator [QI], and e-prescribing) for maximizing safety.

Factors Affecting Medication Safety in the Elderly

Health Literacy

Key risk factors include patients with the following characteristics: elderly, low income, unemployed, less than a high school education, minority ethnic group, non-English speaking or English as second language (HRET, ISMP, & MGMA, 2008b). Pertaining specifically to the elderly, functional deficits such as poor hearing and low vision will impact health literacy. Behaviors and responses that may indicate limited literacy include the following:

reluctance to read materials at the practice, incomplete or inaccurate registration forms, frequently missed appointments, noncompliance with medication regimens, lack of follow-through with laboratory tests, imaging tests, or referrals to consultants, inability to name medications, what they are for, and/or timing of medication administration (HRET, ISMP, & MGMA, 2008b). One study found that 42% of patients could not understand simple instructions on a prescription bottle (Jenkins & Vaida, 2007). All practice staff should be trained to recognize and manage health literacy issues (HRET, ISMP, & MGMA, 2006).

Medication Adherence

Adherence with medications approximates 50%, and non-adherence to medication regimens has shown to be associated with 10% of hospital admissions and 23% of admissions to nursing homes (Vermeire et al., 2001). Factors related to nonadherence should be identified and addressed. The number of barriers identified negatively correlates with a patient's level of adherence. On average, patients identified several barriers to medication adherence: these include efficacy, confidence, alcohol use, and understanding the provider instructions (Vermeire et al., 2001). The best predictors of nonadherence are the number of psychiatric disorders and the complexity of dosing regimens.

In a systematic review of adherence interventions, 49% were associated with increases in medication adherence (McDonald et al., 2002); however, patient education was ineffective as a sole strategy. Adherence increased most consistently with behavioral interventions that reduced dosing demands and involved monitoring and feedback. Simplification of dosing regimens increased adherence 8%–20% (Schroeder et al., 2004). Evidence suggests that once-a-day dosing enhances daily compliance, results in fewer missed doses, and patient compliance with scheduling. Dose simplification to single-pill vs. two-pill dosage significantly increased the persistence with prescribed therapy. Compliance in older adults was higher with dose simplification and unit-of-dose packaging (Schroeder et al., 2004). Compliance was higher when subjects took medication via blister packaging. Subjects with a written medication card had both higher knowledge and increased compliance. Omission errors were the lowest in the group that used both a medication schedule and organizer. Groups of patients that received reminder charts had a higher medication compliance and medication knowledge than those that received counseling only.

The clinician should assess the patient's or caregiver's cognitive capacity to organize, remember, and administer

medications. If the patient intentionally misses doses, assess the reason(s). For all patients on a prescribed medication regimen, monitor the patient with each encounter for medication adherence, medication side effects, lab work (as appropriate) for prescribed medications, and medication effectiveness. Measures of adherence include practical methods such as: asking the patient, noting a treatment response, and attendance at appointments. If applicable or available, other measures include: drug levels, pharmacy refills, and patient self-monitoring. In addition to simplifying regimens, involving the family or significant others is a strategy to increase adherence (Haynes et al., 2002). Effective communication involves assessing adherence at each visit and developing a reminder system.

Culture of Safety

Safety culture is the enduring value placed on worker and public safety by everyone at every level of an organization; it refers to the extent to which individuals and groups will commit to personal responsibility for safety, act to preserve, enhance and communicate safety concerns, strive to actively learn, adapt, and modify (both individual and organizational) behavior based on lessons learned from mistakes, and be rewarded in a manner consistent with these values (Jones et al., 2008). A system for reporting errors should be in place and is supported by a culture that allows for open collection and sharing of data within the practice (HRET, ISMP, & MGMA, 2006). It should be made clear to the staff that errors will be considered opportunities for education, not punishment, and when errors or near misses do take place, all clinicians and non-clinical personnel should be included in the educational effort (Jenkins & Vaida, 2007).

Patient Safety Organizations (PSOs), established under the Patient Safety and Quality Improvement Act of 2005, have the primary mission of improving patient safety and quality. The Physician Practice Safety Assessment (PPSA) provided data for designing web-based tools for medication safety that will target outpatient practices and become an important resource for implementing medication-safety best-practices. Tool topics were selected based on their ability to reduce potential for serious harm, promote positive behavioral change, applicability to most or all practice settings, and ability to be implemented without a large capital investment. When the PPSA was piloted, full implementation of action items related to medication safety scored lowest (40%) when compared to other patient safety measures. The average score in the medication safety domain was 63% (HRET, ISMP, & MGMA, 2008c).

An office culture that fosters open, effective communication is critical to medication safety. Information should be shared among all team members, medication orders are to be read back, problematic abbreviations should be avoided, there should be an awareness of similar drug names (studies have shown that 25% of medication errors are a result of drug names that look alike or sound alike) (HRET, ISMP, & MGMA, 2006), handwriting should be legible, and ideally, the prescribing system should be electronic, as recommended by the IOM by 2010. Labeling and storage may be problematic. Drugs must be separated, with the storage area(s) well-organized and with controlled access (Jenkins & Vaida, 2007).

Rational Prescribing

Evidence-based practice and the concept of “rational prescribing,” as begun by the World Health Organization (WHO) in the 1970s, are intended to reduce inappropriate prescribing and improve patient care (Crigger & Holcomb, 2008). According to the WHO, rational use of medication requires that “patients receive medications appropriate to their clinical needs, in doses that meet their own individual requirements, for an adequate period of time, and at the lowest cost to them and their community” (WHO, 2010). Several studies have shown that 34% of the prescriptions in the United States are unnecessary (Farrell et al., 2003). The influence of drug sampling by the pharmaceutical industry has been shown to promote inappropriate prescribing in studies of physicians (Angell, 2004). Likewise, 82% of nurse practitioners believed that their choices of medications were influenced by the availability of samples. Poly-pharmacy (the use of multiple medications and/or administration of more medications than are clinically indicated) is a consequence of irrational prescribing. Researchers have consistently reported that patients receiving a large number of medications are at higher risk for receiving inappropriate medications (Aparasu & Mort, 2000). Interventions for improving prescribing in practice include: changing institutional policies, marketing strategies, societal factors, and practitioner clinical practices (Figueiras et al., 2001).

Direct-to-consumer advertising is widely used in the United States and exerts a major effect on medication-seeking behavior, a potential contributor to poly-pharmacy. Drug marketing can influence practitioners directly, psychologically, and educationally (Monagan et al., 2003). Research also indicates that the greater the prescribers’ connection with the pharmaceutical industry, the greater the denial of its influence.

Clinical Approaches to Enhancing Medication Safety in the Elderly

Beers Criteria

Beers and colleagues developed criteria to guide clinicians when prescribing medication with the potential for adverse effects in the ambulatory elderly. The Beers criteria were developed in 1991 and applied to nursing home patients; in 1997, it was revised to apply to community dwelling elderly (Stuck et al., 1994). In 2001, Zhan developed criteria for drugs that contraindicated in the elderly, delineating drugs to always avoid, drugs that are rarely appropriate and high-risk drugs which that may have some indications (Zhan et al. 2001). This agent-specific list was revised in 2002 to include: long-acting benzodiazepines, short-duration barbiturates, muscle relaxants, indomethacin, propranolol, propoxyphene, dipyridamole, amitriptyline, and chlorpropamide, to name several (Aparasu & Mort, 2000). Clinicians can refer to the Beers list of 48 individual medications or classes to avoid in patients older than 65, because the risk is unnecessarily high and safer alternatives exist (Jenkins & Vaida, 2007). The original criteria, developed through literature and consensus methodology, comprised medications that are generally inappropriate and those that are inappropriate if recommended dosages or durations are exceeded; several of the medications were deemed inappropriate because there are safer alternatives (Aparasu & Mort, 2000).

The application of the Beers criteria and other tools for identifying inappropriate medication use assists clinicians to plan interventions for decreasing drug-related costs and minimize drug-related problems (Fick et al., 2003). About 30% of hospital admissions in elderly patients may be linked to drug-related problems or drug toxic effects (Hanlon et al., 1997). Adverse drug events have been linked to preventable problems in elderly patients, such as depression, constipation, falls, immobility, confusion, and hip fractures (Bootman et al., 1997). Other studies have found that patient-initiated medication (PIM) use, such as non-steroidal anti-inflammatory drugs (NSAIDs) and benzodiazepines, have been associated with adverse outcomes and increased costs (Smalley & Griffin, 1996).

Quality Indicators

Preventable adverse drug events (pADEs) are estimated at 14.9 per 1,000 person-months. The frequently cited drug-related problems that required hospital admission were inadequate monitoring (45%), patient nonadherence (37%), and dosing frequency errors (27%). In office-based

studies, the three following drug categories were responsible for 86.5% of pADEs: cardiovascular drugs, analgesics, and hypoglycemic agents (HRET, ISMP, & MGMA, 2008b). These practices could benefit from the use of medication reconciliation and building staff awareness of high-alert medications that may require dose reduction and/or medication monitoring, especially in the elderly.

QIs can be applied in practice to identify areas of care in need of improvement and can form the basis of interventions to improve care. Automation of the ambulatory prescribing process has the benefit of enhancing patient safety through computerized transmission of legible prescriptions directly to the pharmacy and checks for harmful interactions. This would also put a check in place if the elder is utilizing more than one pharmacy.

The Assessing Care of Vulnerable Elders (ACOVE) project, a collaboration between RAND Health and Pfizer, Inc., seeks to develop a living set of QIs for the medical care provided to vulnerable older persons. Those who received higher quality care had 10% higher survival over 3 years, supporting the validity of these QIs (Wenger et al., 2007). To be a valid measure of quality, a health-care process must be strongly linked to an outcome that is important to patients. One quarter of the QIs involve medication-prescribing decisions. A chart-based review of pharmacological care of community-dwelling elderly people in a managed care setting applying ACOVE indicators found substantial underuse of appropriate medications (50%), medication monitoring (36%), and education (19%). Overuse of inappropriate medications occurred infrequently (3%) (Shrank et al., 2007).

All vulnerable elderly are recommended to have an up-to-date medication list readily available in the medical record that is accessible to all health care providers and includes over-the-counter medications. Such a list makes it possible to identify potential drug-related causes of new symptoms, define and eliminate inappropriate duplication of therapies, correct dangerous drug-to-drug or drug-disease interactions, and streamline the regimen to improve adherence (Shrank et al., 2007). At each encounter, all medications should be reviewed with the patient, ideally utilizing the “brown bag method,” in which patients bring to the encounter all of their prescription and nonprescription medications. All vulnerable elderly are recommended to have an annual drug regimen review, as this allows an opportunity for the discontinuation of unnecessary medications, as well as the addition of necessary drugs not currently prescribed. Medications prescribed by other providers can be reviewed and documented at this time. If a vulnerable elderly patient is prescribed an

ongoing medication for a chronic medical condition, documentation of response to therapy is imperative. Such an approach will help to clarify whether a drug is meeting the therapeutic goal for which it was prescribed and provides a rational basis for its continuation, modification, or discontinuation (Shrank et al., 2007).

Additional items related to medication reconciliation include: the provision of an up-to-date list of all medications, documentation of medication response and any adverse effects at each encounter, and communication of all medications received when care is transferred elsewhere (hospital, nursing home, home health care) (HRET, ISMP, & MGMA, 2008c). Items related to high-alert medications include: a system in place to track all patients receiving warfarin therapy and monitoring of INRs, written indications for as-needed medications included on the prescription, and establishing a list of high-alert medications prescribed that require direct contact of the provider for renewals (HRET, ISMP, & MGMA, 2008c).

Indicators related to patient information include: having a system in place for a name alert process for patients with the same or similar names, requiring a protocol at each encounter that documents patients’ medication allergies, and standardizing height and weight measurements in the metric system for accurate dosage calculations. In addition, four diagnoses may have a significant impact on medication selection, dosing, and frequency. They are diabetes mellitus, kidney disease, liver disease, and psychiatric disease. A system should be in place to highlight these conditions when medications are prescribed (Jenkins & Vaida, 2007).

Electronic Prescribing

E-prescribing may be defined as the transmission, using electronic media, of prescription or prescription-related information between a prescriber, dispenser, pharmacy benefit manager, or health plan directly (Centers for Medicare & Medicaid Services [CMS], 2009). E-prescribing has the potential for improving health outcomes and was adopted by Congress with the passage of the Medicare Improvements for Patients and Providers Act of 2008. This act requires Medicare to provide incentive payments to successful e-prescribers. Starting in 2012, those who are not successful e-prescribers will receive reduced payment (Curtis, 2008).

A qualified e-prescribing system generates a complete active medication list using electronic data and allows professionals to select medications, print prescriptions, transmit prescriptions electronically, and conduct

alerts. Alerts are written or acoustic signals to warn the prescriber of possible undesirable or unsafe situations, including potentially inappropriate dose or route of administration of a drug, drug-to drug interactions, allergy concerns, or warnings and cautions. The system also provides information on lower-cost therapeutically appropriate alternatives and provides information on formulary or tiered formulary medications, patient eligibility, and authorization requirements. The automation of the ambulatory prescribing process has many potential benefits, including: patient safety, patient satisfaction, avoidance of unnecessary phone calls, and improved formulary compliance (CMS, 2009).

Conclusion

Drug-related problems in the elderly may involve overuse, inappropriate drugs, and omission of drugs that are indicated. Rational use of drugs requires that patients receive medications appropriate to their clinical needs, in doses that meet their own individual requirements for an adequate period of time, and at the lowest cost to them and their community. Since the Beers criteria were revised in 1997, there has been a significant increase in the number of scientific studies addressing drug use and appropriateness in older patients, but there is still a lack of controlled studies in the older population and particularly in patients older than 75 years and patients with multiple co-morbidities.

When prescribing medications for the elderly, clinicians should consider the following factors: health literacy, medication adherence, safety culture, rational prescribing, use of the Beers criteria, measurement of QIs, and electronic prescribing. In doing so, the DNP can be assured of elevating the level of medication safety in the elderly.

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