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The Role of the Nurse in Quality Improvement and Patient Safety

Rola pielęgniarki w poprawie jakości i bezpieczeństwie pacjenta

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Abstract

The role of nurses as health professionals varies greatly throughout the world. What is constant for all nurses is that the nursing profession is expected and committed to serve society and provide high quality and safe health care to all recipients of health care. To that end, safety and quality initiatives are underway across the globe to achieve the best health care outcomes possible based on the implementation of scientific evidence and best evidence-based clinical practices available. The purpose of this paper is to explain how safety and quality improvement (QI) initiatives achieve high quality outcomes for patients and how an understanding of the relationships among research, evidence-based practice, and QI and the role of the professional nurse in QI helps nursing meet its commitment to achieve the best possible care and outcomes for patients. The Model for Improvement is provided as a scientific methodology for QI initiatives in health care. Nurses understand the processes of care including what works well and what does not, and they have the clinical experience and scientific knowledge needed to improve processes of care that lead to more effective patient outcomes. (JNPN 2019;8(1):30–36)

Key Words: quality improvement, safety, outcomes, Model for Improvement, nurses' role

Streszczenie

Znaczenie pielęgniarek, jako fachowych pracowników służby zdrowia, jest zróżnicowane w zależności od regionu na świecie. Jednak stałą i niezmienną cechą charakterystyczną dla tego zawodu jest oddana służba społeczeństwu i zapewnienie wysokiej jakości opieki zdrowotnej i bezpieczeństwa wszystkim chorym. W tym celu na całym świecie podejmowane są inicjatywy związane z bezpieczeństwem i jakością, aby osiągnąć najlepsze możliwe wyniki opieki zdrowotnej w oparciu o dowody naukowe i najlepsze dostępne praktyki kliniczne oparte na dowodach. Celem tego artykułu jest wyjaśnienie, w jaki sposób inicjatywy poprawy bezpieczeństwa i jakości (QI) wpływają na poprawę jakości opieki nad pacjentem oraz jak zależności między badaniami naukowymi, praktyką kliniczną opartą na dowodach oraz rolą pielęgniarki w QI wpływają na realizację zadań pielęgniarki w celu osiągnięcia jak najlepszej opieki i wyników dla pacjentów. Ten model poprawy stanowi metodologię naukową dla inicjatyw QI w opiece zdrowotnej. Pielęgniarki doskonale znają wady i zalety mechanizmów funkcjonujących w opiece zdrowotnej i potrafią doskonale wykorzystywać doświadczenie kliniczne i zdobytą wiedzę naukową w celu poprawy świadczonych usług mających na celu poprawę jakości opieki nad pacjentem. (PNN 2019;8(1):30–36)

Słowa kluczowe: polepszanie jakości, bezpieczeństwo, wyniki, model poprawy, rola pielęgniarek

Introduction

Health care delivery systems and role of nurses as health professionals vary greatly throughout the world in a variety of health care systems. The characteristics of any health care system are based on the social,

political, economic, cultural, technological, geographic, demographic, and legal dimensions of the country and the developmental status and resources of the country. Such characteristics are influenced by the supply and distribution of health care providers. The values of a nation are reflected in the resources dedicated to health

care, access to health care among its populace, and the configuration of the system and care delivery. In turn, the educational and local and national regulatory system within a country influence the roles and latitude of health providers including nursing.

There are both significant differences and commonalities in health care systems, nursing education, and the scope of nursing practice. Worldwide, the nursing profession is committed to provide safe and quality health care and to serve society with a common thread directed at achieving the best possible clinical outcomes for patients and populations. To that end, a number of safety and quality initiatives are underway across the globe dedicated to implementing the best scientific evidence and best practices available to achieve the best possible health care outcomes.

Nurses play an important role in providing quality and safe care because they are the frontline connection with the patient and present in most settings where health care is delivered. Nurses come to work every day for two purposes. The first is to provide the best care possible for the patients and families they serve, and second, to improve current care practices to achieve better outcomes for patients. The nurses' understanding of the processes of care within given settings and cultures enable nurses to see opportunities to improve processes of care to achieve better outcomes. It is through nurse led quality improvement (QI) initiatives that the nursing profession achieves better clinical outcomes.

The purpose of this paper is to explain how safety and QI initiatives achieve high quality outcomes for patients and populations, and how an understanding of the relationship among research, evidence-based practice, and QI, and the role of the professional nurse in QI, helps nursing meet its commitment to achieve the best possible care and outcomes for patients.

Research, Evidence-based Practice, and Quality Improvement

It is important to understand the relationship of research and evidence-based practice (EBP) to QI and what each component brings to the development of quality and safety initiatives. The following briefly defines and describes research, EBP, and QI.

Research

Research is a systematic investigation, designed to contribute to the development of new knowledge which will enhance the profession's approaches to clinical practice. The research process asks questions that a

research protocol seeks to answer. Boyer [1] wrote a seminal report on scholarship that described research as the scholarship of discovery because research discovers knowledge and new ideas [2,3] which in turn are applied to practice. Research findings become the evidence that is used to improve clinical practice.

Evidence-based Practice

Evidence-Based Practice (EBP) is patient care supported by the most relevant evidence from research findings. EBP uses research findings as the basis for clinical processes, decision making, and management of patient care and involves a systematic search, appraisal, and synthesis of research, clinical expertise, patient preferences and values to answer a clinical question. Nurses provide care and make clinical decisions through the integration of patient's values with the best research evidence [4,5]. Nursing practice should integrate the best evidence to guide nursing care and improve clinical outcomes. Practice processes based on evidence generated by research become the steps which are implemented in quality and safety initiatives.

Quality Improvement

Quality improvement (QI) is a systematic approach to improvements in health delivery in specific settings in which data-guided activities and methods are implemented as iterative tests of change to improve processes of care and clinical outcomes. It leads to better health outcomes of patients and related health care services. QI is an example of what Boyer [1] described as the scholarship of application or engagement because QI involves the application of knowledge and expertise within the healthcare discipline with results that can be shared with and/or evaluated by peers [1]. Continuous QI processes are driven by the evidence base that is generated from research initiatives.

Nursing develops and implements quality and safety initiatives to strengthen clinical care processes and improve desired outcomes at the unit and institutional levels. A nursing focus on using EBP in health care settings is not synonymous with a focus on QI. Although nurses may base care and treatment on the most recent research-based evidence, the transition to the implementation of a QI focus requires a different set of skills and processes to improve desired outcomes in the same healthcare settings.

Flow of Knowledge to Practice

Figure 1 depicts the relationship of research, EBP and QI. Research uncovers new knowledge which becomes evidence to support clinical care. Nurses use research evidence to improve clinical practices in clinical settings. Quality improvement flows from research and evidence-based practice to change and improve nursing practices that may not be achieving the best outcomes of care. A QI initiative first evaluates a current system, determines why the system is not achieving the best desired outcomes, and develops new or revised processes to achieve more effective clinical care and outcomes.

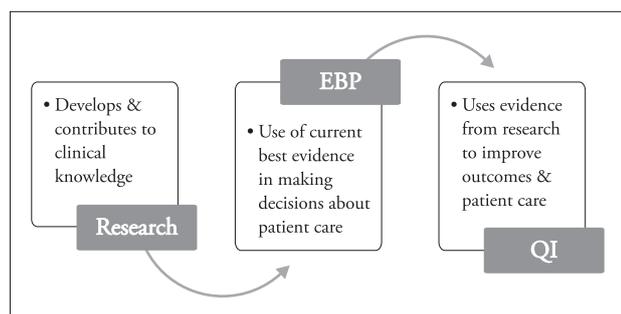


Figure. Flow of Knowledge from Research to Practice to Quality Initiatives

Similarities and Differences between Research and Quality Improvement

There are both similarities and differences between the research studies and QI initiatives. The implementation of a QI project is iterative in nature and the steps of a QI protocol may change during the implementation phase in response to evaluation of what works or does not work to achieve desired clinical outcomes. In contrast, a research protocol is unchanged from beginning to end of the research study to maintain internal consistency, validity, and reliability. Consequently, a QI initiative

may seem to a research-oriented person unstructured or haphazard, lacking the rigor that is the hallmark of a research study.

In contrast, the implementation process of a QI project is iterative and adaptive, and steps in the process may change during implementation. QI methodology is not haphazard despite well thought out changes in the QI initiative protocol due to the ongoing evaluation process, and follows a plan known as trial and learning [6]. The Plan-Do-Study-Act (PDSA) cycle is the framework for a trial-and-learning methodological approach to the ongoing QI evaluation process that suggests better ways to implement clinical care and more effectively reach desired outcomes. Table 1 compares research to QI in seven areas.

What drives a QI initiative is another area of difference between research and QI. In research, there is a problem statement followed by hypotheses that research findings support or dismiss. In QI, the expertise of nurses and front-line providers who use care processes and see what outcomes they are getting in relation to what outcomes they should be getting drive the initiative. Clinical knowledge and experience along with available scientific evidence is the source of knowledge about how to improve processes of care and provide the “hunches” or “theories” that may drive proposed changes. The nurse’s clinical knowledge and experience is powerful in determining clinical outcomes that need improvement and providing safe quality care. It is through the iterative process of PDSA cycles that clinicians apply, test, and modify hunches or personal theories.

Research and QI initiatives both rely on prior research findings as well as evidence from other sources when research findings are not available to determine the focus of the research study or QI initiative. Research findings; provide the evidence that guides nurses to integrate the best interventions to improve care for patients and clinical outcomes, and provide the foundation for evidence based clinical practice. Yet, there are some

Table 1. Comparison of QI and Research

	Research	QI
Inquiry base	Uses prior research, evidence & experience to develop the research question	Uses prior research, evidence & experience to develop the QI initiative
Questions/answers	Seeks answers to clinical problems	Seeks answers to clinical problems
Methods	Systematic data collection	Systematic data collection
Protocol	Systematic: Protocol rigid & unchanged throughout the study	Systematic: Able to change protocol in response to ongoing evaluation process
Data comparison	Compare data from one arm of experiment to a different arm	Compare program/process/system outcomes to baseline data or established set of standards
Results	Answers a research question	Improves a program/process/system that results in greater safety, efficiency, or satisfaction
Goal	Improve patient care	Improve patient care

aspects of clinical care and practice for which there is not a sound research base available. In such cases, reliance is based on best practices. Best practices are defined as the most up-to-date patient care interventions, which result in the best patient outcomes and minimize patient risk of complications or death [7].

Nurses utilize clinical practice guidelines (CPG) to provide safe and consistent care. A CPG is a tool with clinical steps based on scientific evidence and clinical expertise to standardize an approach to clinical care, and improve professional practice and patient outcomes [8]. While the steps of a CPG usually combine research-based evidence and best practices, processes and protocols not based on research findings are difficult to support. For example, an inpatient nursing unit may use evidence-based protocols or guidelines to guide procedures that nurses carry out on a daily basis. With a clearer understanding of the commonalities and differences among research, EBP, and QI, consideration is given to the overriding contributions of all three to supporting quality and safety in health care.

Patient Safety and Quality

A fundamental characteristic and goal of health and health care is patient safety. The IOM notes that the delivery of quality health care and patient safety are indistinguishable from each other [9]. While safety is subsumed within the concept of quality, they are abstractions that do not exist as discrete entities, and are evident by the interaction created between standards (the norms and values) and indicators of quality that guide health care delivery [10]. The stakeholders of health care who include health professionals, organizations, policy makers, and society set quality standards and identify the indicators of quality.

There are many definitions of the terms safety and quality specific to their relationship to health care. Patient safety is defined simply as “prevention of harm to patients” [9]. A related term, medical error, is defined as an unintended, but preventable adverse effect of care, whether or not it is evident or harmful to the patient [11]. A frequently cited definition of quality is “the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge” [11]. Quality is further defined as safe, effective, patient centered, timely, efficient, and equitable; these are clearly indicators of quality [12]. As all definitions of quality imply safety, it is the foundational link to quality upon which all other aspects of quality care are built [12] and subsumed within the definition of quality. Quality care cannot exist without safe care.

The nursing profession’s interest in quality can be traced to Florence Nightingale. In 1855 Nightingale analyzed mortality data from British troops and used that information to reduce mortality rates through changes in organizational and hygiene practices [13]. Quality of care is a global concern as safety and quality transcends national borders and variations in health care delivery models. The World Health Organization [14] estimated that adverse events occurred in approximately 42.7 million of 421 million hospitalizations annually, and it is the 14th leading cause of morbidity and mortality. In high income countries, 1 in 10 patients are harmed while hospitalized, 50% of the injuries were preventable. In low-middle income countries, adverse events are 8% with 30% leading to death; 83% were preventable.

Patient safety and quality is a global concern that affects high, middle, and low income countries. Some countries address the problem based on recognition of its scope and huge impact. The United States (US) experience with safety and quality can serve as a case study worth examining. While Americans believed that the US health care system provided safe and high quality care, research findings did not support this assumption. The findings of a seminal report entitled, *To Err is Human*, noted that 44,000 to 98,000 die each year from medical error [15]. This startling report received the national attention of the general public, health care providers, and policy makers. This report, and reports that followed, told the story of a US health care system in need of fundamental redesign. *To Err is Human* [15] was followed by *Crossing the Quality Chasm* [12], which further elucidated the shortcomings of the US health care system and made recommendations. *To Err is Human* [15] recommended redesign of health care processes, a focus on patient-centered care, development of effective team care, and many other important aspects to support safe care. Other publications about safety and quality of health care followed. The 2010 nursing focused IOM seminal report, *The Future of Nursing* [16] addressed needed changes to optimize the contributions of nursing to safe health care. The key recommendations were that nurses should practice to the full extent of their education and licensure, work collaboratively in teams, and be life-long learners. The report noted that nurses are underutilized professionals who could be a huge part of the solution to an ailing health care system.

The United Kingdom (UK) is a leader in examining their health care system and implementing QI initiatives to improve their safety and health care outcomes. However, in spite of aggressive QI programs to address safety and quality in the United States, the UK, and other countries, there is still a long way to go. Nurses are uniquely positioned to lead interdisciplinary teams as well as to be team members to improve processes of

care. Since nurses are the frontline providers of care 24/7, they understand care processes and how these processes can be improved to achieve better health care outcomes. Because processes of care are complex, and require the input of multidisciplinary team members, nurses must work collaboratively with other team members to address safety and quality issues.

The Science and Model of Improvement

Quality improvement science has developed over the years in a variety of industries from Toyota manufacturing to large scale product distribution. The Institute of Healthcare Improvement (IHI) has been a leader in the United States and internationally in developing the Science of Improvement, a model designed specifically for health care. The Science of Improvement is an approach in healthcare to improve quality, safety and value in systems at the local, state, national, and international levels [17]. The science underlying QI methodology is based on data and components that are observable, and capable of being tested through the scientific method to ensure the validity of the outcomes [18]. One aspect of QI methodology is to recognize that any changes made within a clinical setting, unit, or system should consider the complex nature of clinical systems, and how changes in process or structure can positively or negatively affect the system and people who work within it. Implementers of QI initiatives need to take into account the multiple interactions within a system or organization that must align with each other to work as efficiently as possible. Since the goal of a QI initiative is to change a process to produce more effective outcomes, implementers must assess the current system (i.e. local context), identify needed changes to achieve desired clinical outcomes, and clearly state the steps to disrupt that system to effect positive outcomes [18]. The success of a QI initiative within an organization to make changes that improve quality and safety, depends on people working together, understanding the changing processes, and integrating those changes into the existing system in a way that makes sense and improves the performance of the system [18].

The methodology of a QI initiative is systematic and planned. Any change starts with a clear goal of what outcomes need improvement [17]. The next steps include the development of a plan to achieve desired results. The plan is informed by research, clinical experience, and clinical expertise. QI is an iterative process that begins with small tests of change through PDSA cycles that leads to iterative improved outcomes over a short period of time. The small tests allow the new process to be refined in the given context of the specific clinical setting [17]. Once a process change is established and

working well on a unit, the same QI processes may be applied to other units to achieve the same desired outcomes; this process is known as spread [17].

The systematic approach of QI methodology includes the use of tools such as needs assessment, process maps, and key driver diagrams. These tools and others help the QI team to assess a system, determine what processes are or are not working, identify current system components, and determine how specific changes will impact the overall system [18]. Improvement science combines expert knowledge, tools, and specific methods that incorporate systems theory, clinical science, statistics, and evidence from multidisciplinary fields [17]. The systematic approach of making changes and then observing and measuring the results of the changes to improve desired clinical outcomes is the foundation of QI methodology.

Quality Improvement Science and the Model for Improvement

The Science of Improvement principles are captured in the IHI Model for Improvement [17]. The model is composed of two parts; part one includes three fundamental questions that must be answered to develop the QI project. Part two is the PDSA cycles for testing change and learning. The three questions that comprise part one are examined first. Question 1 asks ‘what are we trying to accomplish?’ The answer is stated in what QI methodology says is a clear aim statement that is (S)imple, (M)easurable, (A)chievable, (R)elephant, and (T)ime sensitive; this is known as a SMART aim statement. Question 2 asks ‘how will we know that a change is an improvement?’ This question implies measurement. You must have baseline data about what you wish to change followed by data that are measured after implementation to see if the desired change occurred. The change process is driven by data that are reflective of the rigor of QI methodology. Question 3 asks ‘what changes can we make that will result in improvement?’ Not all changes lead to improvement of outcomes. Changes may precipitate unintended consequences that make matters worse either in the process itself or in other areas of the system. Therefore, an evaluation of the change must be included to determine the impact of the change.

The second component of the IHI Model for Improvement is the PDSA iterative cycles. As describe previously, PDSA cycles are small tests of change based on observations to see how the process/system responds to the changes made. The PDSA cycle is a trial and learn model. A QI initiative consists of many concurrent PDSA cycles that take place as needed (e.g. daily, weekly, monthly). Improvements and changes are made in small increments and continue with each PDSA cycle until

the desired measurable outcome is achieved. This brief overview of the IHI Model for Improvement helps to explain the model and why nurses as frontline caregivers are well suited to implement QI initiatives at the unit and organizational levels.

Examples of Nurse Led Quality Improvement Projects in Neuroscience Nursing

Quality improvement is an integral part of nursing practice regardless of the practice setting or specialty. The following are brief examples of nurse-initiated QI projects.

Nurses in a neuroscience intensive care unit (NICU) observed that many ventilated patients developed ventilator associated pneumonia (VAP). VAP increases the risk of mortality as well ventilator time, length of stay, and cost of care. Many hospitals have achieved significant reductions in VAP rates, some to zero, by implementing the VAP bundle [19]. A “bundle” is a group of evidence-based best practices, when applied together, result in substantial improvement in addressing a clinical problem. The VAP bundle has been implemented in many ICUs, along with teamwork and communication strategies such as structured multidisciplinary rounds and daily goal setting to wean patients from ventilators as quickly as possible [19]. The nurses conducted a literature review and found implementation of the VAP bundle showed a dramatic decrease VAP. The VAP bundle includes: head of the bed elevation to 30–45 degrees; daily sedative interruption and assessment of readiness to extubate; peptic ulcer disease prophylaxis; deep venous thrombosis prophylaxis; and daily oral care with chlorhexidine [19]. The nurses collaborated with other team members to increase awareness of VAP and the scientific evidence to support the VAP bundle. The physician director and nurse leader agreed to pilot the VAP bundle. In six months, VAP decreased from 12.6% to 1.8%. It also led to shorter stays in the NICU and better patient outcomes.

Nurses working in an acute stroke unit were concerned about the number of patients readmitted with complications. After review of medical records and input from patients and families, the nurses designed a model in which patients would be called by a unit nurse within 48 hours and one week after discharge to assess progress, identify worrisome trends, and provide information and support. With the support of the medical staff, the nurses developed a list of questions to guide the telephone conversation. The questions related to functionality, treatment plan, medications, follow-up appointments, and patient generated questions. Nurses were able to make suggestions to patients and caregivers and, if warranted, provide referrals for medical or other

treatment. Patients and caregivers expressed appreciation for the follow-up calls, information, and reassurance provided. Within three months, the readmission rate within 30 days of hospital discharge dropped from 30% to 5%.

These are but a few brief examples of changes in processes of care that were nurse initiated. The clinical experience and knowledge of the nurses were the basis for improving processes that led to better patient outcomes. These examples underscore the need to work collaboratively with other team members (e.g. physicians, therapists) to recognize problems and find solutions. Most problems are complex and need the input of all team members.

Conclusions

QI science in health care is rapidly developing and being implemented around the globe. Nurses are perfectly positioned to assume a major role in QI initiatives that link quality and safety outcomes because they are the frontline care providers who know how processes of care can be improved. The recognition of the contributions that professional nurses make to safety and quality outcomes is developing with the nurse as an equal partner with physicians in improving patient outcomes. Although the role of professional nurses around the globe varies by country and health care systems, nurses have the ability and expertise to achieve better patient care and outcomes regardless of health care systems. This paper presented an introduction to QI strategies, the nurse’s role in QI and underscored the connection of QI initiatives to safety, recognizing that without safe care there is no quality.

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